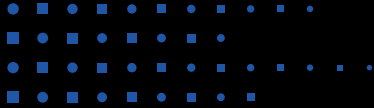
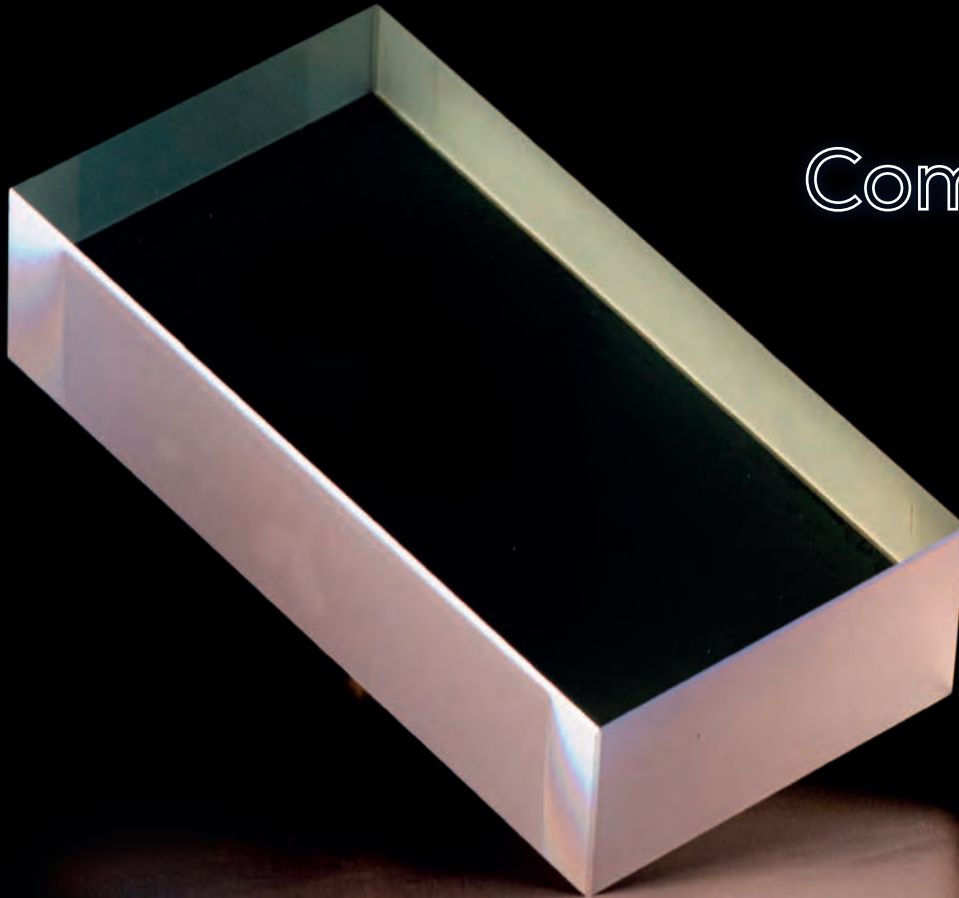




UltraFast
Innovations



Your supplier of custom-made ultrafast optics



Optical
Components

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Our mission and history

UltraFast Innovations is a premium manufacturer of custom-made optics

UltraFast Innovations GmbH (UFI) is a young and dynamic startup located north of Munich at the Forschungszentrum Garching. UltraFast Innovations develops, manufactures and merchandises customer-made optics und devices for ultra-short pulse laser application.

UFI was founded in 2009 as a spin-off from the Ludwig-Maximilians-Universität München and the Max Planck Institute of Quantum Optics, in particular from the reseachgroups of Prof Ferenc Krausz and Prof Ulf Kleineberg. Our roots date back to the inception of chirped mirrors in the 1990s.

UltraFast Innovations has many years of experience, despite its young age.

From the beginning, Prof. Krausz and colleagues pioneered chirped mirror technology and attosecond pulse generation. Over the years, much experience in the theoretical design, reliable manufacture and thorough testing of optics has thus accumulated. This experience has helped crucially in numerous innovations; for instance, in the generation of laser pulses of three femtoseconds duration. It was also the key ingredient in achieving some of the shortest light pulses ever created, at 80 attoseconds duration. Now, we are making this experience available to our customers.

Our products

Our products cover the spectrum from the UV-VIS-IR range all the way to the XUV-range. We are specialized in the design and manufacture of optical elements tailor-made for ultrafast laser applications. We have design and manufacturing capabilities in dielectric optics for laser applications, as well as metallic multilayer structures for X-ray applications. By providing an integral consulting approach to our customers, we help them to find the optics that suit their exact requirements.

We are deeply integrated into ongoing research activities and can implement latest research results into novel products that are tested in real world applications. Our large network of research groups and laser companies helps us to better understand customer needs.

Be a part of a strong and innovative team!

Continuous innovation, strong customer orientation and an effective team are essential to our product development process. Therefore, UltraFast Innovation is continuously looking for highly motivated people with an entrepreneurial spirit.

Please email us your letter of motivation including salary expectation, attaching your complete CV and copies of your degrees, to:

info@ultrafast-innovations.com

or post to:

UltraFast Innovations GmbH
Dieselstr. 5
85748 Garching b. München
Germany

Optics manufacturing



Clean room

We are proud to have facility with the clean room of Class 100 (ISO4). Coating machines: HELIOS and SYRUS installed inside of this cleanroom.

Magnetron sputtering system

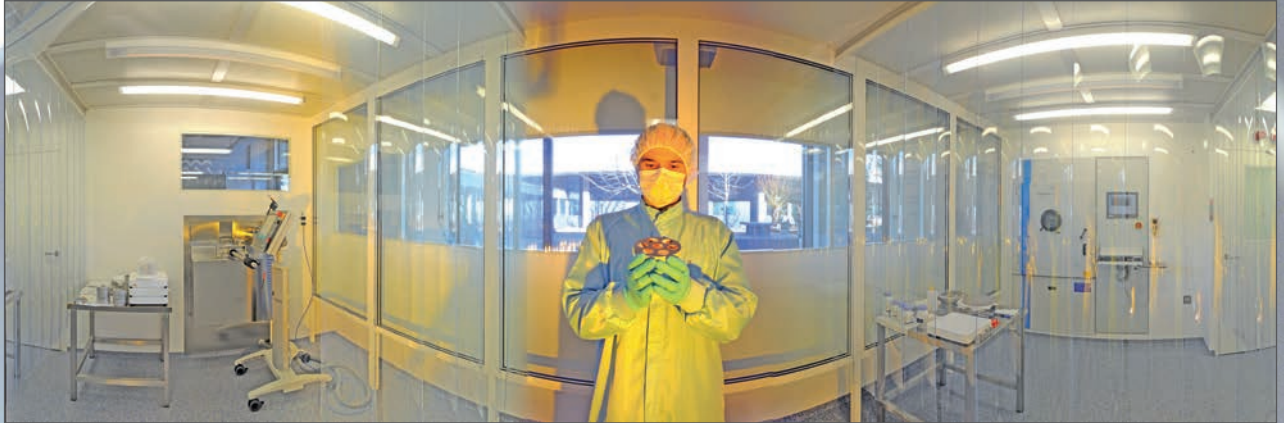
Helios, manufactured by Leybold Optics, is equipped with two magnetrons and a plasma source, thus providing plasma/ion-assisted reactive dual magnetron sputtering. The produced coating films have very dense layers which results in the following advantages:

- extremely shift-free layers
- mechanically and thermally stable layers
- low scattering losses
- high damage threshold

The system covers the spectral range 200-4500 nm and can coat substrate diameters up to 100 mm.

Ion-beam deposition system

The Nexus IBD-O, manufactured by Veeco Instruments is equipped with two inductively coupled ion beam plasma sources. The second plasma source may be used for optional ion beam assisted deposition. In-situ spectral ellipsometry (NIR-UV) allows sub-nanometer process control during deposition. Ion-beam deposition is known to produce very dense and smooth layers in a stable process. The UHV background vacuum pressure of 10 torr ensures clean layers.




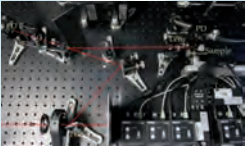

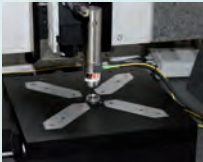
All that is essentially important for XUV mirrors, where each deposited layer is limited to 1-5 nm thickness and tens to hundreds of layers are formed. Up to 8 inch substrates can be loaded using a load-lock system.






Electron-beam evaporation system

SyrusPro-710 by Leybold Optics is an e-beam system. It has a novel process control that features maximum automation allowing high throughput and fast turnover. Electron-beam evaporation is mainly employed for non-dispersive coatings. Syrus can handle large-scale optics with diameters up to 265 mm. It can be used for the spectral range from 200 nm to 10 μm .

Optics characterization and quality control

The following tools are available at UltraFast Innovations to verify the outcome of the coating process. Optics can be characterized with regard to their reflectivity, dispersion, surface quality and damage threshold. For the most challenging optics designs we will perform test coating runs before the actual coating.

Optics characterization and quality control		
Optical microscope	Digital optical microscope VHX-600 DSO from Keyence has objective with factor changes in range X500 up to X5000. Thanks to its sharp objective it is capable to take 3D pictures of surface. Microscope is used for the surface inspection.	
Laser Induced damage threshold (LIDT)	For high-power applications, the damage threshold of optics is critical. We can systematically measure the onset of optical damage by means of femtosecond laser systems and microscopic instruments. The measurement is performed with 50 fs and 1 ps pulses and a fluence up to 4.4 J/cm ² . Measurement can be performed as at kHz as well as at MHz repetition rates.	
Design Software	In close collaboration with Optilayer software team, we have developed a special version of Optilayer. This version allows us to design the broadest dispersive mirrors so far, covering 1.5 octaves. We have capabilities in design, preproduction and post-production analyze of dispersive mirrors.	
Atom Force Microscope (AFM)	AFM from Fries Research & Technology GmbH is a very high-resolution type of scanning probe microscopy, with demonstrated resolution on the order of a few angstrom. The surface roughness measurement with AFM has to be performed to keep scattering losses under control.	

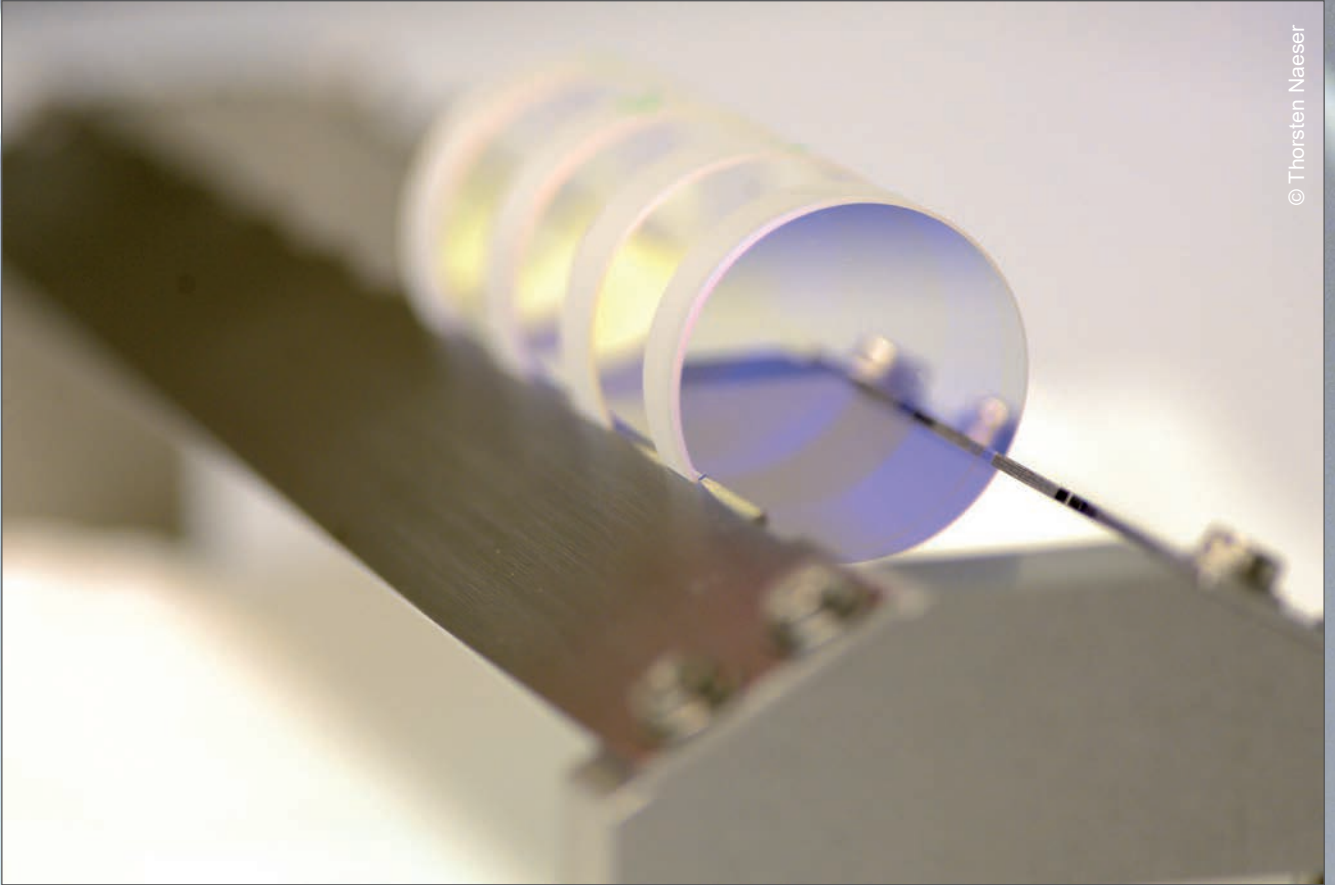
Optics characterization and quality control		
Transmission and Reflection measurements	Spectrometers have an absolute accuracy of 0.1 % and are working in range of 170 – 3300 nm.	
Absolute reflectance measurements	Our precision reflectometer and optical loss-meter utilizes the cavity ring-down technique to determine reflectance and losses in thin films at 808, 1030 and 1550 nm with sub-ppm-level precision. Reflectances from 98 % to 99.9995 % can be precisely determined.	
Absolute absorption measurements	Our precision absorbmeter utilizes the laser calorimetry technique to determine absorbance in thin films at the 1030 nm with sub-1-ppm-level precision.	
GD and GDD measurements	White-light interferometry allows measuring dispersion characteristics of mirrors. It is based on a Michelson interferometer measuring the delay of different spectral components of the white spectrum in a tested mirror at different delays of one of the arms. It operates in the spectral range from 250 nm to 2.2 μm with an accuracy better than 5 fs ² .	
Surface roughness and figure measurements	A cantilever in the Dektak 150 Stylus Profiler from Veeco scans the surface profile of a sample mechanically along one axis with few nanometer resolution. Measurement series yield 3-D surface profile pictures and can be used as easy characterization tools to measure film thicknesses, stress and surface roughnesses over a surface up to 200 mm.	

Optics consulting and design

Designing customized optics is a process that demands deep knowledge in the production, as well as in the application of optics. At UltraFast Innovations, we can offer you both: upon first contact, we will provide consulting for your optics problem. Be your application industrial or scientific, our experimental knowledge helps us to find the most suitable solution to fit your needs.

In a second step, we will simulate optics designs and perform pulse analyses according to your requirements. Our design software includes algorithms to reduce the number of layers and to eliminate thin layers in the design. Furthermore, we can perform an error analysis with regard to errors in layer thickness and layer refractive indices. Consequently, the sensitivity of each coating to manufacturing tolerances can be evaluated and different coating options ranked accordingly.

In close collaboration with Optilayer software team, we have developed a special version of Optilayer. This version allows us to design the broadest dispersive mirrors so far, covering 1.5 octaves. We have capabilities in design, preproduction and post-production analyze of dispersive mirrors.



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Ultrafast Optics



© Thorsten Naeser

Ultrafast Optics

The goal of generating short laser pulses down to the limit set by a single wave cycle of light has been pursued ever since the invention of lasers. Laser pulses consisted of only a small number of wave cycles allow more efficient exploitation of nonlinear optical effects with implications as striking as the generation of single sub-femtosecond light pulses. The controlled superposition of light frequencies extending over more than one octave together with carrier-envelope phase control pave the way for shaping the sub-cycle evolution of light fields in laser pulses.

Here, we provide an overview of dispersive multilayer optics offering high reflectivity and controlled group delay dispersion (GDD) over some 1.5 octaves spanning ultraviolet to near infrared frequencies.

A DM is a dispersive optical interference coating usually designed by optimizing the initial multilayer design [Szipöcs R., Spielmann C., and Krausz F, (1994), 'Chirped multilayer coatings for broadband dispersion control in femtosecond lasers', *Opt. Lett.*, 19, 201–203.]. A DM is characterized by a certain value of the GDD, the second derivative of the phase shift on reflection with respect to the angular frequency. A DM can provide the broadband spectrum with support, comparable with prism and grating pairs, but additionally it offers control of third and higher-order dispersions and higher efficiency (reflectivity) together with better beam stability. Reflection from the top layer of a multilayer structure brings so-called ripples to the spectral GDD curve due to interference between waves reflected from the top layer and waves which have penetrated and been reflected from deeper. Ripples become pronounced in the case where air is an incident medium. In general, the mirror GDD should compensate material (through which the initially short pulse passes) or the (nonlinear) pulse chirp so that the residual dispersion fluctuations are acceptably small in all of the relevant spectral range. Usually, during design optimization, residual fluctuations drop to a low level. The GDD fluctuations can broaden the pulse and lead to energy transfer from the initial single pulse to satellites. The period of the ripples in the spectral domain determines the position of the satellite in the temporal domain, and the amplitude of these oscillations determines the amount of energy which transfers into the satellite.

Several approaches have been devised for suppressing undesirable oscillations:

Double-chirped mirrors:

Kärtner F. X., Matuschek N., Schibli T., Keller U., Haus H. A., Heine C., Morf R., Scheuer V., Tilsch M., and Tschudi T., (1997), Design and fabrication of double-chirped mirrors, *Opt. Lett.*, 22, 831–833.,

Matuschek N., Kärtner F. X., and Keller U., (1999), Analytical design of double-chirped mirrors with custom-tailored dispersion characteristics, *IEEE J. Quantum Electron.*, 35, 129–137.

Back-side-coated DMs:

Matuschek N., Gallmann L., Sutter D. H., Steinmeyer G., and Keller U., (2000), Back-side-coated chirped mirrors with ultrasmooth broadband dispersion characteristics, *Appl. Phys. B*, 71, 509–522.

Complementary pairs of DMs:

Laude V. and Tournois P., (1999), Chirped mirror pairs for ultrabroadband dispersion control, in *Digest of Conference on Lasers and Electro-Optics (CLEO_US)* (Optical Society of America), 187–188.

Tilted-front-interface DMs:

Tempea G., Yakovlev V., Bacovic B. and Krausz F., (2001), Tilted-front-interface chirped mirrors, *J. Opt. Soc. Am. B*, 18, 1747–1750.

Brewster-angle” DMs:

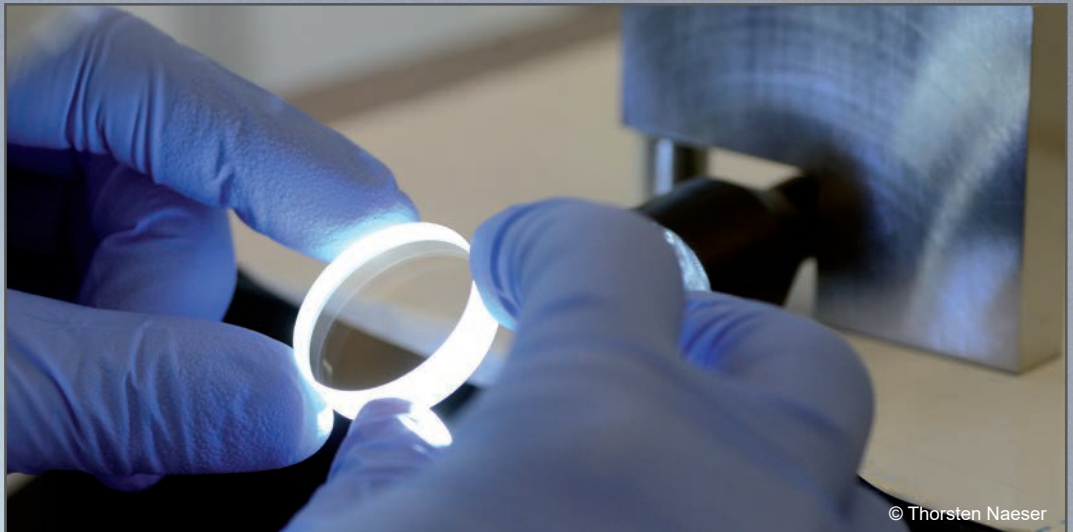
Steinmeyer G., (2003), Brewster-angled chirped mirrors for highfidelity dispersion compensation and bandwidths exceeding one optical octave, *Opt. Express*, 11, 2385–2396.

Double-angled DMs:

Pervak V., Ahmad I., Trubetskov M. K., Tikhonravov A. V., and Krausz F., (2009), Double-angle multilayer mirrors with smooth dispersion characteristics, *Opt. Express*, 17, 7943-7951.

Our company uses any of those invented approaches to fit in the best way your needs. Below a few examples and more details on pros and contra of those approaches for DM with $R > 99\%$ and $GDD = -50 \text{ fs}^2$ in bandwidth 600-1000 nm. Range 600-1000 nm is range covered by broadband Ti:Sapphire or by system with hollow-core system.

Mirrors



Mirrors-Overview

Name of mirror/application	Ultra-broadband dispersive mirrors (PC, IR)	Dispersive mirrors	High-dispersion mirrors (HD)	Beam splitters (BS)	Ultra-high-reflection mirrors (UHR)
Hollow-core fiber compression (sub-3-5 fs)	***	*	*	***	*
Broadband oscillators (3-5 fs)	***	*	*	*	*
Ti: Sapphire Oscillators 10-20 fs	**	**	**	*	*
All – dispersive mirrors compressor (prism/grating free compression)	*	**	***	*	*
Input coupler	*	*	*	*	*
Output coupler	*	*	*	*	*
Yb:YAG oscillators (@1030 nm)	*	**	*	*	*
Transport mirrors	*	*	*	*	*
Enhancement cavities	*	*	*	*	***
Wavesynthesizer	***	**	*	***	*
OPCPA	***	**	*	**	*
IR Application	***	**	*	**	*

Spectral filters (F)	Metal coating (M)	Anti-reflection coatings (AR)	Positive dispersive mirrors (PD, IR)	Third-order dispersion mirrors (TOD, IR)	Output and input couplers (OC, IC)
*	*	**	**	*	*
*	*	**	**	***	***
*	*	**	**	*	***
**	**	*	**	**	*
*	*	***	*	*	***
*	*	***	*	*	***
*	*	*	***	*	***
**	***	*	*	*	*
**	*	*	*	*	***
*	**	**	*	*	**
*	*	*	*	**	**
**	***	*	*	**	***

Ultra-broadband dispersive mirrors

Ultra-broadband dispersive mirrors

Our ultra-broadband compression mirror sets are available in many configurations. In particular for the near infrared spectral region we can realize up to 1.5 octaves of bandwidth covering wavelength range of 400-1200 nm. These mirror sets can be employed for pulse compression at chirped-pulse Ti:sapphire amplifier systems, for broadband oscillators and other applications. Customers have reached pulse durations down to 3 fs after spectral broadening in hollow-core fibers and gas cells with mirrors designed and manufactured by UltraFast Innovations. References and publications are available upon request.

The mirror GDD should compensate material (through which the initially short pulse passes) or the (nonlinear) pulse chirp so that the residual dispersion fluctuations are acceptably small in all of the relevant spectral range. Usually, residual fluctuations drop to a low level during design optimization. The GDD fluctuations can broaden the pulse and lead to energy transfer from the initial single pulse to satellites. There are many design approaches which allow us to obtain GDD with low oscillations. All possible design approaches are available at Ultrafast Innovations:

Complementary pair DM

Complementary mirror pairs were invented to overcome the fundamental problem of dispersion oscillations. Still, some residual ripples remain due to fluctuations in manufacturing. Using two different mirrors for which the GDD curves have the same oscillations and are shifted by only half a period the average GDD curve has lowest possible oscillations. Such a design can be realized easily for a pair of DMs covering less than 1 octave.

Double-angled DM (invented in 2009 by our co-worker Dr. V. Pervak)

UltraFast Innovations offers the next generation of ultra-broadband chirped mirrors: double-angle dispersive mirror technology. In 2009 we suggested a novel concept for suppressing GDD oscillations in broadband wavelength range. It is based on identical DMs used at two different angles of incidence in combination.

The “double-angle” DMs offer:

- i) better manufacturing stability compared to the conventional complementary-pair approach;
- ii) reduced manufacturing costs compared to the complementary-pair approach which requires two perfectly matched coating runs;
- iii) double angled mirrors produced within different coating runs may be combined together.

Brewster angle DM

Placing a DM at the Brewster angle for the top layer ensures only a small amount of Fresnel-reflected light resulting in oscillation-free GDD curve. P-polarized light at large angles (f.i. the Brewster angle of fused silica is $\sim 56^\circ$) requires a significantly higher number of layers and greater total optical thickness compared to normal incidence. The Brewster angle DM can be used in an extra-cavity application where angle of 55.6° is easily realized. Contrarywise, the intra-cavity beam bounces at a small incidence angle making it unrealistic to use the Brewster-angle CM as a laser oscillator mirror. CM as a laser oscillator mirror.

Many dispersive mirrors from UltraFast Innovations are available as double-angle optics. Please inquire whether your application can make use of this novel technology.

Please browse UFI's design database for following examples:

(<http://www.ultrafast-innovations.com/index.php/database>)

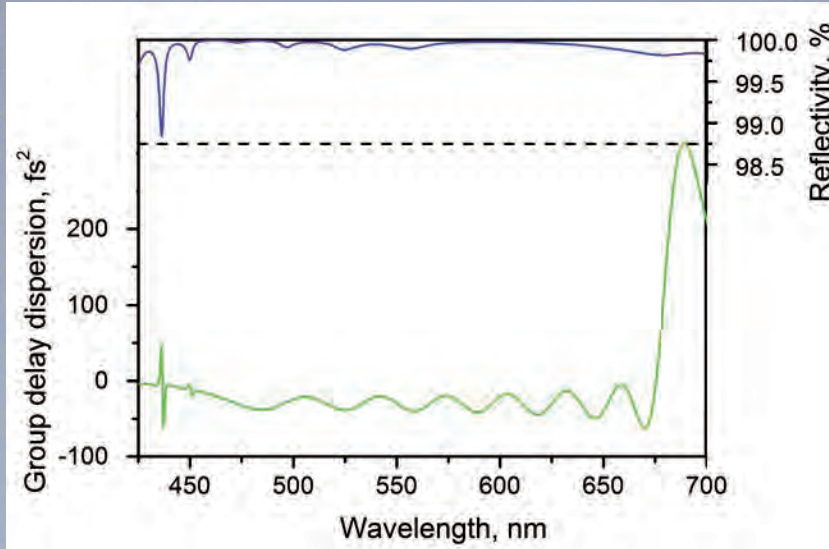
PC5, PC9, PC42, PC45, PC47, PC52, PC61, PC70, PC305

Applications
Pulse compression after spectral broadening in hollow-core fibers or gas cells
Cavity mirrors for ultra-broadband laser oscillators

See also literature for further information and application:

- T. Ganz et al. Optics Letters, Vol. 36, Issue 7, 1107-1109 (2011)
- V. Pervak et al. Opt. Express 17 7943 (2009)
- T. Nagy et al. Opt. Lett. 36, 4422 (2011)
- T. Witting et al. Opt. Lett. 36 1680 (2011)
- I. Ahmad et al. Applied Physics B 97, 529 (2009)
- S. Zherebtsov et al. Nature Physics 7, 656-662 (2011)
- J. Rauschenberger et al. Laser Phys. Lett. 3, 37 (2006)
- J. Seres et al. Appl. Phys. B 82 513 (2006)

BROAD-BAND DISPERSIVE MIRROR PC 120_RC1



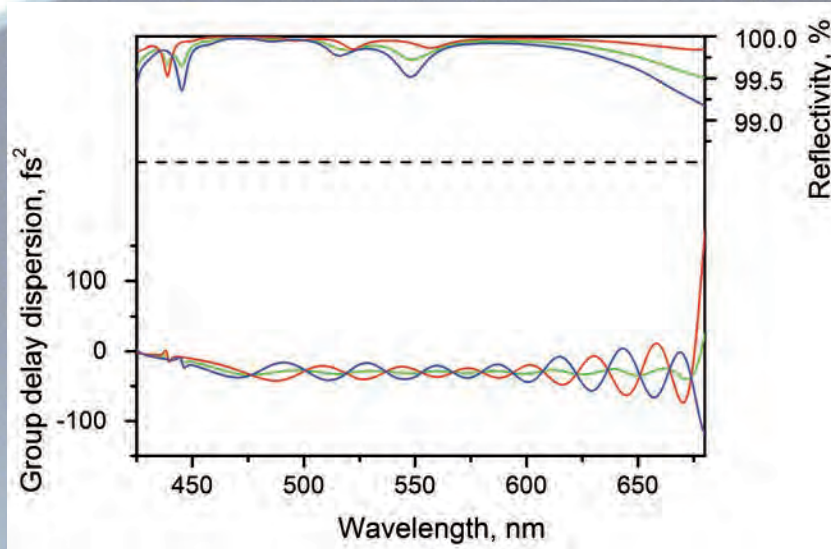
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	450 nm
Spectral working range high end	675 nm
Central wavelength	562 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	20 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



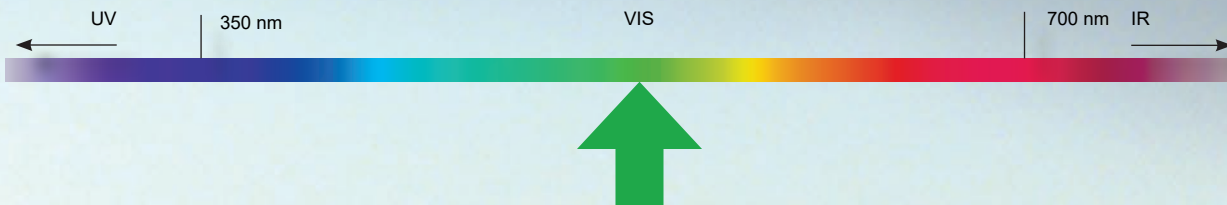
BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 120_RC2



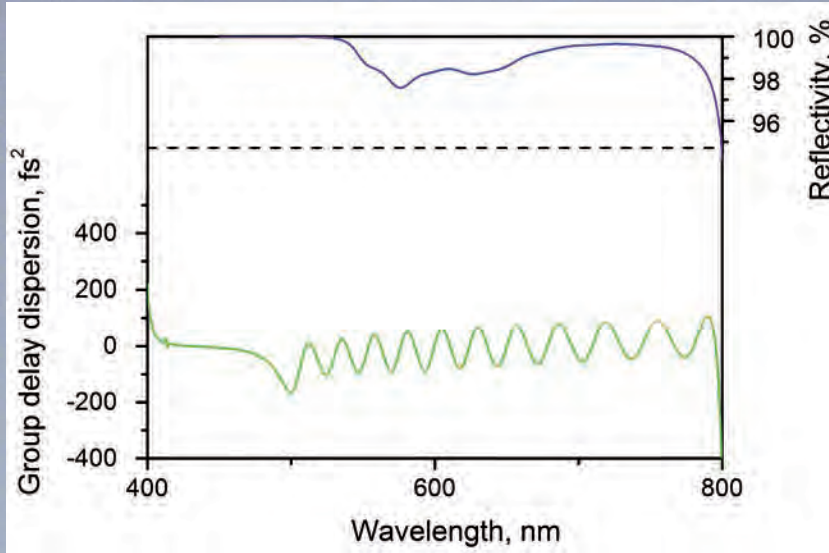
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	450 nm
Spectral working range high end	675 nm
Central wavelength	562 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	5 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 109_RC1



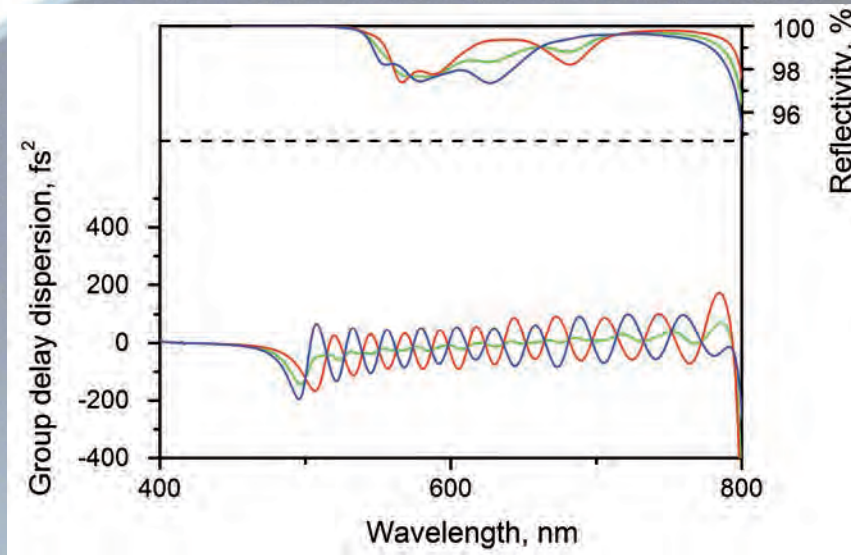
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS
Spectral working range low end	500 nm
Spectral working range high end	800 nm
Central wavelength	650 nm
Nominal GDD	-25 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 97 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 109_RC2



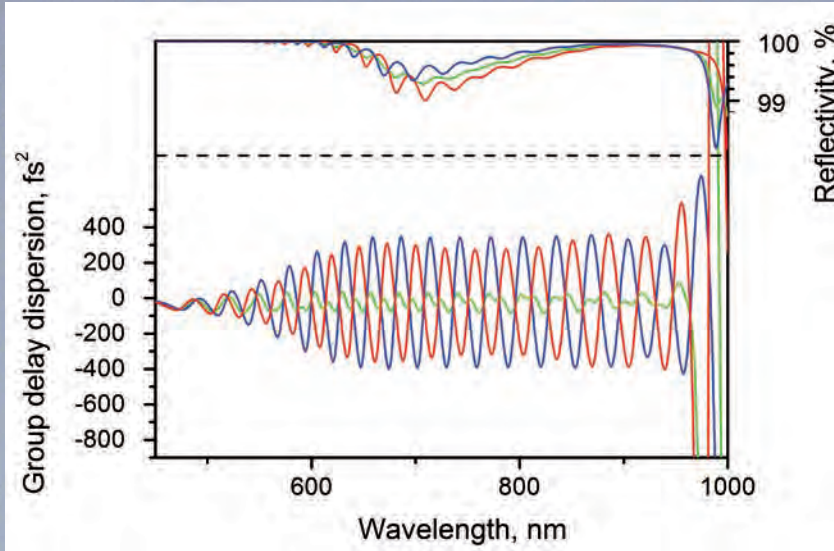
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	P

Spectral category	VIS
Spectral working range low end	500 nm
Spectral working range high end	800 nm
Central wavelength	650 nm
Nominal GDD	-25 fs ² *
Nominal GDD maximum deviation	15 fs ²
Minimum Reflectance	> 97 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 37_1



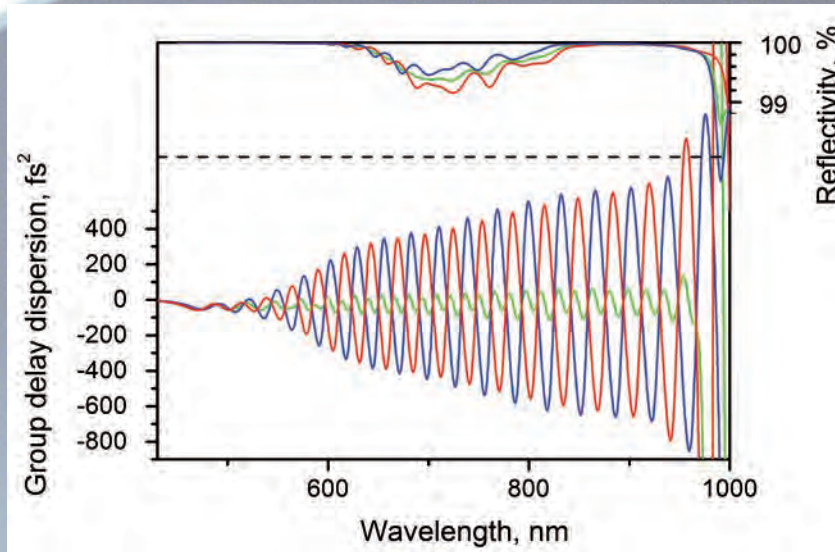
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	s

Spectral category	VIS-IR
Spectral working range low end	450 nm
Spectral working range high end	950 nm
Central wavelength	700 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 37_2



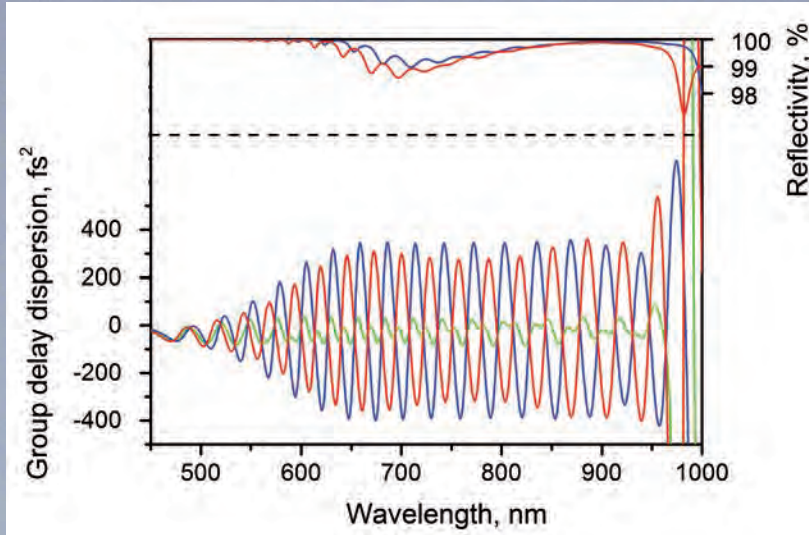
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	s

Spectral category	VIS-IR
Spectral working range low end	450 nm
Spectral working range high end	950 nm
Central wavelength	700 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	80 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 37_3



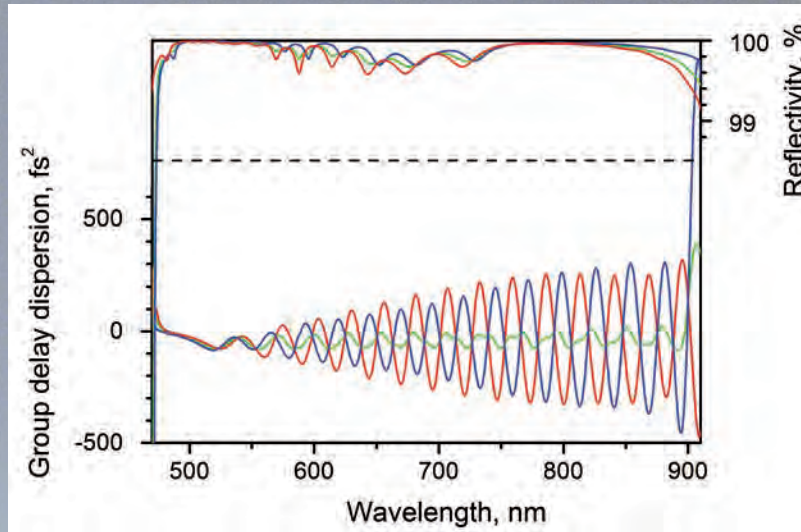
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	450 nm
Spectral working range high end	950 nm
Central wavelength	700 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 75



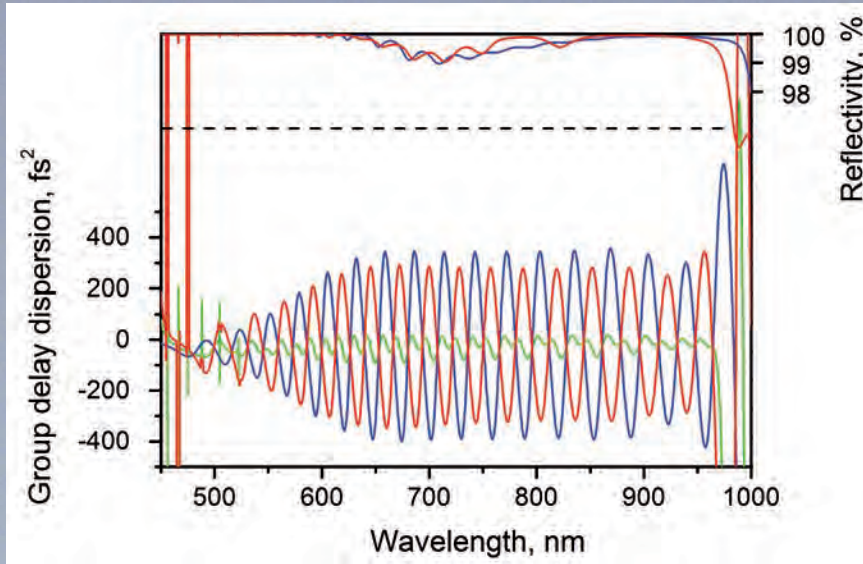
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	900 nm
Central wavelength	700 nm
Nominal GDD	-40 fs^2 *
Nominal GDD maximum deviation	100 fs^2
Minimum Reflectance	$> 99 \%$

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 37_4



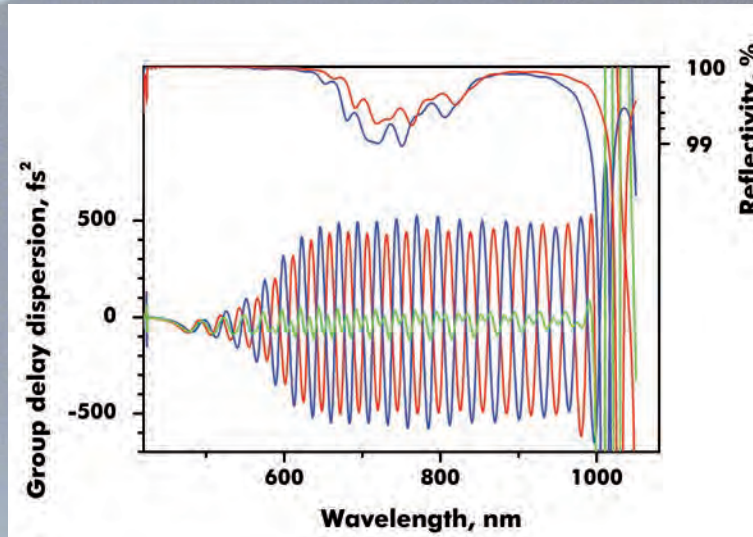
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	480 nm
Spectral working range high end	960 nm
Central wavelength	720 nm
Nominal GDD	-40 fs ²
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 1332



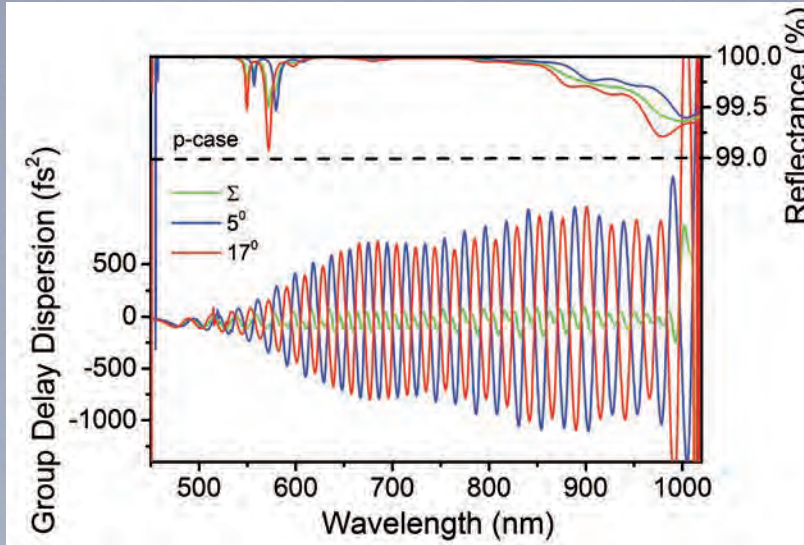
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	p

Spectral category	VIS - IR
Spectral working range low end	450 nm
Spectral working range high end	1000 nm
Central wavelength	725 nm
Nominal GDD	-40 fs ² *
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 1334_RC4



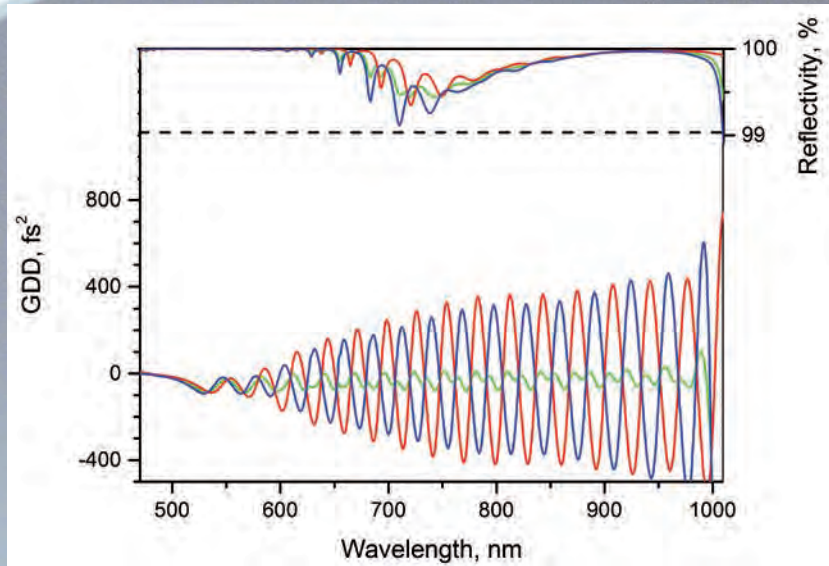
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	17
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	1000 nm
Central wavelength	750 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 42



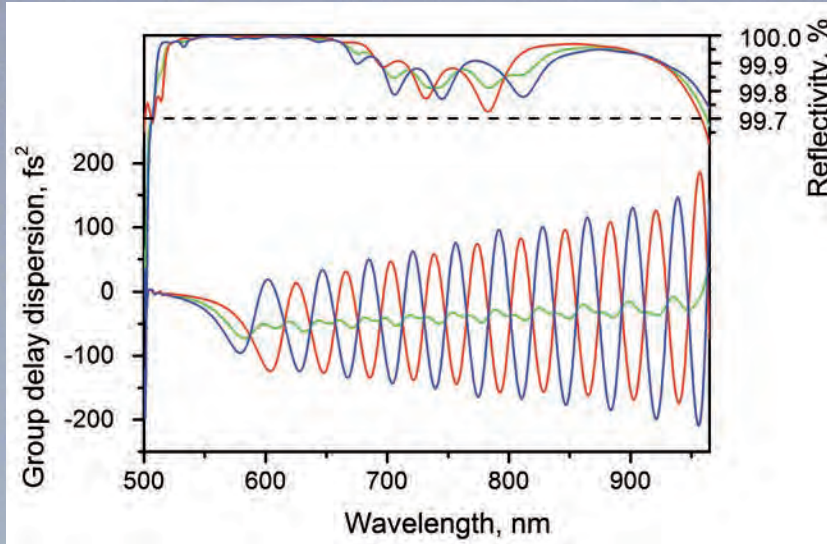
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	1000 nm
Central wavelength	750 nm
Nominal GDD	-45 fs ² *
Nominal GDD maximum deviation	75 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 150



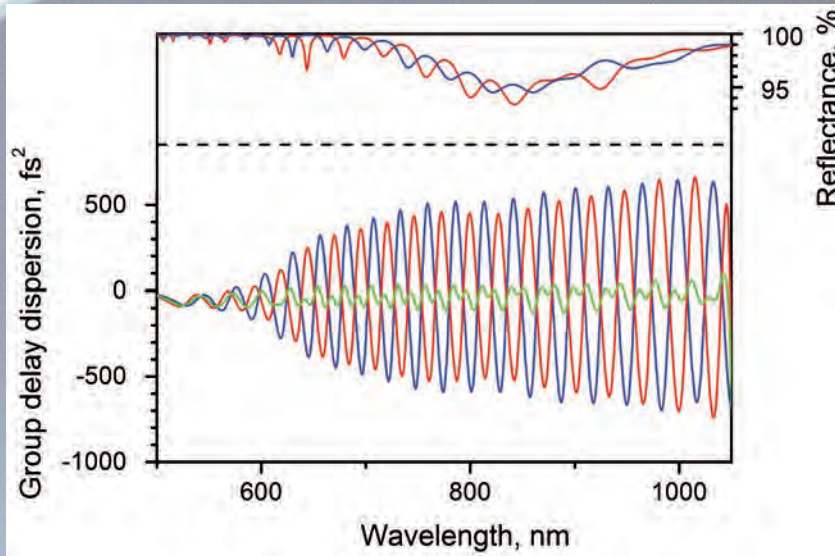
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	570 nm
Spectral working range high end	960 nm
Central wavelength	765 nm
Nominal GDD	-50 fs ²
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.7 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 122



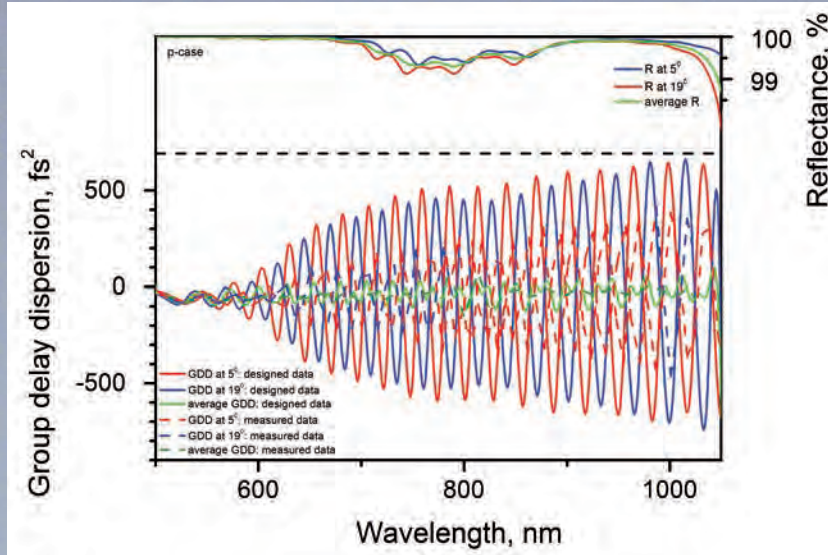
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	1050 nm
Central wavelength	775 nm
Nominal GDD	-50 fs ² *
Nominal GDD maximum deviation	70 fs ²
Minimum Reflectance	> 94 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 70



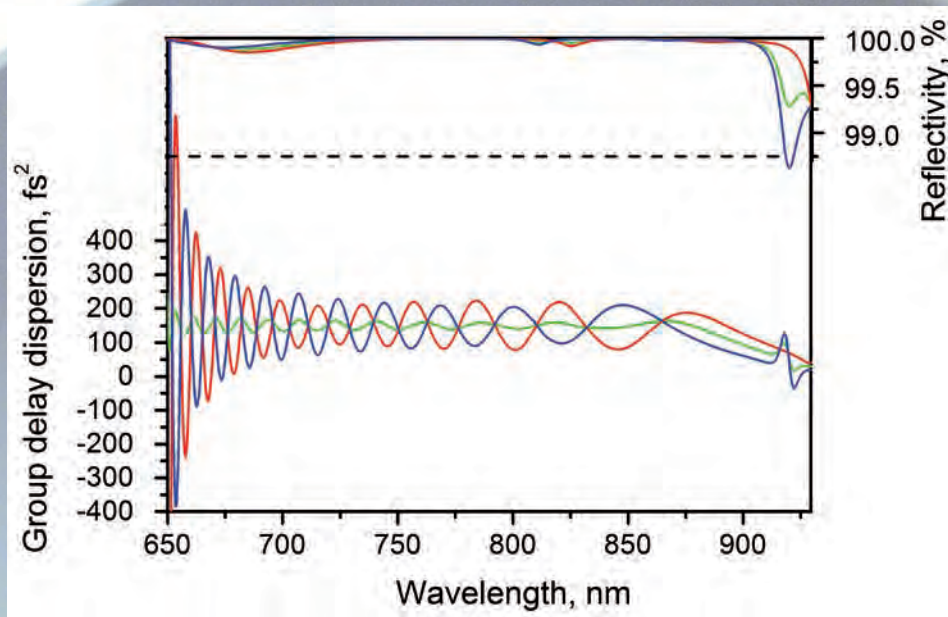
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	1050 nm
Central wavelength	775 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 139_RC2

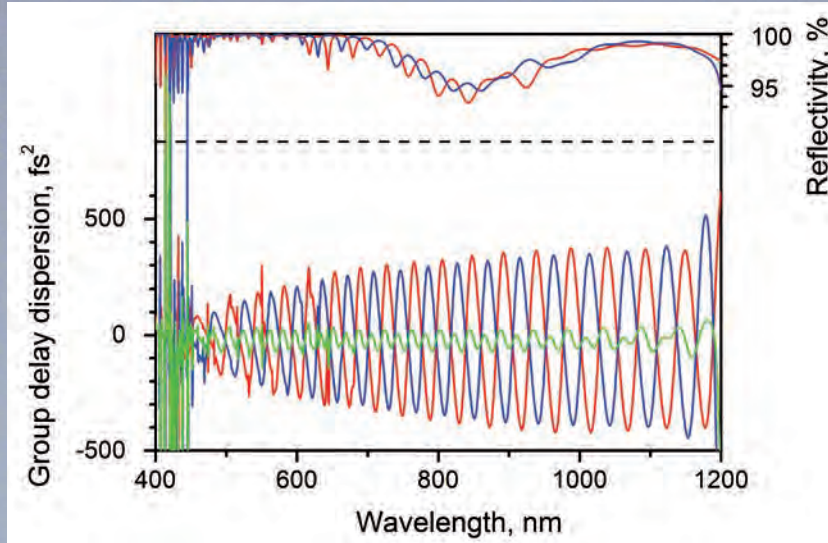


Details	
Description of the design	Broad-band complementary pair with positive dispersion
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	660 nm
Spectral working range high end	900 nm
Central wavelength	780 nm
Nominal GDD	150 fs ²
Minimum Reflectance	> 99.8 %



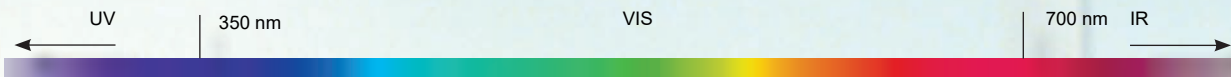
BROAD-BAND COMPLEMENTARY PAIR UBCM



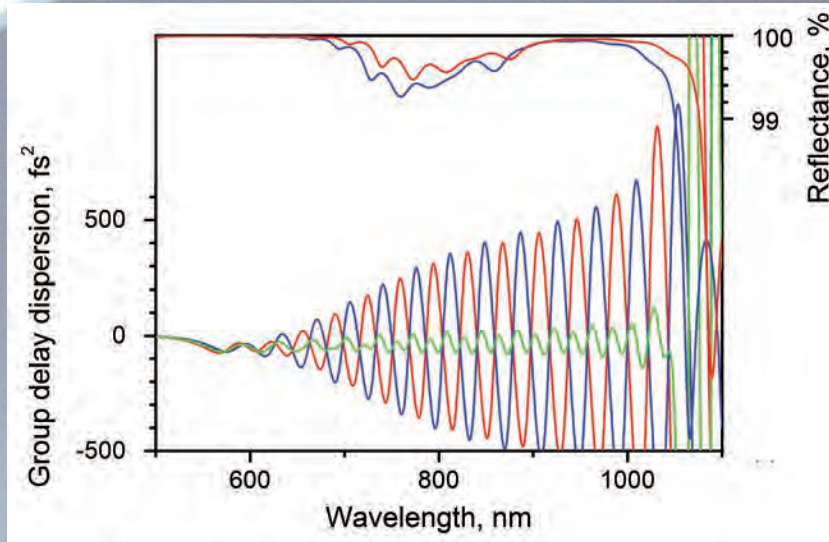
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	400 nm
Spectral working range high end	1200 nm
Central wavelength	800 nm
Nominal GDD	-25 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 94 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 32



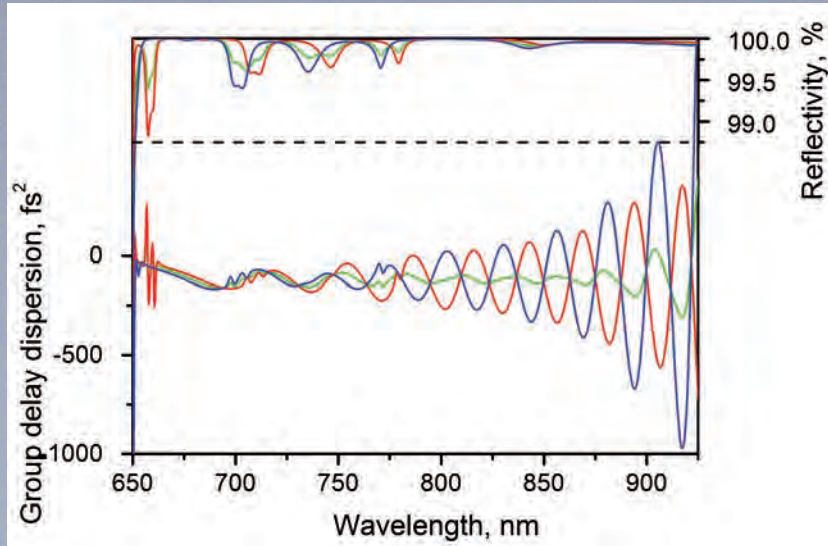
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	550 nm
Spectral working range high end	1050 nm
Central wavelength	800 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 1306



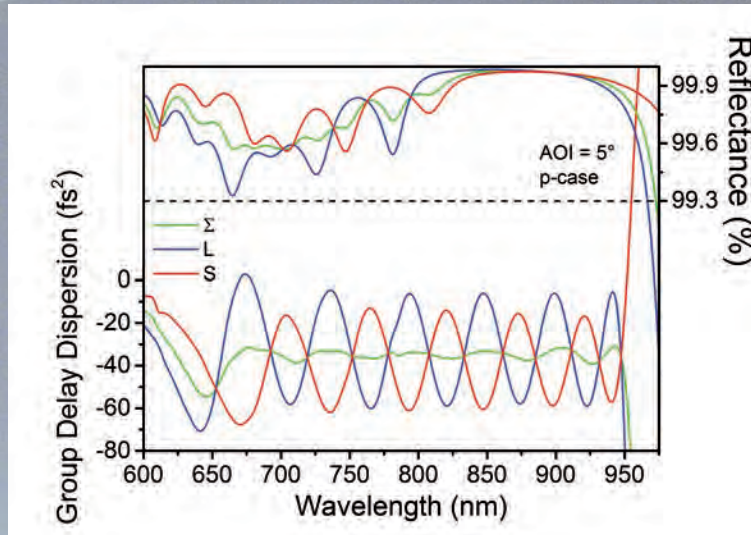
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	18
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	680 nm
Spectral working range high end	920 nm
Central wavelength	800 nm
Nominal GDD	-120 fs ² *
Nominal GDD maximum deviation	40 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 1541



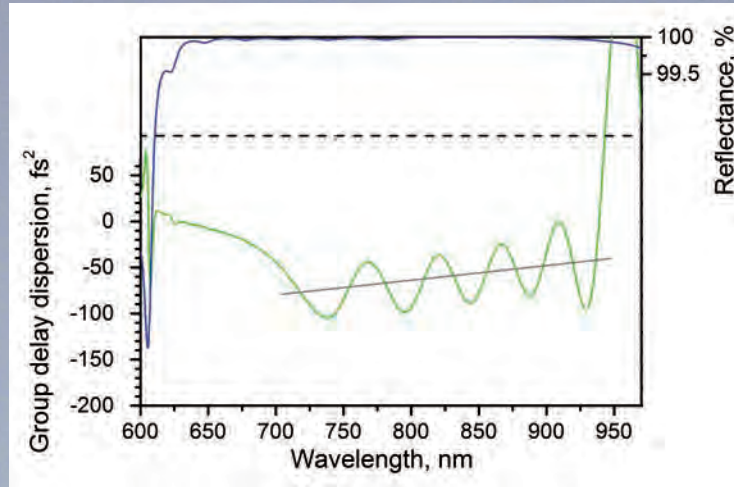
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS - IR
Spectral working range low end	650 nm
Spectral working range high end	950 nm
Central wavelength	800 nm
Nominal GDD	-35 fs^2 *
Minimum Reflectance	> 99.30 %

* not constant over defined working range



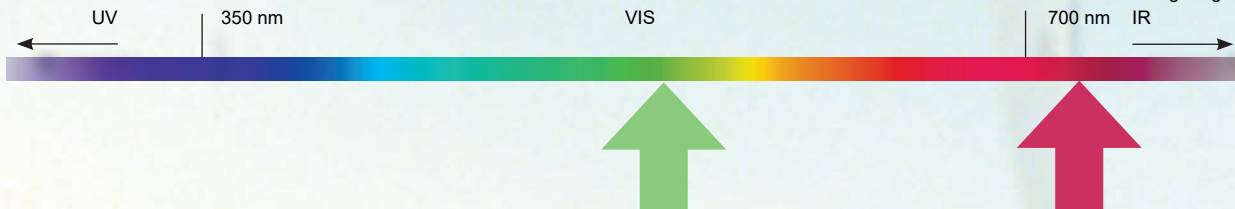
DISPERSIVE DICHROIC MIRROR PC 41



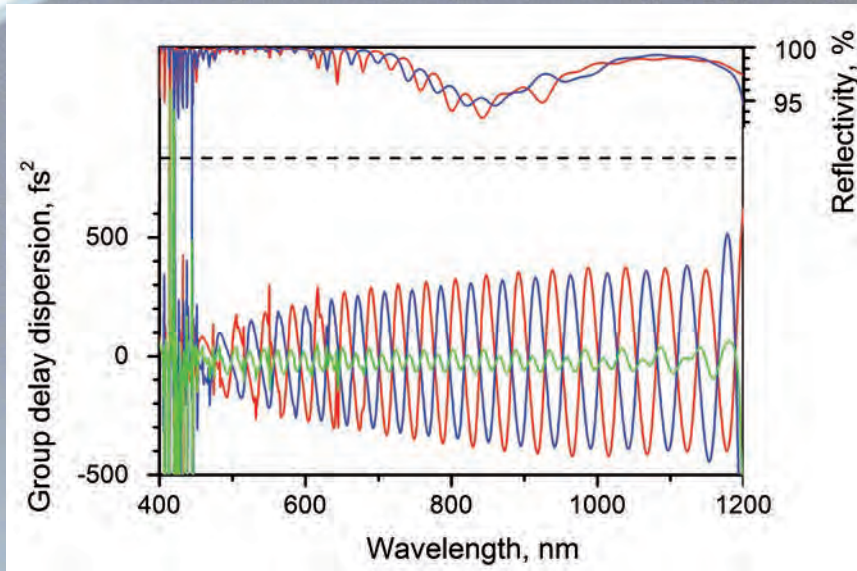
Details	
Description of the design	Dispersive dichroic mirror
Type	Mirror
Subtype	High (negative) dispersion mirror
First working range	
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	700 nm
Spectral working range high end	940 nm

Central wavelength	820 nm
Nominal GDD	-60 fs ² *
Nominal GDD maximum deviation	40 fs ²
Minimum reflectance	99.00 %
Second working range	
Second spectral working range low end	522.0 nm
Second spectral working range high end	542.0 nm
Polarization regime	p
Minimum transmittance	99 %

* not constant over defined working range



ULTRA BROAD-BAND DISPERSIVE MIRROR CM 65



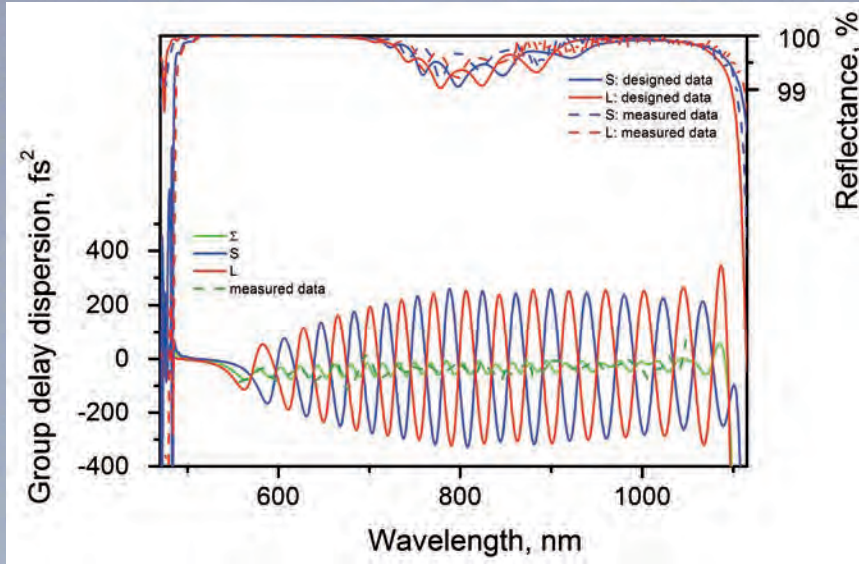
Details	
Description of the design	Ultra-broad-band dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	450 nm
Spectral working range high end	1200 nm
Central wavelength	825 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	94 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 45



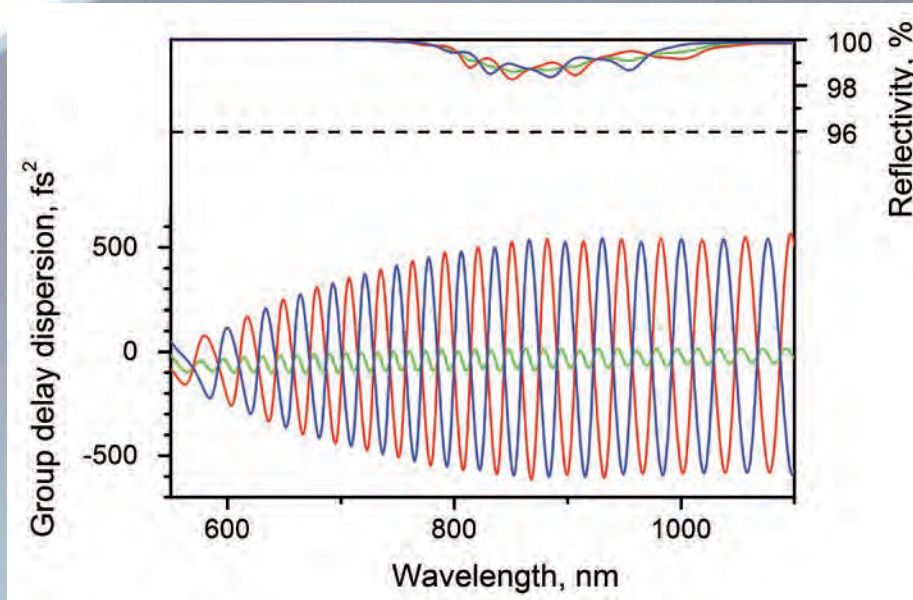
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	550 nm
Spectral working range high end	1100 nm
Central wavelength	825 nm
Nominal GDD	-40 fs^2 *
Nominal GDD maximum deviation	40 fs^2
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 47



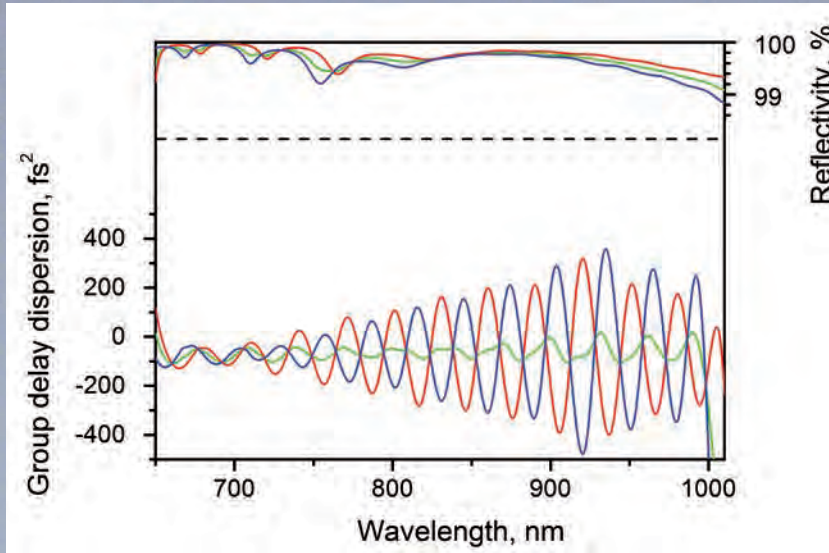
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	550 nm
Spectral working range high end	1100 nm
Central wavelength	825 nm
Nominal GDD	-60 fs ²
Nominal GDD maximum deviation	40 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 84



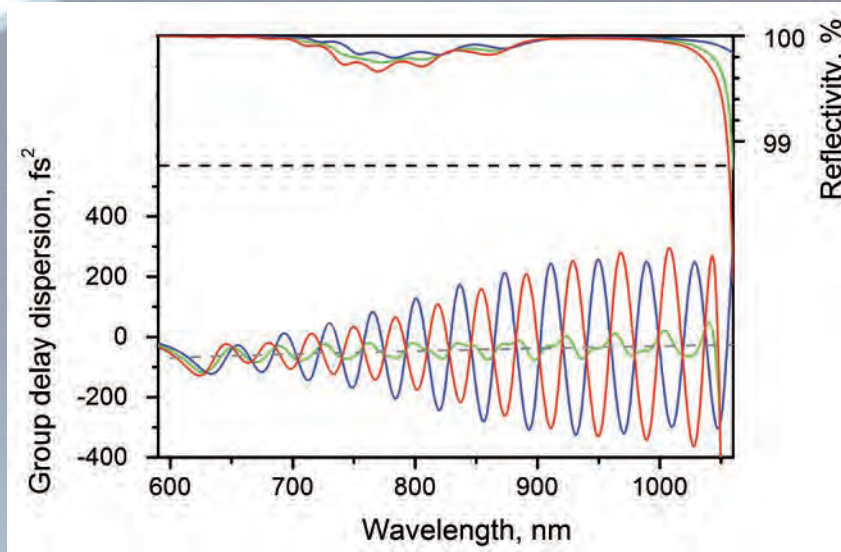
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	650 nm
Spectral working range high end	1000 nm
Central wavelength	825 nm
Nominal GDD	-70 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 108_RC1



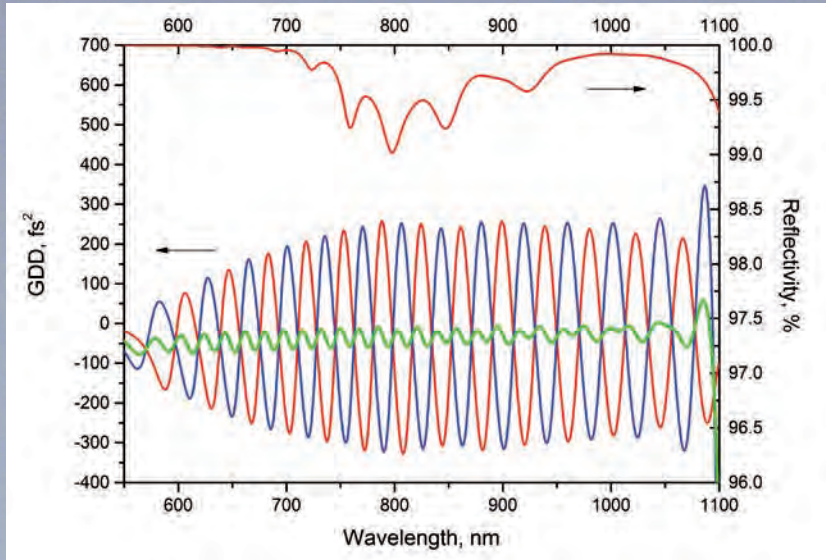
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	600 nm
Spectral working range high end	1050 nm
Central wavelength	825 nm
Nominal GDD	-50 fs ² *
Nominal GDD maximum deviation	40 fs ²
Minimum Reflectance	> 99.5 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 5



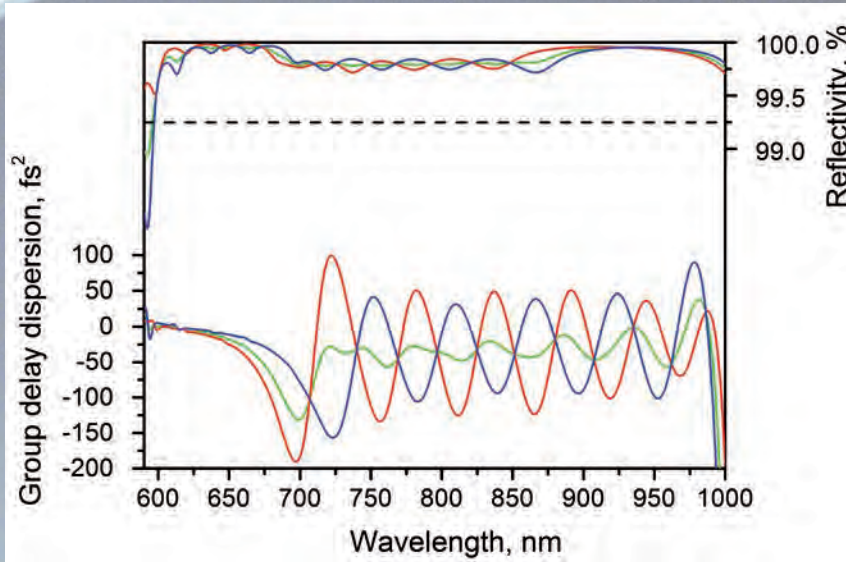
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	550 nm
Spectral working range high end	1100 nm
Central wavelength	825 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	25 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 1321



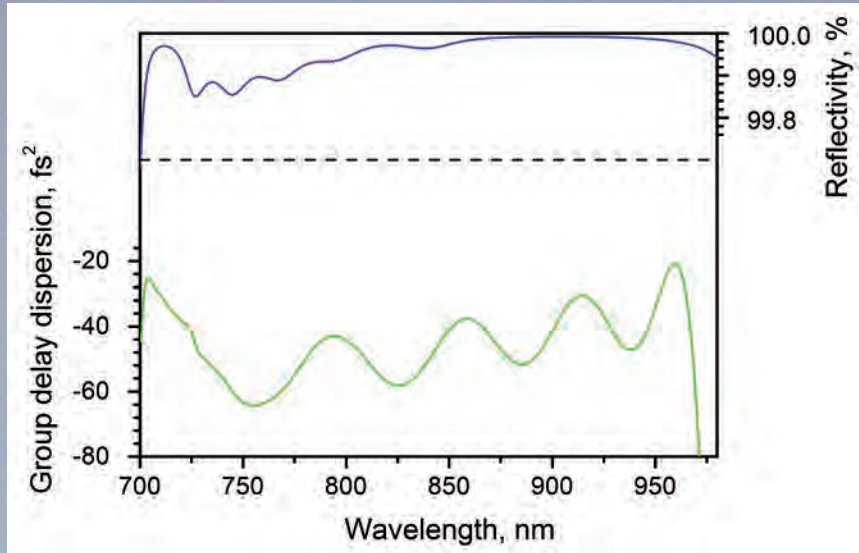
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	700 nm
Spectral working range high end	970 nm
Central wavelength	835 nm
Nominal GDD	-30 fs ²
Nominal GDD maximum deviation	20 fs ²
Minimum Reflectance	> 99.5 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR WITH THIRD-ORDER DISPERSION PC 40



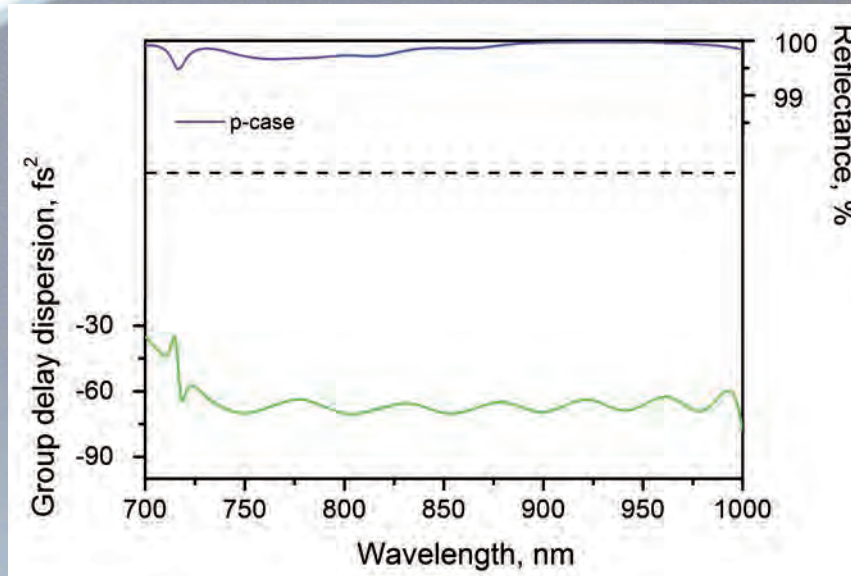
Details	
Description of the design	Broad-band dispersive mirror with third-order dispersion (TOD)
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	730 nm
Spectral working range high end	970 nm
Central wavelength	850 nm
Nominal GDD	-50 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



DISPERSIVE MIRROR CM 68



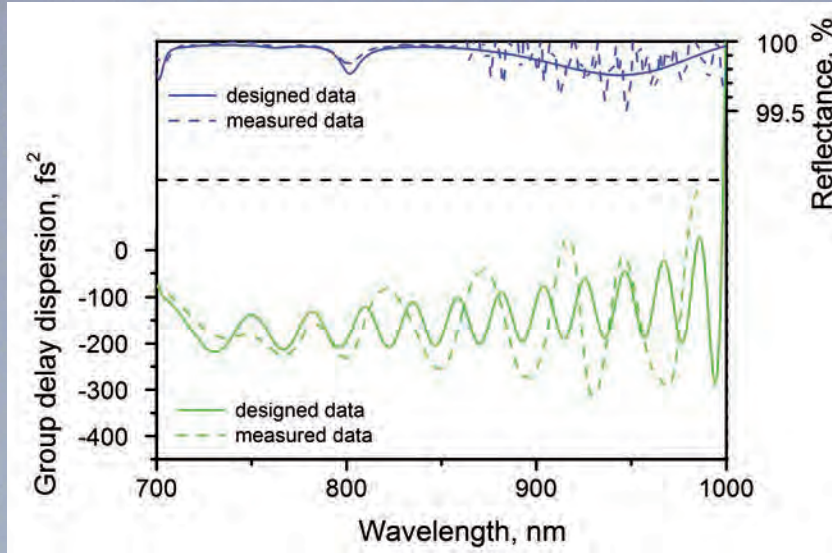
Details	
Description of the design	Dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	725 nm
Spectral working range high end	1000 nm
Central wavelength	862 nm
Nominal GDD	-70 fs ² *
Nominal GDD maximum deviation	5 fs ²
Minimum Reflectance	99.5 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR CM 63



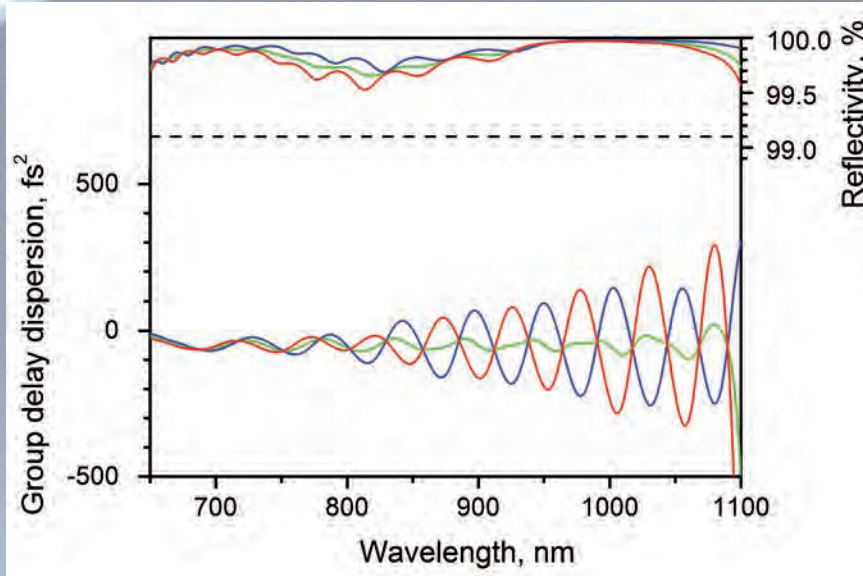
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	720 nm
Spectral working range high end	1000 nm
Central wavelength	860 nm
Nominal GDD	-150 fs ² *
Nominal GDD maximum deviation	150 fs ²
Minimum Reflectance	> 99.5 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 93



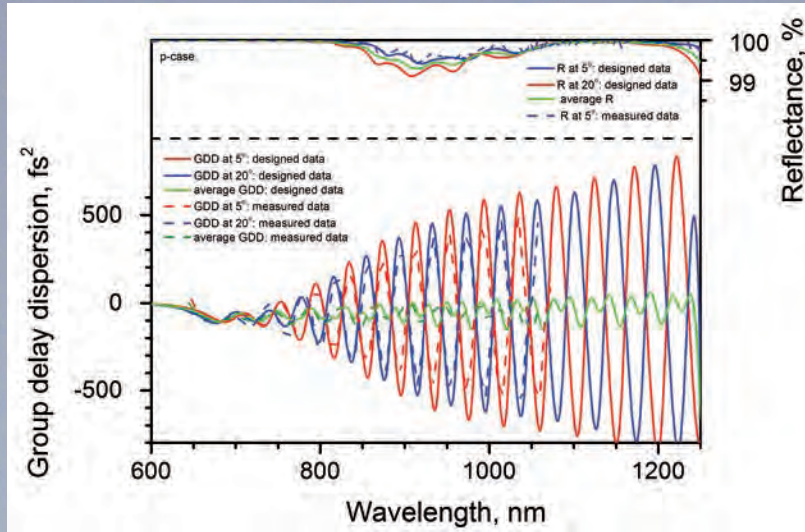
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	21
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	650 nm
Spectral working range high end	1100 nm
Central wavelength	875 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 99.5 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 53



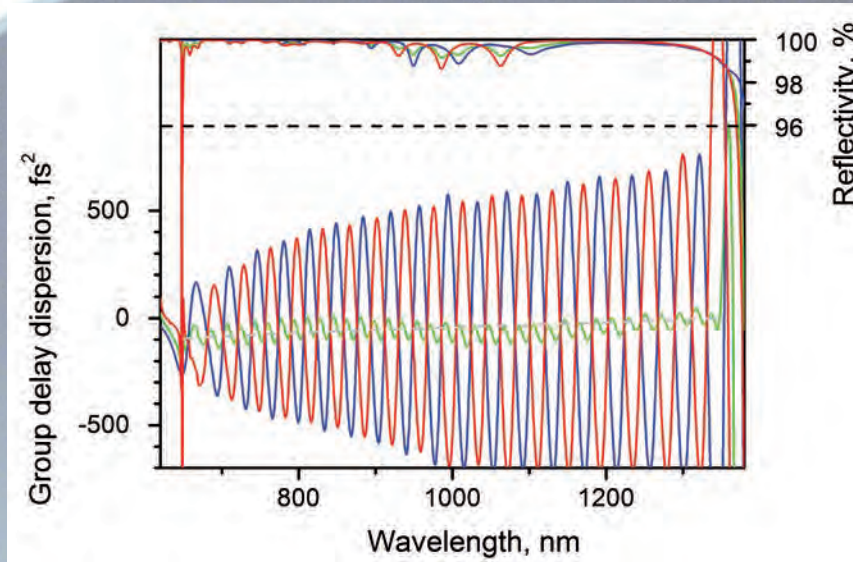
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	650 nm
Spectral working range high end	1250 nm
Central wavelength	940 nm
Nominal GDD	-60 fs^2 *
Nominal GDD maximum deviation	100 fs^2
Minimum Reflectance	> 99 %

* not constant over defined working range



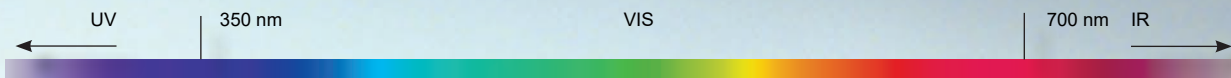
BROAD-BAND COMPLEMENTARY PAIR PC 147



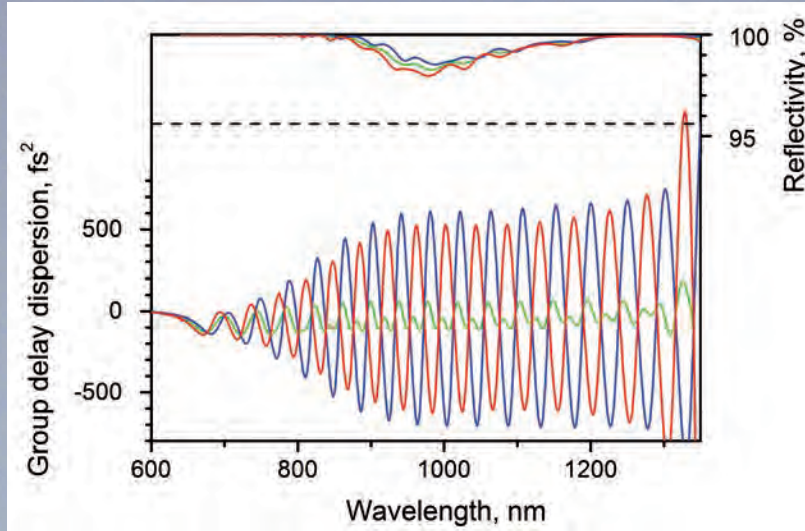
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	650 nm
Spectral working range high end	1350 nm
Central wavelength	1000 nm
Nominal GDD	-60 fs ²
Nominal GDD maximum deviation	60 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 105



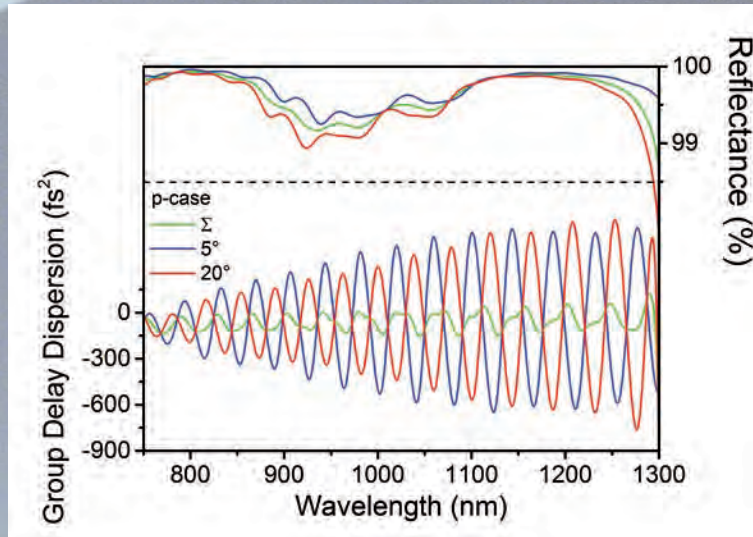
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	650 nm
Spectral working range high end	1350 nm
Central wavelength	1000 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	90 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 1542



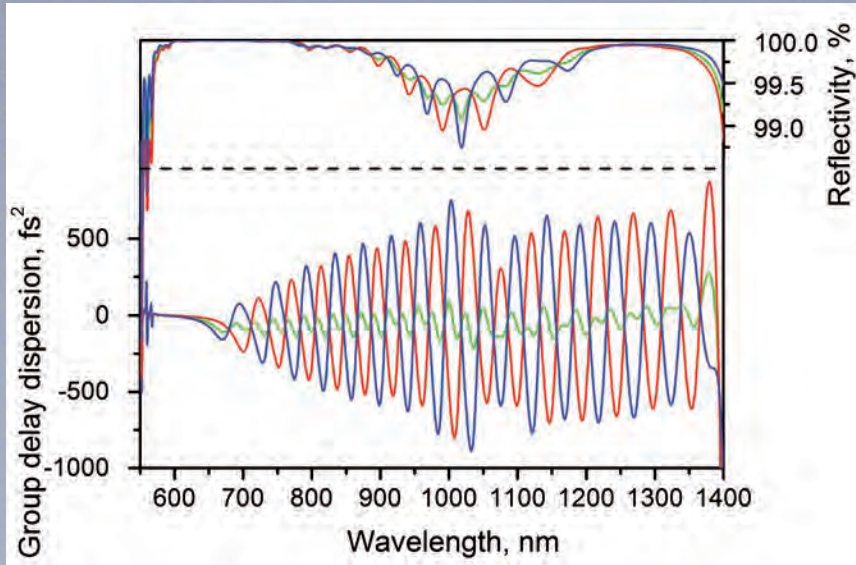
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS - IR
Spectral working range low end	730 nm
Spectral working range high end	1300 nm
Central wavelength	1015 nm
Nominal GDD	-50 fs ² *
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 1331

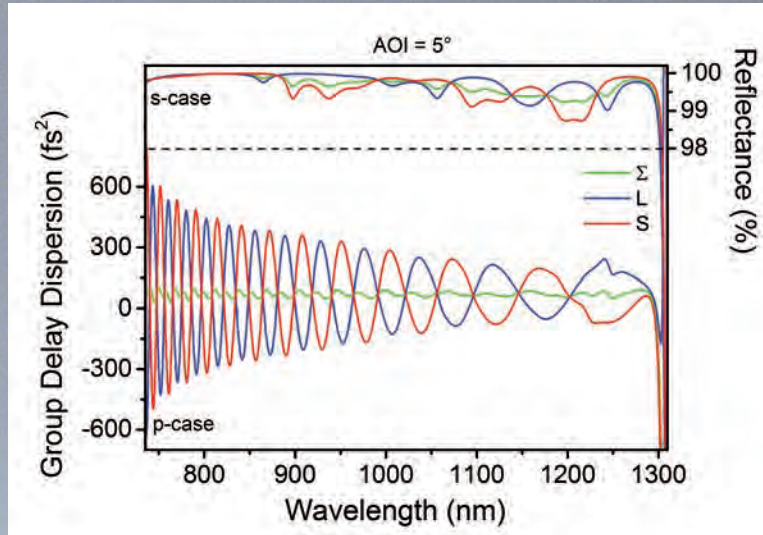


Details		Spectral category	VIS-IR
Description of the design	Broad-band complementary pair	Spectral working range low end	650 nm
Type	Mirror	Spectral working range high end	1380 nm
Subtype	BBDM (broad-band dispersive mirror)	Central wavelength	1015 nm
Angle of Incidence in degrees	5	Nominal GDD	-50 fs ² *
Polarization regime (primary spectral range)	P	Nominal GDD maximum deviation	130 fs ²
		Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 1605



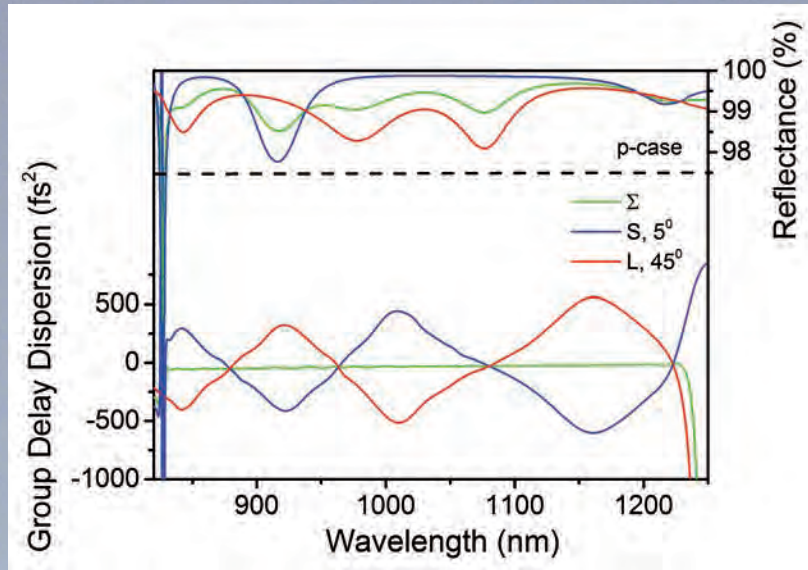
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	730 nm
Spectral working range high end	1300 nm
Central wavelength	1015 nm
Nominal GDD	-40 fs ²
Nominal GDD maximum deviation	70 fs ² *
Minimum Reflectance	> 98.5 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 523_RC2_S_L



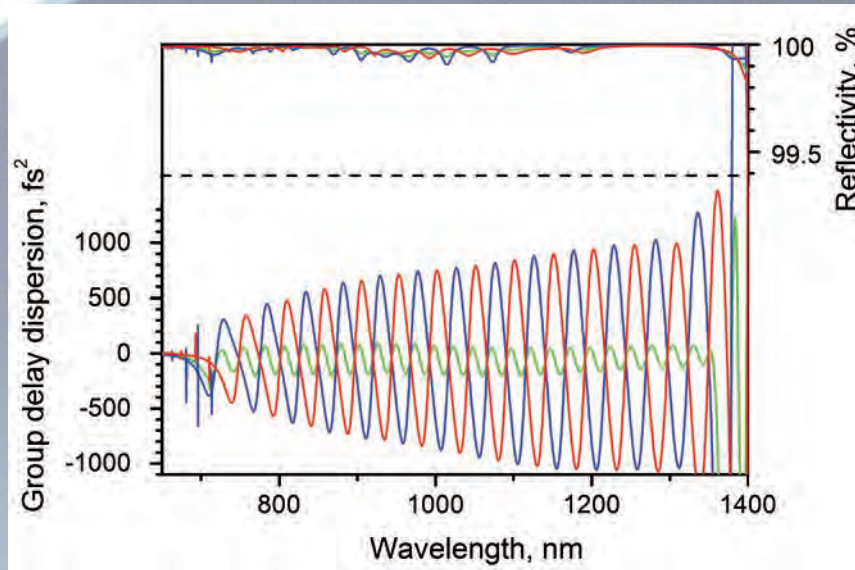
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of Incidence	45
Polarization regime (primary spectral range)	s

Spectral category	VIS-IR
Spectral working range low end	820 nm
Spectral working range high end	1220 nm
Central wavelength	1020 nm
Nominal GDD	-50 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 94



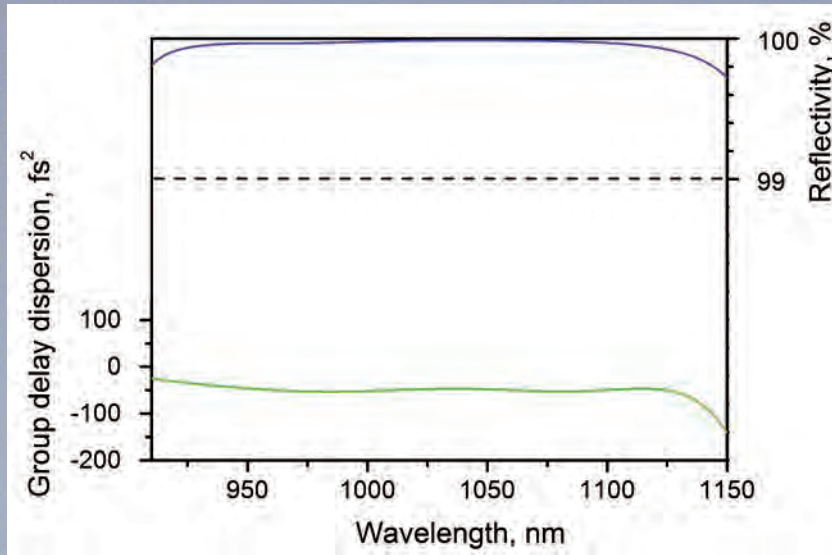
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	1350 nm
Central wavelength	1025 nm
Nominal GDD	-65 fs ²
Nominal GDD maximum deviation	135 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 54



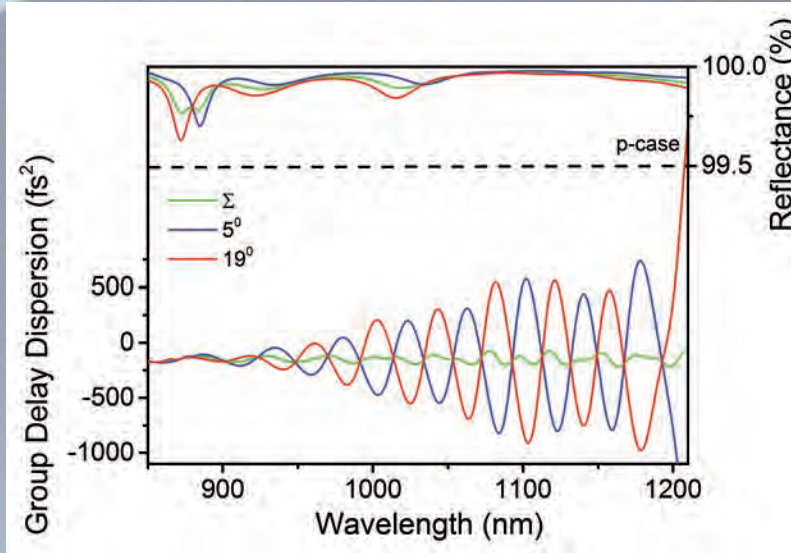
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	925 nm
Spectral working range high end	1125 nm
Central wavelength	1025 nm
Nominal GDD	-50 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 1305



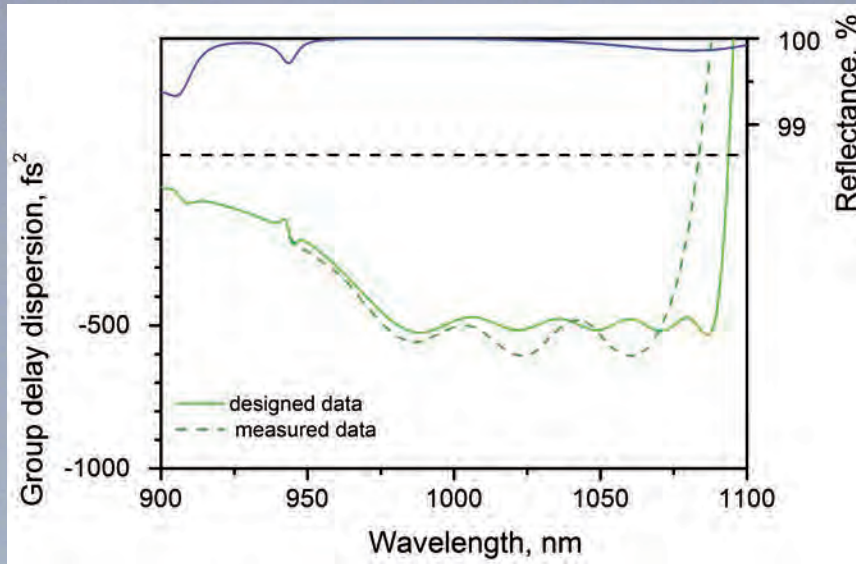
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	850 nm
Spectral working range high end	1200 nm
Central wavelength	1025 nm
Nominal GDD	-200 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99.7 %

* not constant over defined working range



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM 39

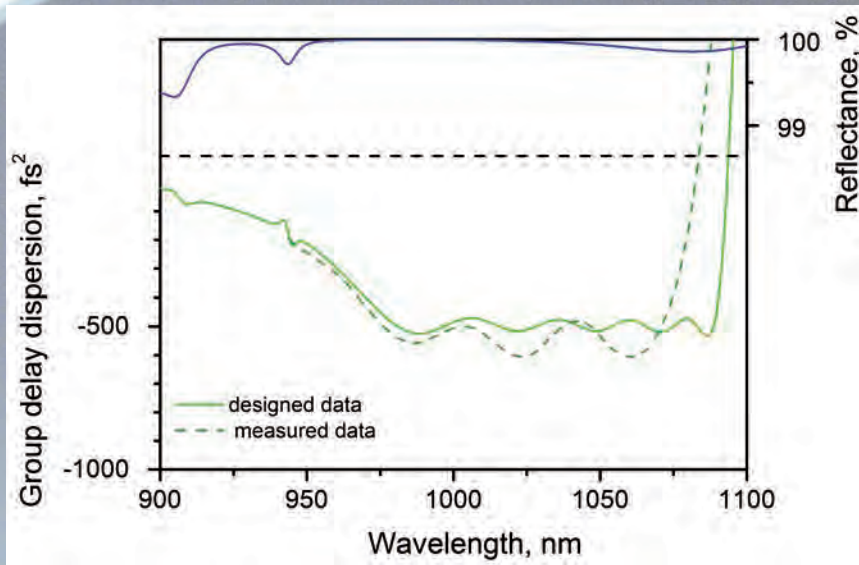


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	980 nm
Spectral working range high end	1080 nm
Central wavelength	1030 nm
Nominal GDD	-500 fs ²
Minimum Reflectance	> 99.8 %



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM 39

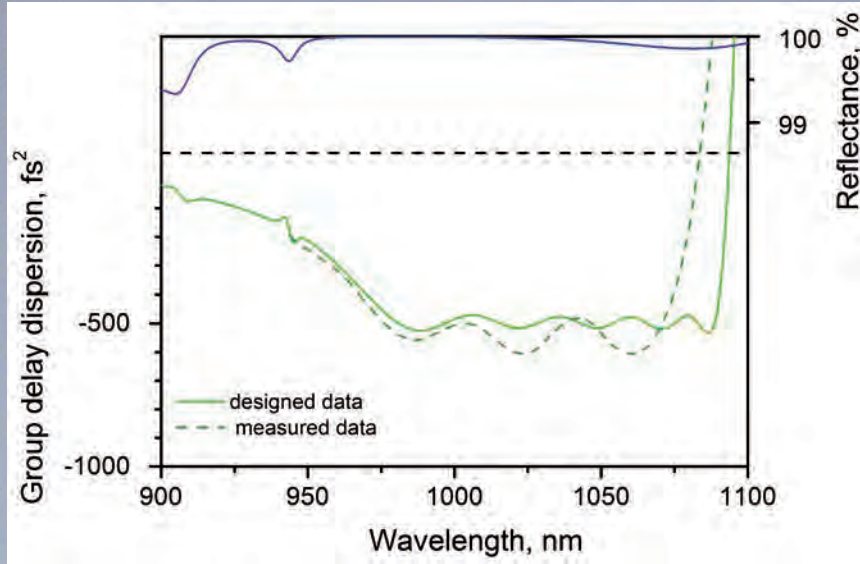


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	980 nm
Spectral working range high end	1080 nm
Central wavelength	1030 nm
Nominal GDD	-500 fs ²
Minimum Reflectance	> 99.8 %



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM 39

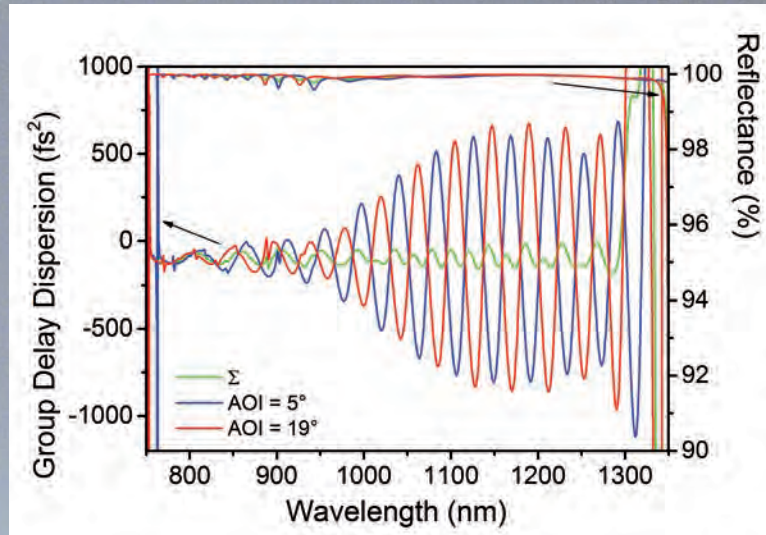


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	980 nm
Spectral working range high end	1080 nm
Central wavelength	1030 nm
Nominal GDD	-500 fs ²
Minimum Reflectance	> 99.8 %



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 1601



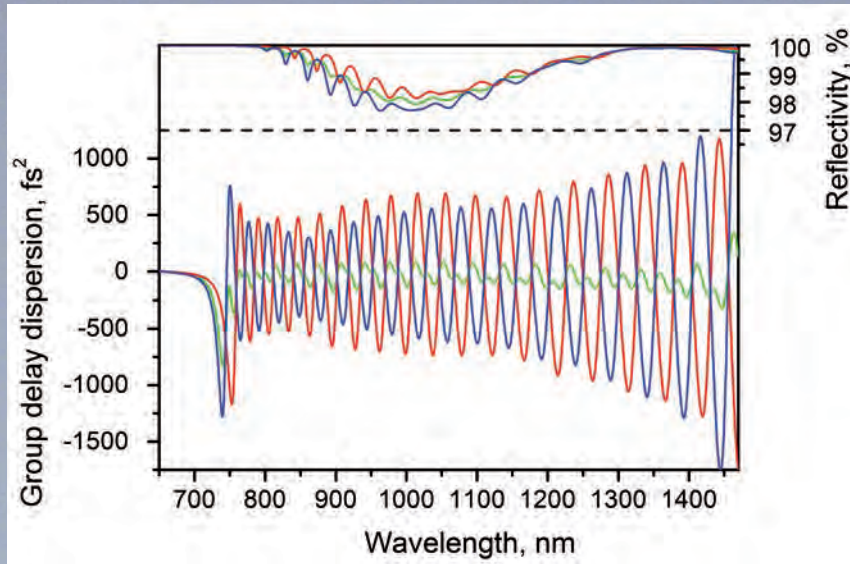
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p

Spectral category	VIS - IR
Spectral working range low end	800 nm
Spectral working range high end	1300 nm
Central wavelength	1050 nm
Nominal GDD	-100 fs ² *
Minimum Reflectance	> 99.5 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 149_DA



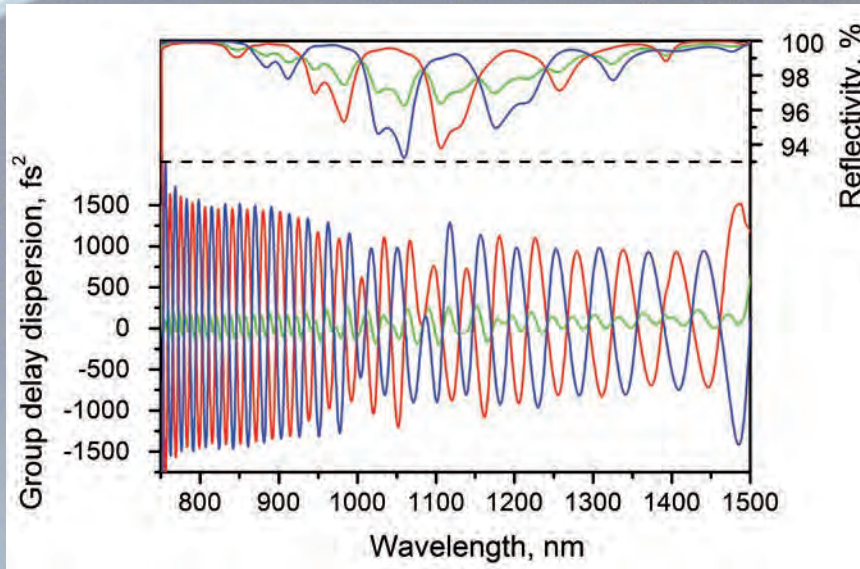
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	1450 nm
Central wavelength	1100 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



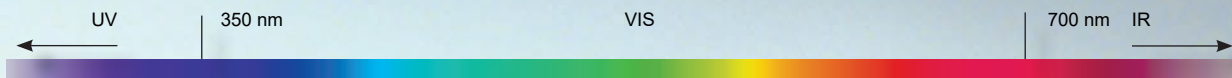
BROAD-BAND COMPLEMENTARY PAIR PC 149_LS



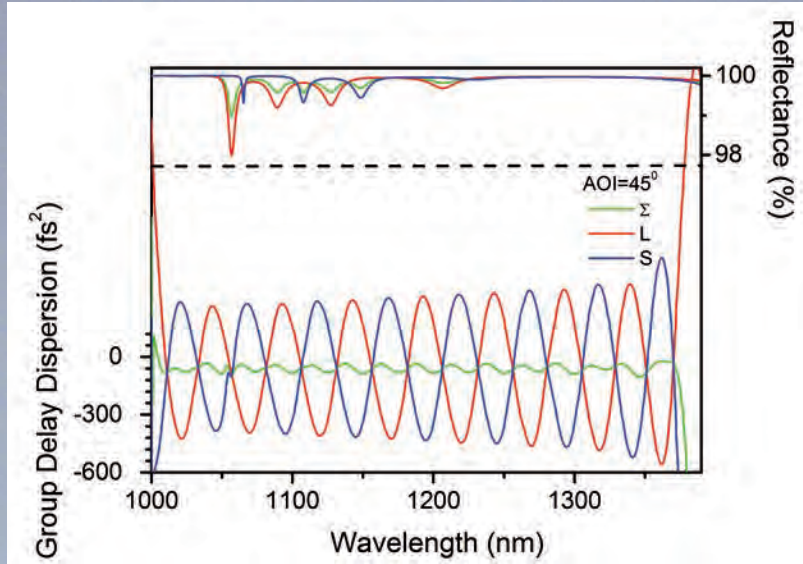
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	1500 nm
Central wavelength	1125 nm
Nominal GDD	30 fs ²
Nominal GDD maximum deviation	150 fs ²
Minimum Reflectance	> 94 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR CM 1405_RC3



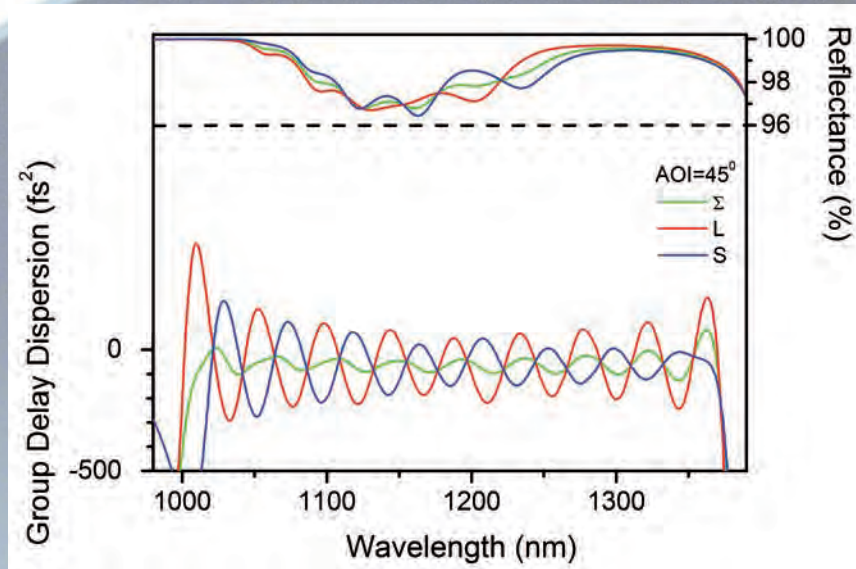
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	4
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	1000 nm
Spectral working range high end	1375 nm
Central wavelength	1187 nm
Nominal GDD	-60 fs ²
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



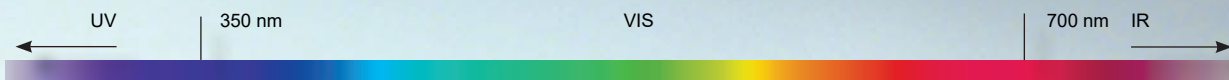
BROAD-BAND COMPLEMENTARY PAIR CM 1405_RC2



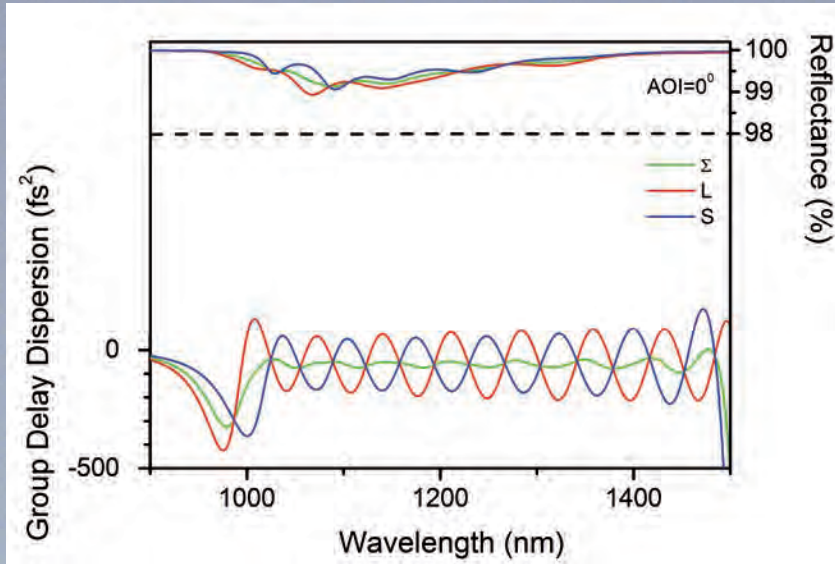
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	4
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	1000 nm
Spectral working range high end	1375 nm
Central wavelength	1187 nm
Nominal GDD	-100 fs ²
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 96 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR CM 1405_RC1



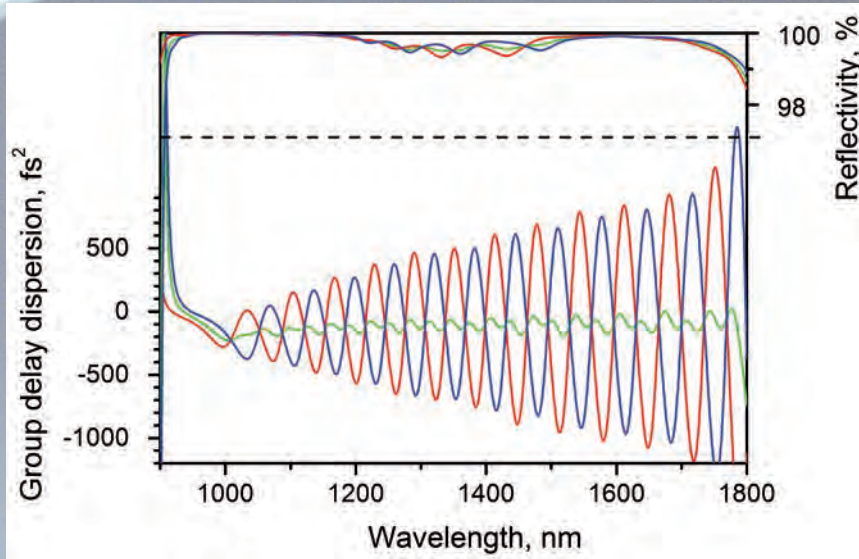
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1000 nm
Spectral working range high end	1500 nm
Central wavelength	1250 nm
Nominal GDD	-60 fs ² *
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND COMPLEMENTARY PAIR PC 61



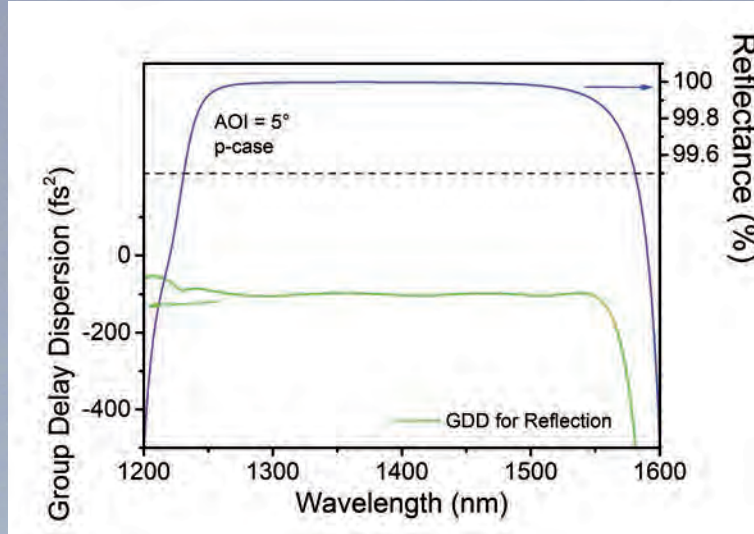
Details	
Description of the design	Broad-band complementary pair
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	1000 nm
Spectral working range high end	1750 nm
Central wavelength	1375 nm
Nominal GDD	-150 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 1581



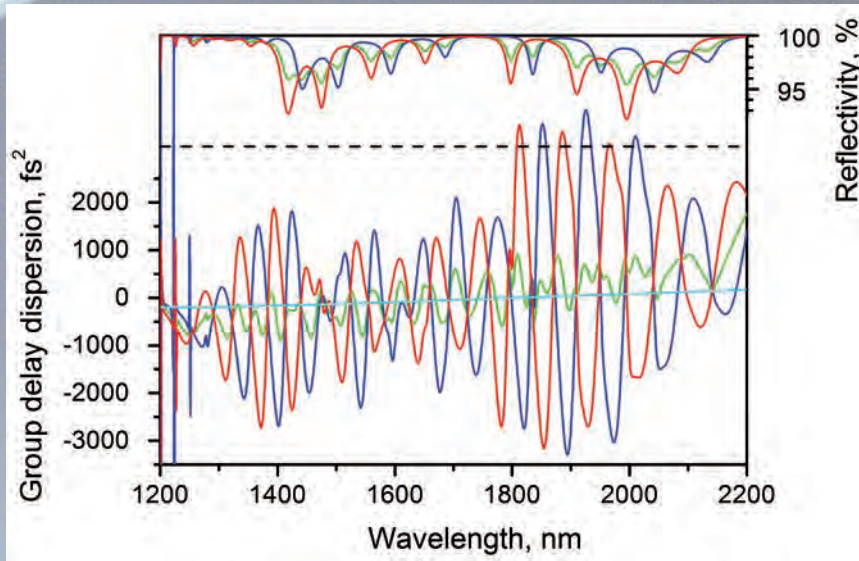
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS - IR
Spectral working range low end	1250 nm
Spectral working range high end	1550 nm
Central wavelength	1400 nm
Nominal GDD	-100 fs ² *
Minimum Reflectance	> 99.90 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 129



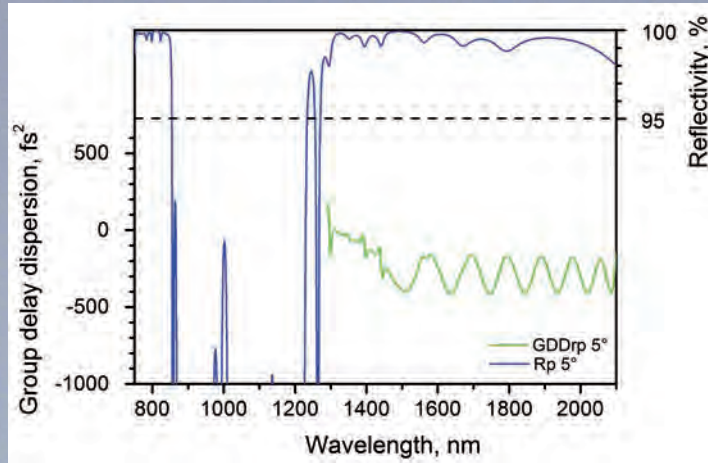
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	7
Second angle of incidence	22
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1250 nm
Spectral working range high end	2150 nm
Central wavelength	1700 nm
Nominal GDD	-100 fs ² *
Nominal GDD maximum deviation	500 fs ²
Minimum Reflectance	> 95 %

* not constant over defined working range



DISPERSIVE DICHROIC MIRROR IR 16



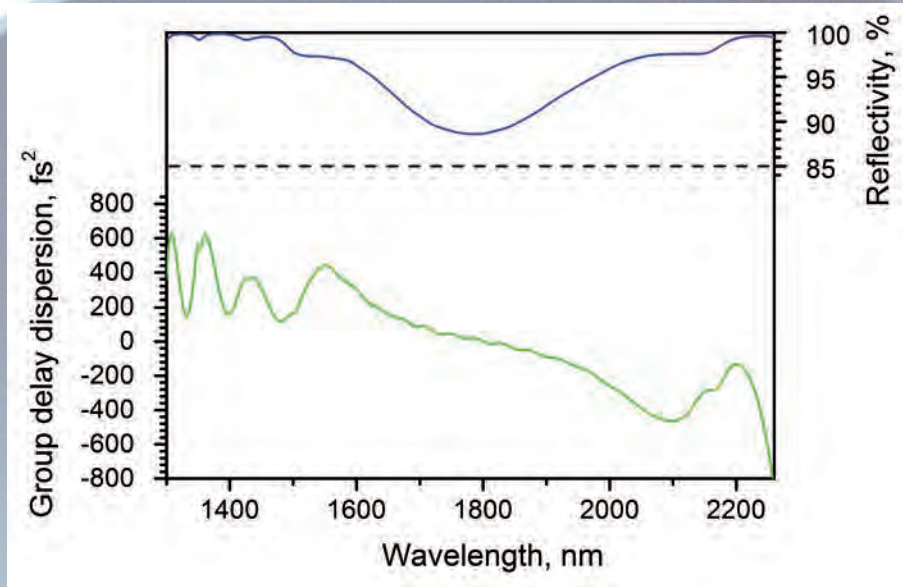
Details	
Description of the design	Dispersive dichroic mirror
Type	Mirror
Subtype	High(negative) dispersion mirror
First working range	
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	1450 nm
Spectral working range high end	2050 nm

Central wavelength	1750 nm
Nominal GDD	-250 fs ² *
Nominal GDD maximum deviation	130 fs ²
Minimum reflectance	98.00 %
Second working range	
Second spectral working range low end	750.0 nm
Second spectral working range high end	850.0 nm
Polarization regime	p
Minimum reflectance	99 %

* not constant over defined working range



MIRROR WITH THIRD-ORDER DISPERSION PC 1315



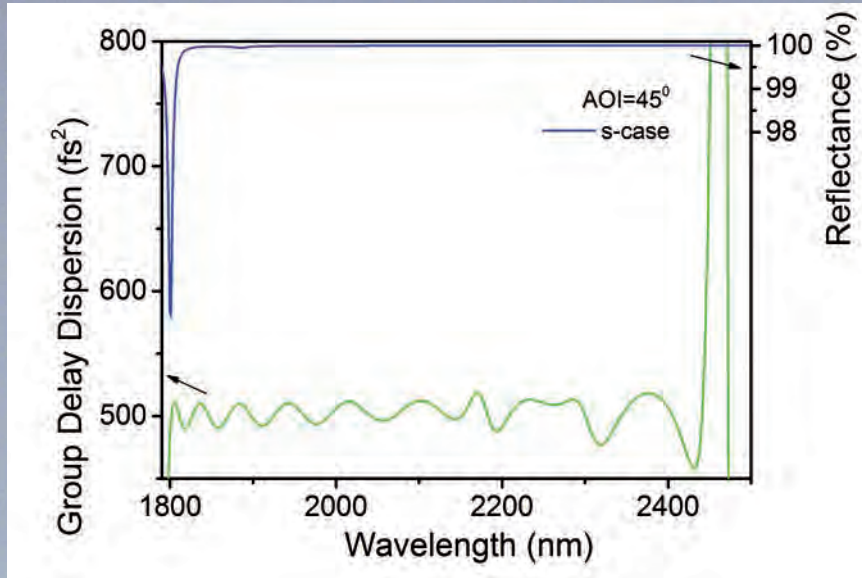
Details	
Description of the design	Mirror with third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1400 nm
Spectral working range high end	2200 nm
Central wavelength	1800 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	88 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1402_RC2



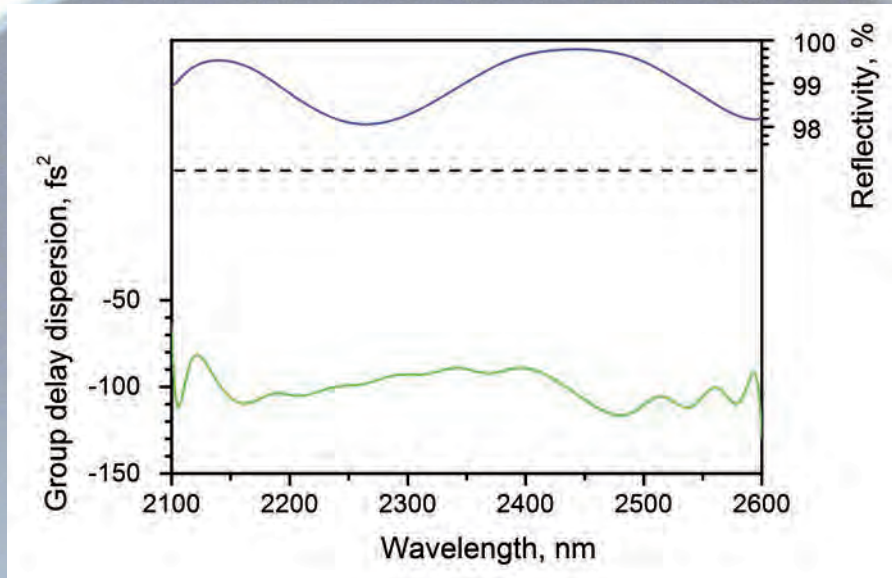
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	4
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	1800 nm
Spectral working range high end	2400 nm
Central wavelength	2100 nm
Nominal GDD	500 fs ² *
Minimum Reflectance	> 99.9 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1301



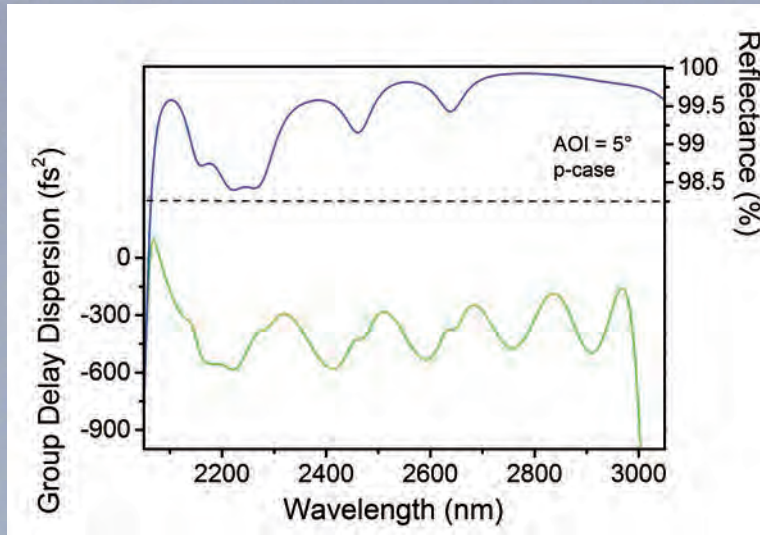
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	2100 nm
Spectral working range high end	2600 nm
Central wavelength	2350 nm
Nominal GDD	-100 fs ² *
Nominal GDD maximum deviation	20 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IC 1501

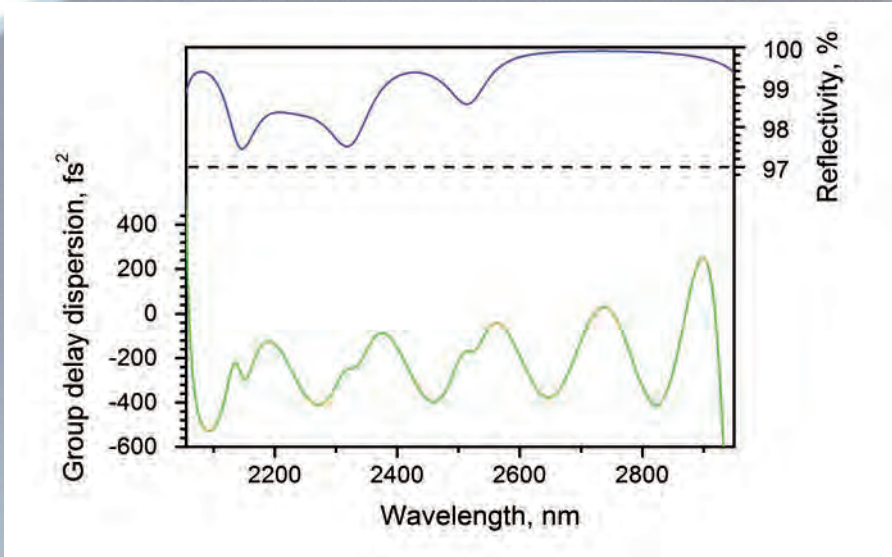


Details		Spectral working range high end	2850 nm
Description of the design	Broad-band dispersive mirror	Central wavelength	2450 nm
Type	Mirror	Nominal GDD	-450 fs ² *
Subtype	DM (dispersive mirror)	Minimum reflectance	98.50 %
First working range		Second working range	
Angle of Incidence in degrees	5	Second spectral working range low end	1940 nm
Polarization regime (primary spectral range)	p	Second spectral working range high end	1940 nm
Spectral category	VIS-IR	Polarization regime	p
Spectral working range low end	2050 nm	Minimum reflectance	5 %
		Minimum transmittance	95 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 24



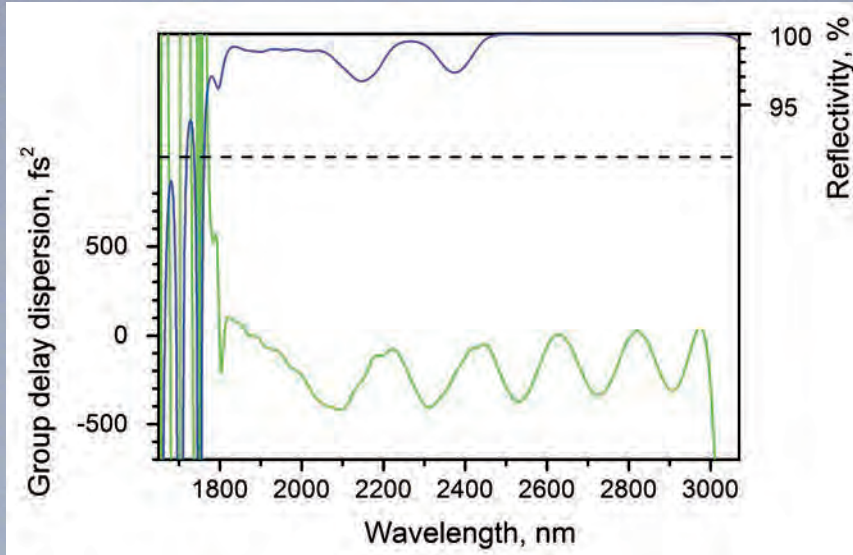
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	2100 nm
Spectral working range high end	2850 nm
Central wavelength	2475 nm
Nominal GDD	-250 fs ² *
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 97 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 25



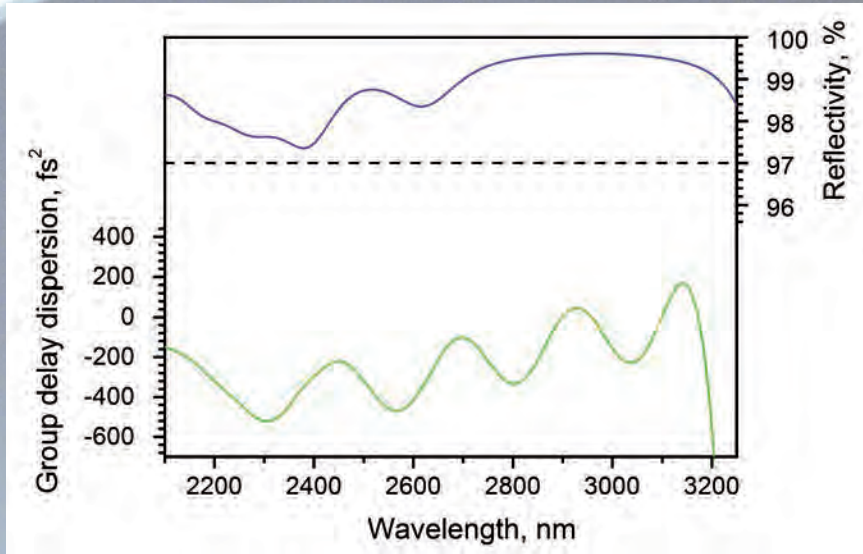
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	2000 nm
Spectral working range high end	3000 nm
Central wavelength	2500 nm
Nominal GDD	-200 fs^2 *
Nominal GDD maximum deviation	160 fs^2
Minimum Reflectance	$> 97 \%$

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 41



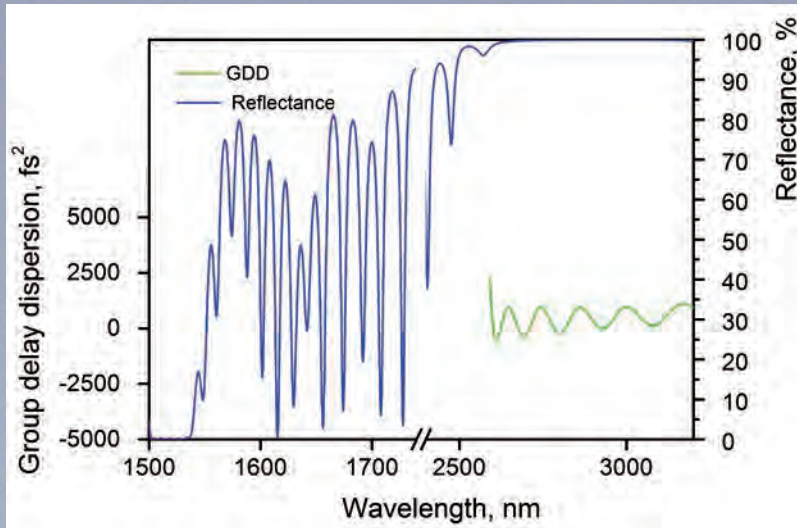
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	2200 nm
Spectral working range high end	3200 nm
Central wavelength	2700 nm
Nominal GDD	-300 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 97 %

* not constant over defined working range



DISPERSIVE DICHROIC MIRROR IR 11

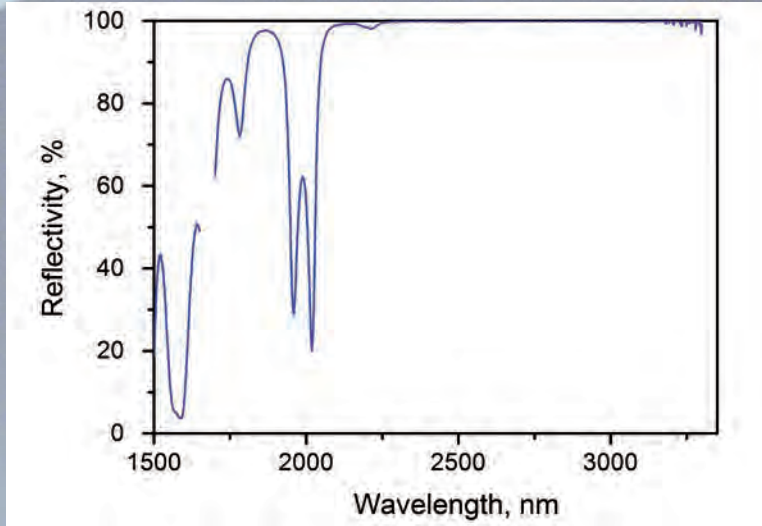


Details	
Description of the design	Dispersive Dichroic mirror
Type	Mirror
Subtype	HR (positive) dispersion mirror
First working range	
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	2600 nm

Spectral working range high end	3200 nm
Central wavelength	2900 nm
Nominal GDD	450 fs ²
Minimum reflectance	99.00 %
Second working range	
Second spectral working range low end	1550.0 nm
Second spectral working range high end	1630.0 nm
Polarization regime	p
Minimum transmittance	99 %



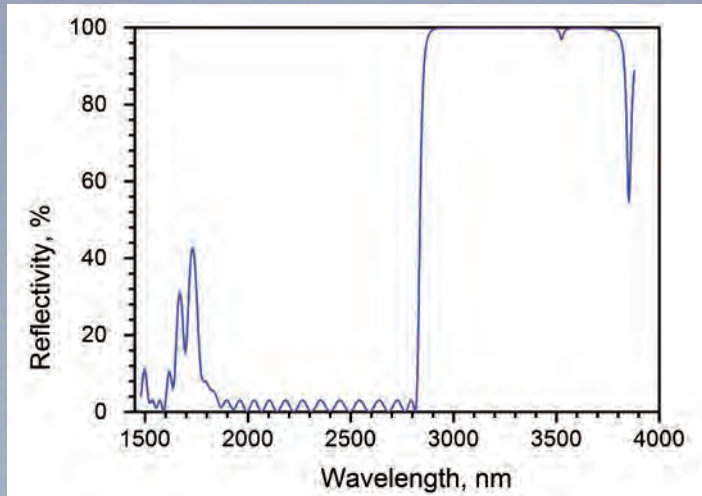
DICHROIC MIRROR IRIC



Details		Spectral working range high end	3500 nm
Description of the design	Dichroic mirror	Central wavelength	2900 nm
Type	Mirror	Minimum reflectance	99.00 %
Subtype	HR (high-reflection) mirror	Second working range	
First working range		Second spectral working range low end	1550.0 nm
Angle of Incidence in degrees	0	Second spectral working range high end	1600.0 nm
Polarization regime (primary spectral range)	p	Polarization regime	p
Spectral category	IR	Minimum transmittance	96 %
Spectral working range low end	2300 nm		



BEAM SPLITTER IR 21

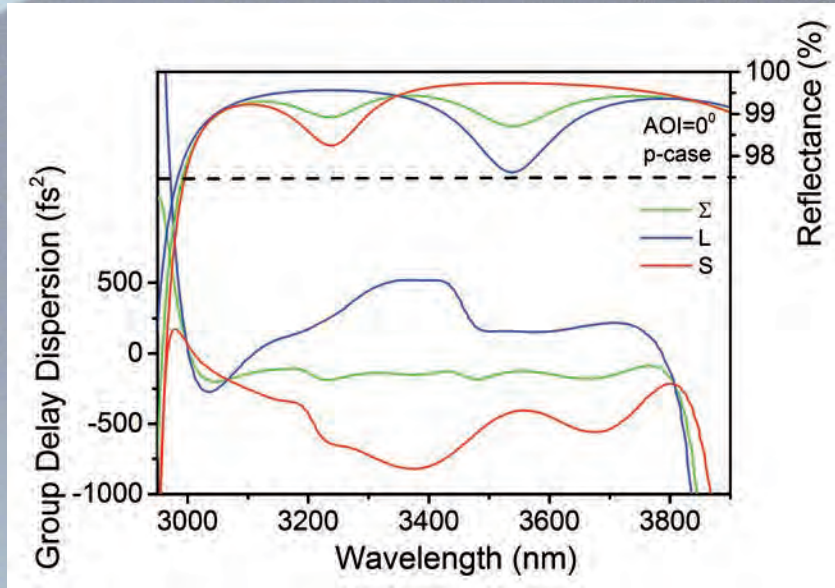


Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	2850 nm
Spectral working range high end	3700 nm

Central wavelength	3275 nm
Minimum reflectance	98.00 %
Second working range	
Second spectral working range low end	1850.0 nm
Second spectral working range high end	2820.0 nm
Polarization regime	p
Minimum transmittance	97 %



BROAD-BAND DISPERSIVE MIRROR IR 1332_RC3_L_S

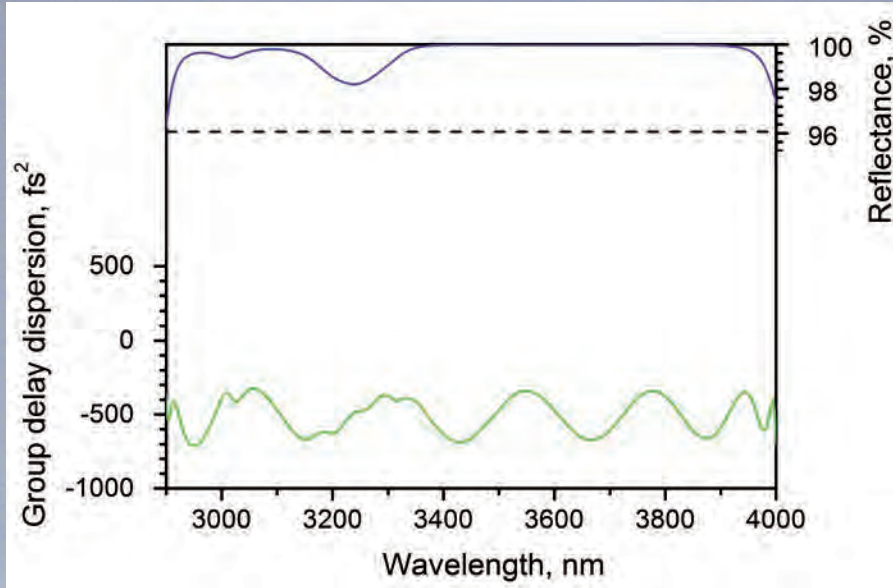


Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	3000 nm
Spectral working range high end	3800 nm
Central wavelength	3400 nm
Nominal GDD	-200 fs ² *
Minimum Reflectance	> 98 %



BROAD-BAND DISPERSIVE MIRROR IR 15

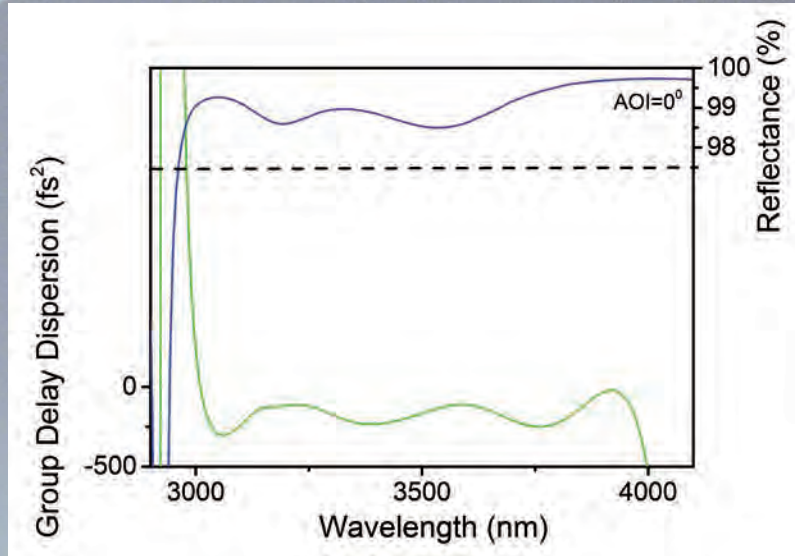


Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	3000 nm
Spectral working range high end	4000 nm
Central wavelength	3500 nm
Nominal GDD	-500 fs ²
Minimum Reflectance	> 98 %



BROAD-BAND DISPERSIVE MIRROR IR 1322_RC1



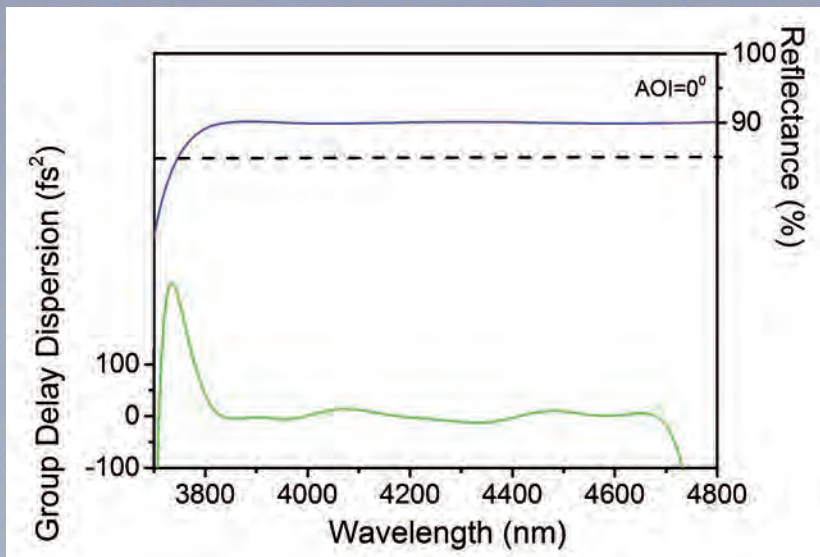
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	3100 nm
Spectral working range high end	3950 nm
Central wavelength	3525 nm
Nominal GDD	-200 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1321_OC_RC5

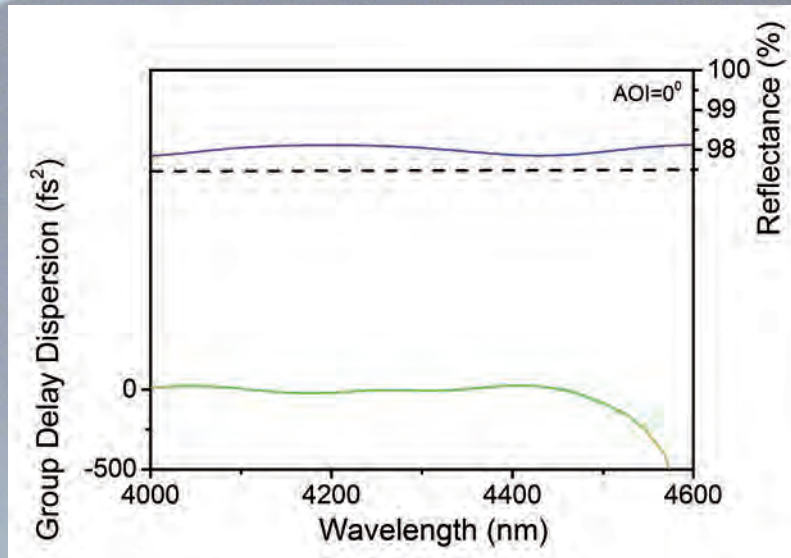


Details		Spectral category	IR
Description of the design	Broad-band dispersive mirror	Spectral working range low end	3850 nm
Type	Mirror	Spectral working range high end	4700 nm
Subtype	DM (dispersive mirror)	Central wavelength	4275 nm
Angle of Incidence in degrees	0	Nominal GDD	0 fs ² *
Polarization regime (primary spectral range)	p	Reflectance	90 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1321_OC_RC4



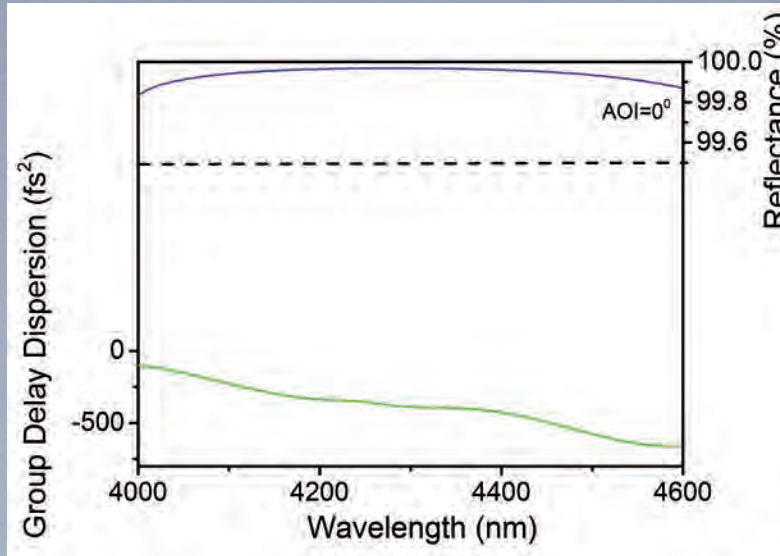
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Spectral category	IR

Spectral working range low end	4000 nm
Spectral working range high end	4600 nm
Central wavelength	4300 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	100 fs ²
Reflectance	98 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1321_OC_RC1



Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	4000 nm
Spectral working range high end	4600 nm
Central wavelength	4300 nm
Nominal GDD	-400 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



Dispersive mirrors

Dispersive mirrors

The dispersive mirror contains of alternating multilayer coating utilizing single or multi - Gires–Tournois effect. The bandwidths of these mirrors are spread up to 250 nm which corresponds to the bandwidth of quarter wave stack around 800 nm. There is a smaller bandwidth of about 150 nm in UV range. It is spread up to 350 nm in IR range.

Please browse UFI's design database for following examples:

(www.ultrafast-innovations.com/index.php/database)

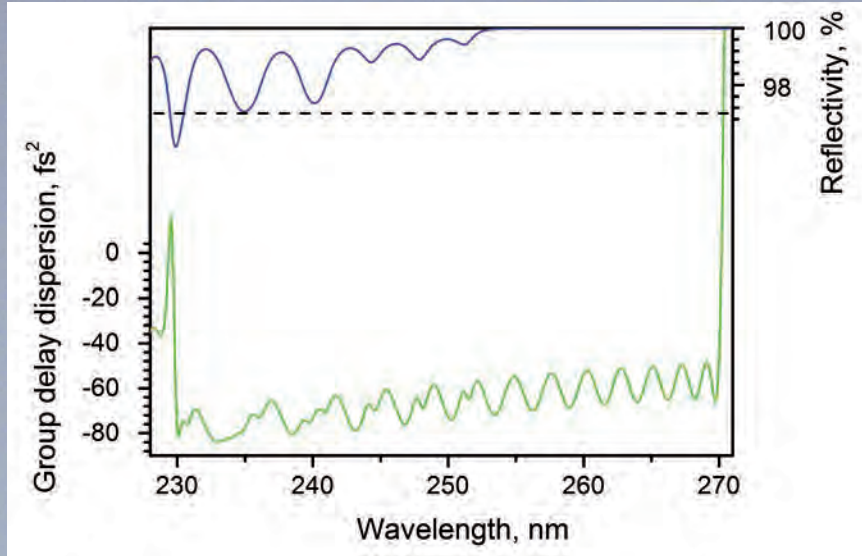
CM313, CM1302, CM1401, CM135, CM31, CM58, CM82, CM53, CM1331, CM61, CM81, CM83

Applications
Pulse compression with spectrum bandwidth up to 250 nm
Cavity mirrors for laser oscillators

See also literature for further information and application:

- V. Pervak et al. Optics Express. 15, 13768 (2007)
- A. Fernández et al., Appl. Phys. B. 87, 395 (2007)
- P. Dombi et al. Optics Express 17, 20598 (2009)
- S. Naumov et al. New J. Physics 7 216 (2005)

HIGH DISPERSIVE MIRROR CM 313



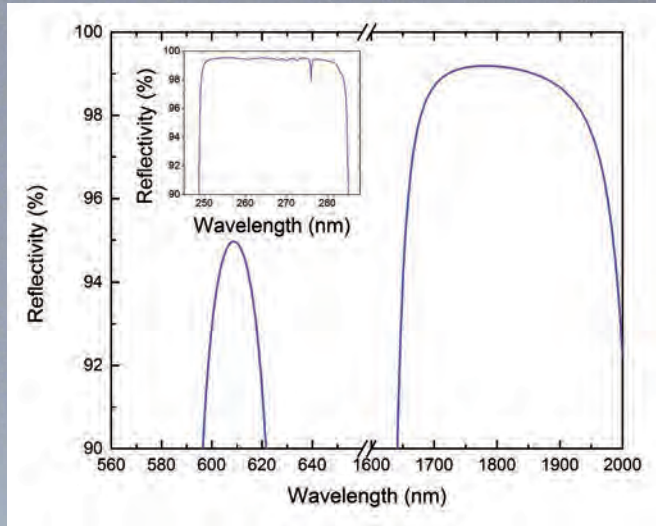
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	8
Polarization regime (primary spectral range)	s

Spectral category	UV
Spectral working range low end	230 nm
Spectral working range high end	270 nm
Central wavelength	250 nm
Nominal GDD	-65 fs ²
Nominal GDD maximum deviation	8 fs ²
Minimum Reflectance	> 96 %

* not constant over defined working range

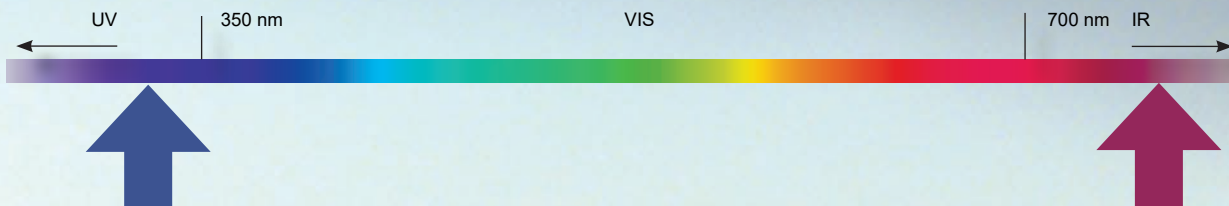


HIGH REFLECTIVE MIRROR CM 1302

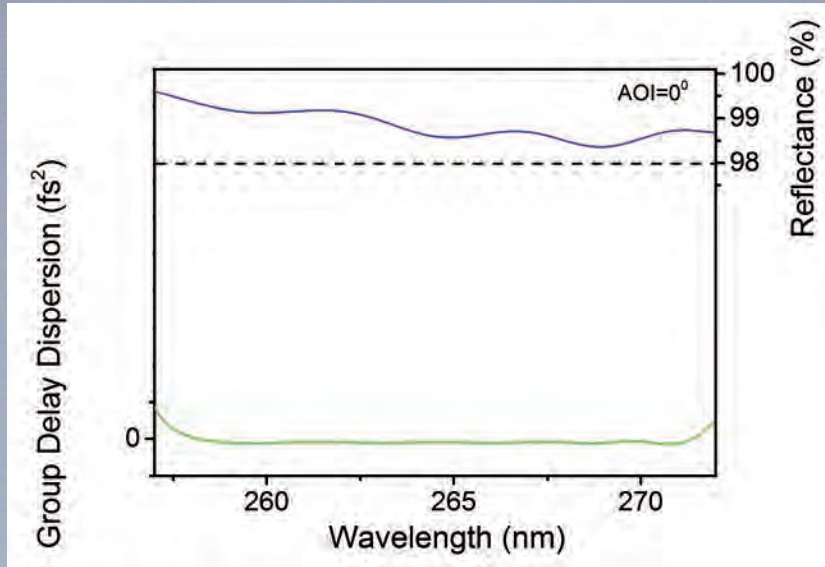


Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
First working range	
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	UV-IR

Spectral working range low end	250 nm
Spectral working range high end	275 nm
Central wavelength	262 nm
Minimum reflectance	> 98 %
Second working range	
Second spectral working range low end	1700.0 nm
Second spectral working range high end	1900.0 nm
Minimum reflectance	> 98 %



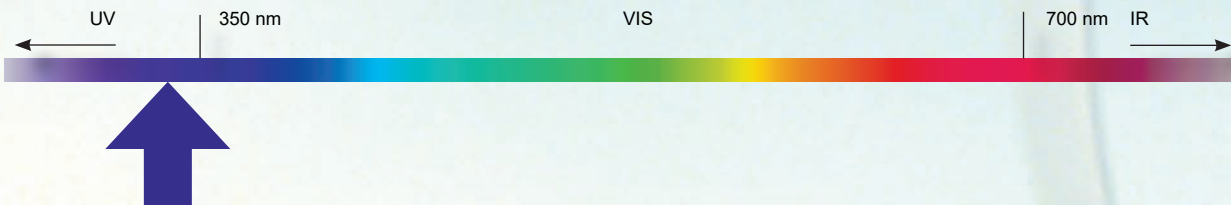
HIGH REFLECTIVE MIRROR CM 1401



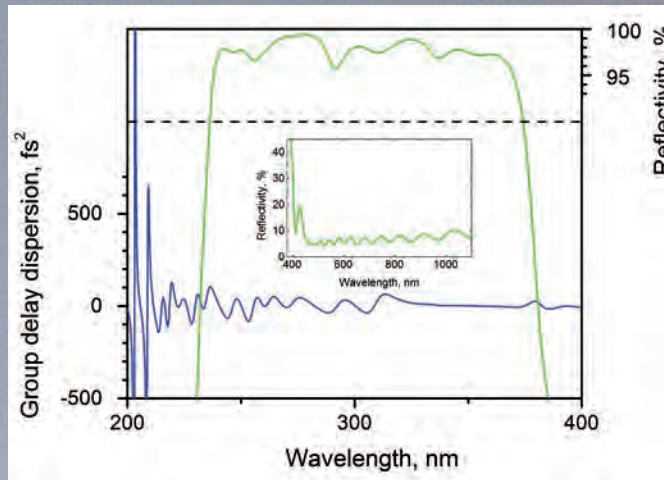
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	P

Spectral category	UV
Spectral working range low end	258 nm
Spectral working range high end	270 nm
Central wavelength	264 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	> 98 %

* not constant over defined working range



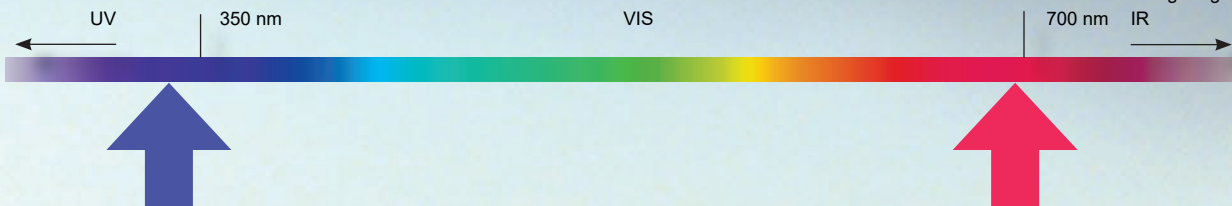
BROAD-BAND DICHOIC MIRROR CM 58



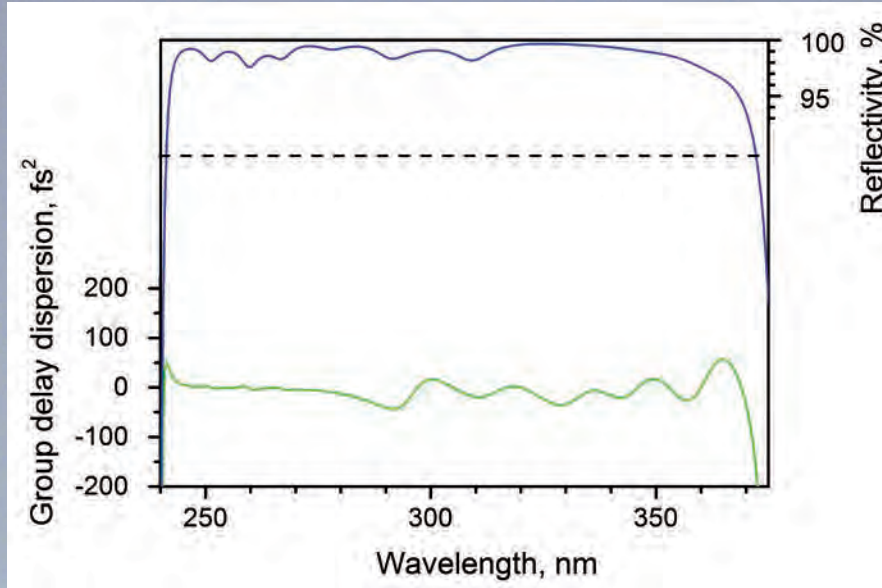
Details	
Description of the design	Broad-band dichroic mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
First working range	
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	UV-VIS
Spectral working range low end	240 nm
Spectral working range high end	370 nm

Central wavelength	305 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum reflectance	95.00 %
Second working range	
Second spectral working range low end	470.0 nm
Second spectral working range high end	1100.0 nm
Polarization regime	p
Minimum transmittance	90.00 %

* not constant over defined working range



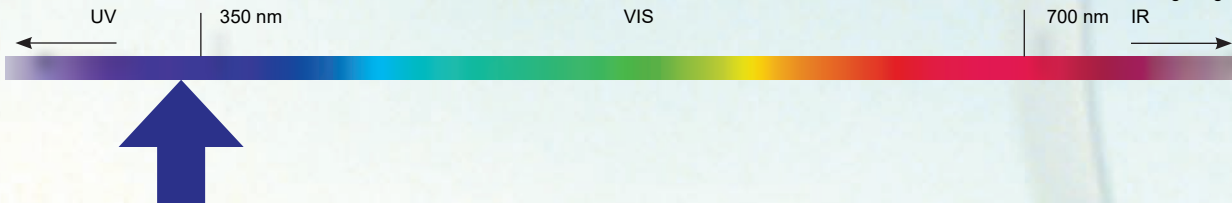
BROAD-BAND HIGH-REFLECTIVE MIRROR CM 31



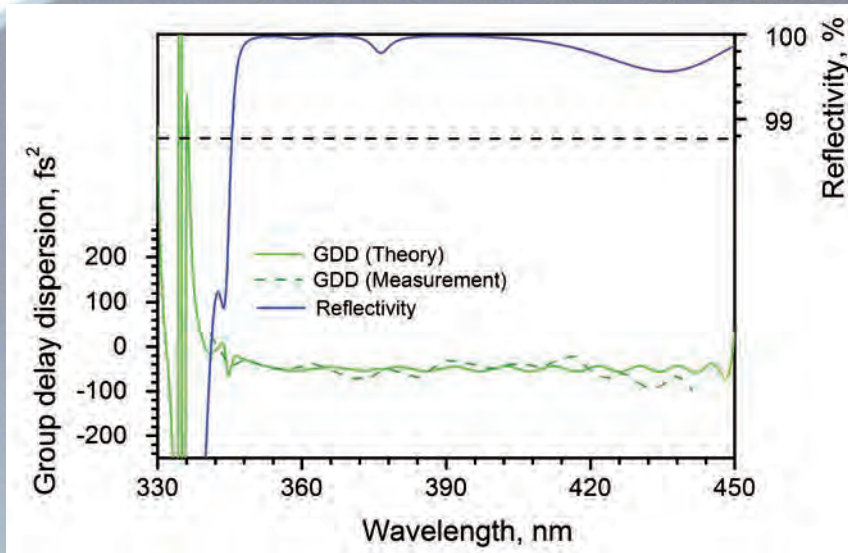
Details	
Description of the design	Broad-band high-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	UV-VIS
Spectral working range low end	250 nm
Spectral working range high end	360 nm
Central wavelength	305 nm
Nominal GDD	0 fs ²
Nominal GDD maximum deviation	30 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR CM 82



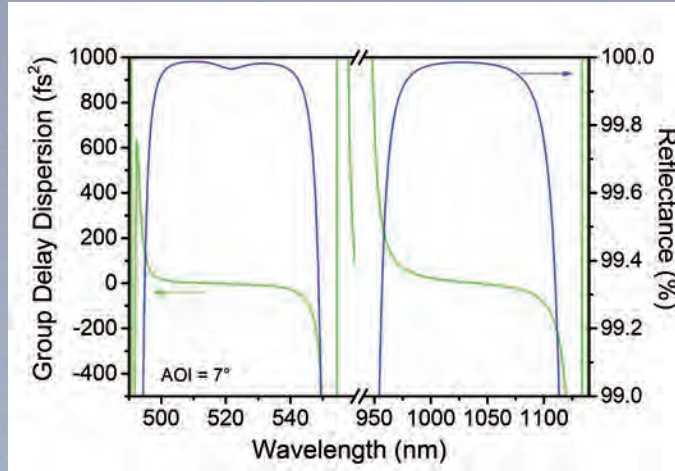
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	350 nm
Spectral working range high end	450 nm
Central wavelength	400 nm
Nominal GDD	-50 fs ² *
Minimum Reflectance	> 99.5 %

* not constant over defined working range



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM 1601



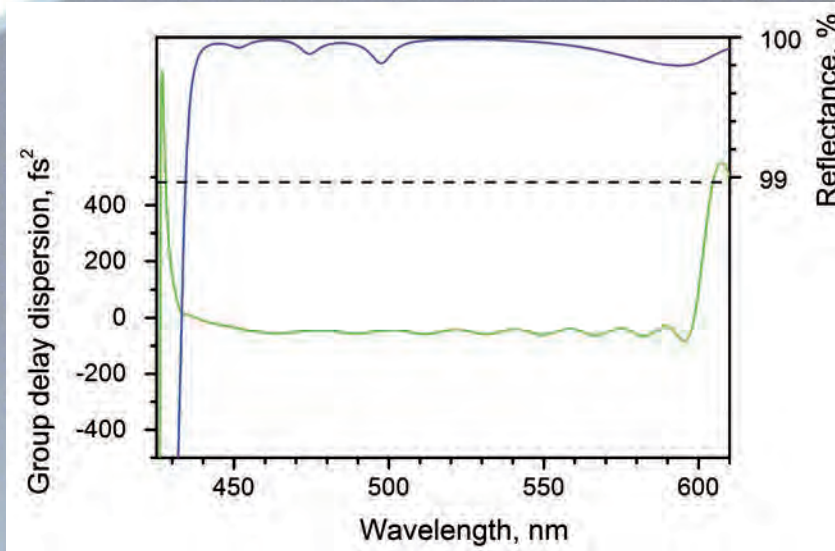
Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
First working range	
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	505 nm
Spectral working range high end	540 nm

Central wavelength	522.5 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	0 fs ²
Minimum reflectance	99.90 %
Second working range	
Second spectral working range low end	990.0 nm
Second spectral working range high end	1080.0 nm
Polarization regime	p
Minimum transmittance	99.90 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR PC 55



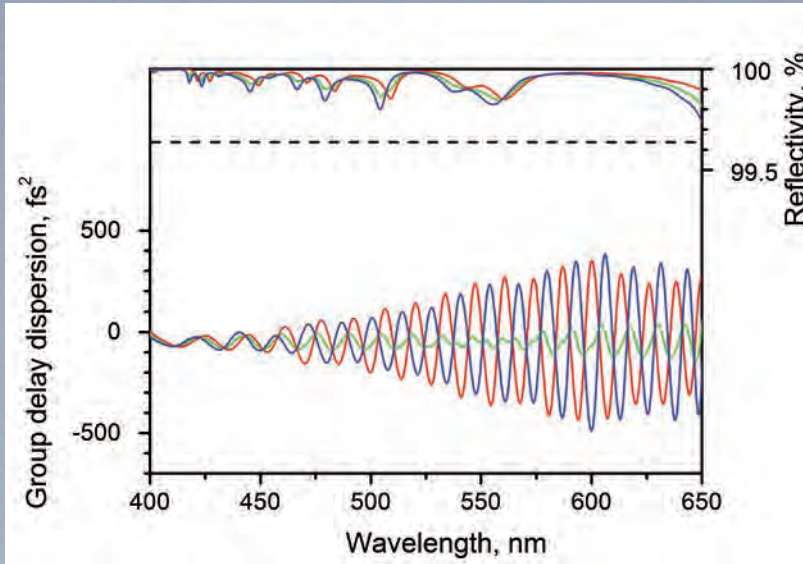
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	450 nm
Spectral working range high end	600 nm
Central wavelength	525 nm
Nominal GDD	-40 fs ² *
Nominal GDD maximum deviation	20 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



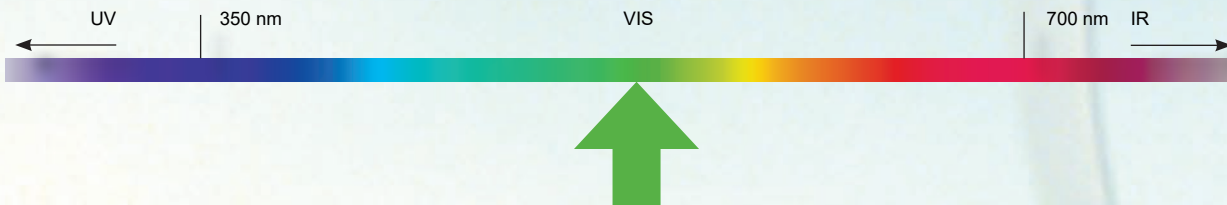
BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR HD 71



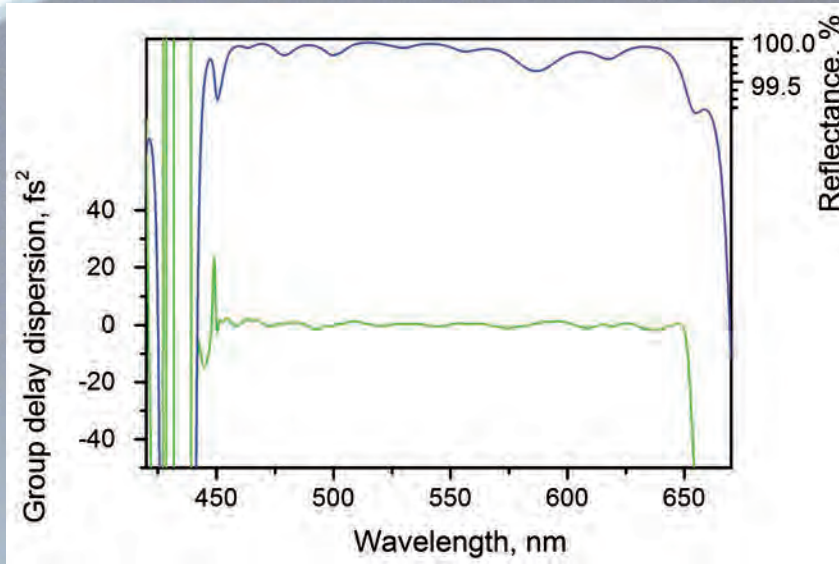
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	16
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	400 nm
Spectral working range high end	650 nm
Central wavelength	525 nm
Nominal GDD	-50 fs ² *
Nominal GDD maximum deviation	80 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



BROAD-BAND HIGH-REFLECTIVE MIRROR CM 53

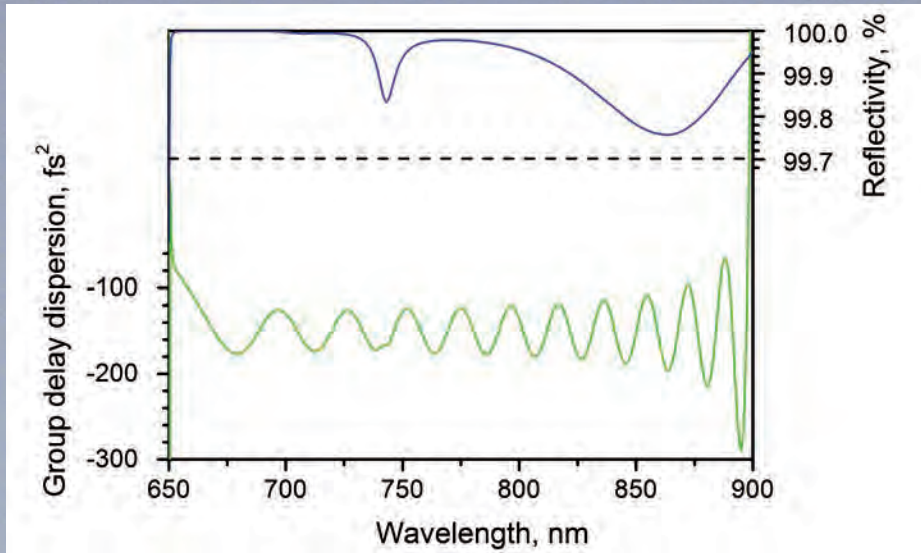


Details	
Description of the design	Broad-band high-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	450 nm
Spectral working range high end	650 nm
Central wavelength	550 nm
Nominal GDD	0 fs ²
Minimum Reflectance	> 99.7 %

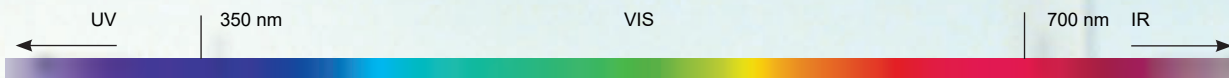


BROAD-BAND DISPERSIVE MIRROR PC 139

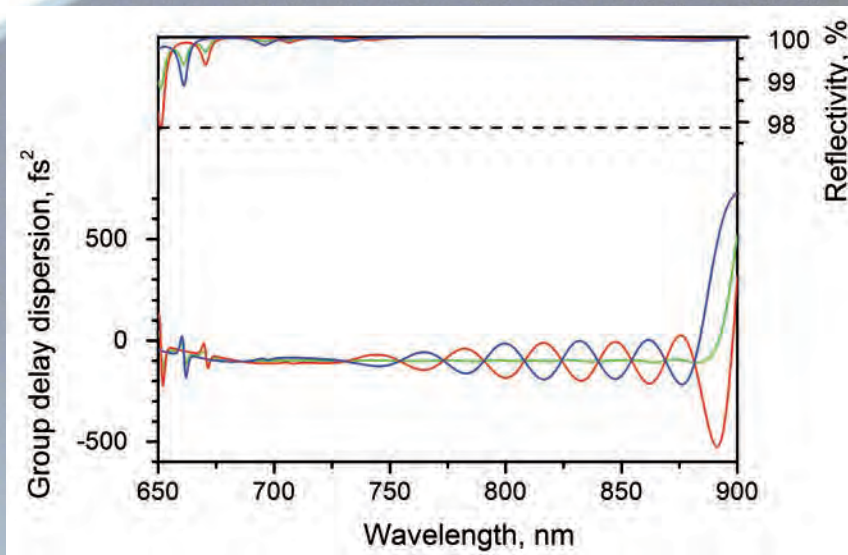


Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	660 nm
Spectral working range high end	880 nm
Central wavelength	770 nm
Nominal GDD	-150 fs ²
Minimum Reflectance	> 99.7 %



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR DA 2



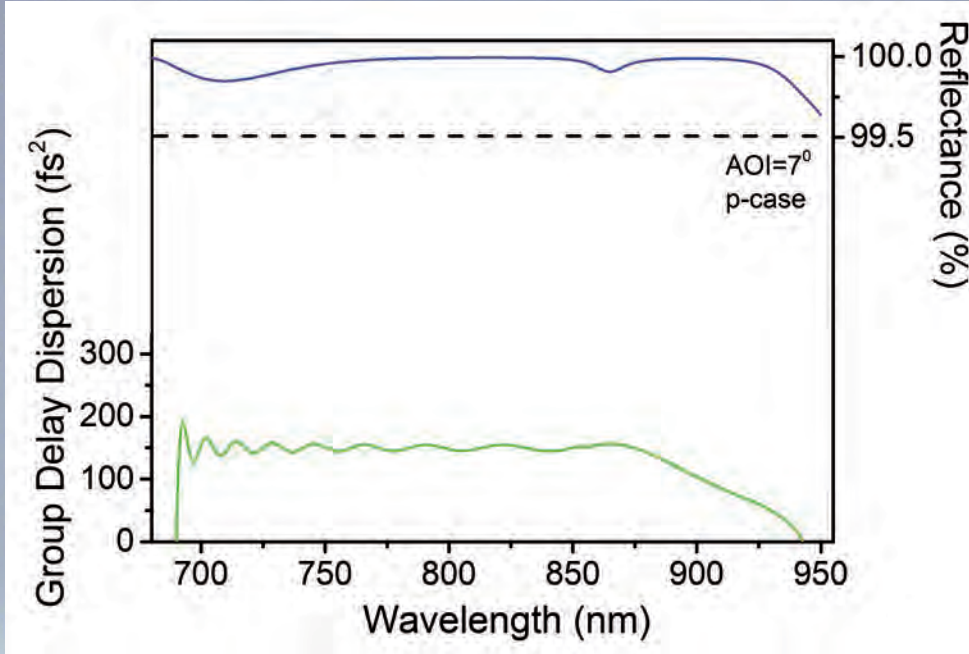
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	680 nm
Spectral working range high end	880 nm
Central wavelength	780 nm
Nominal GDD	-100 fs ² *
Nominal GDD maximum deviation	5 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR PC 1305_RC2

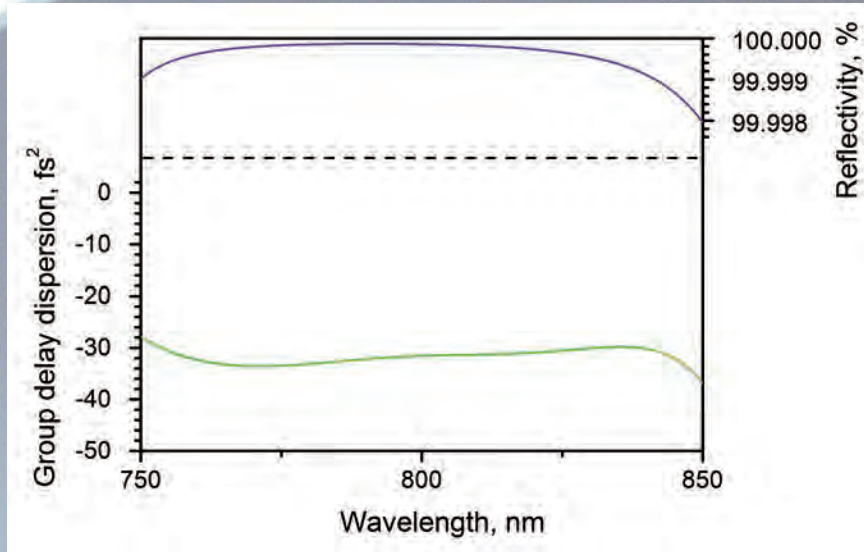


Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	BBDM (broad-band dispersive mirror)
Spectral category	VIS-IR

Spectral working range low end	690 nm
Spectral working range high end	870 nm
Central wavelength	780 nm
Nominal GDD	150 fs^2
Minimum Reflectance	> 99.7 %



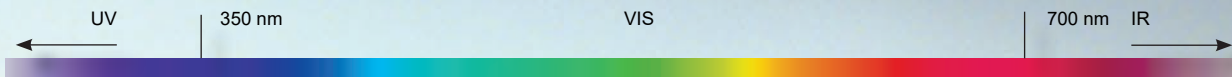
BROAD-BAND DISPERSIVE MIRROR CM 1331



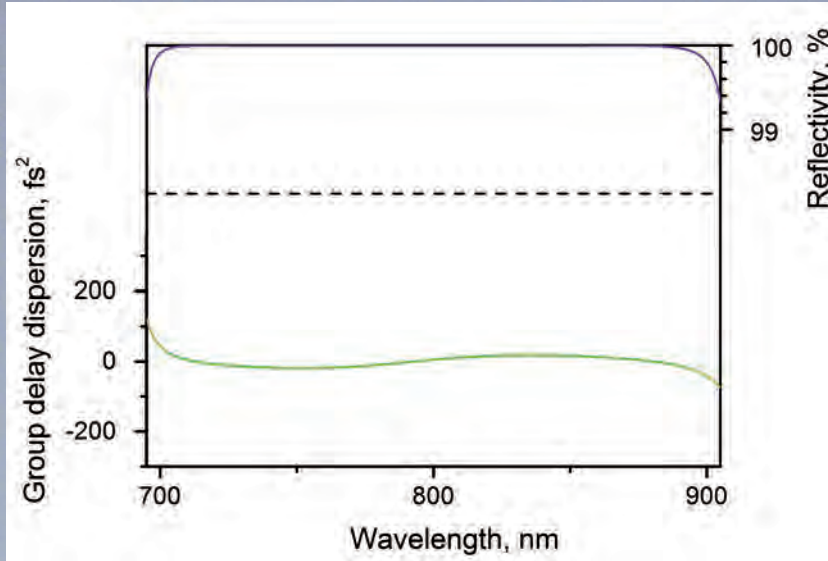
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	760 nm
Spectral working range high end	840 nm
Central wavelength	800 nm
Nominal GDD	-30 fs ² *
Nominal GDD maximum deviation	5 fs ²
Minimum Reflectance	> 99.99 %

* not constant over defined working range



BROAD-BAND HIGH-REFLECTION MIRROR CM 61

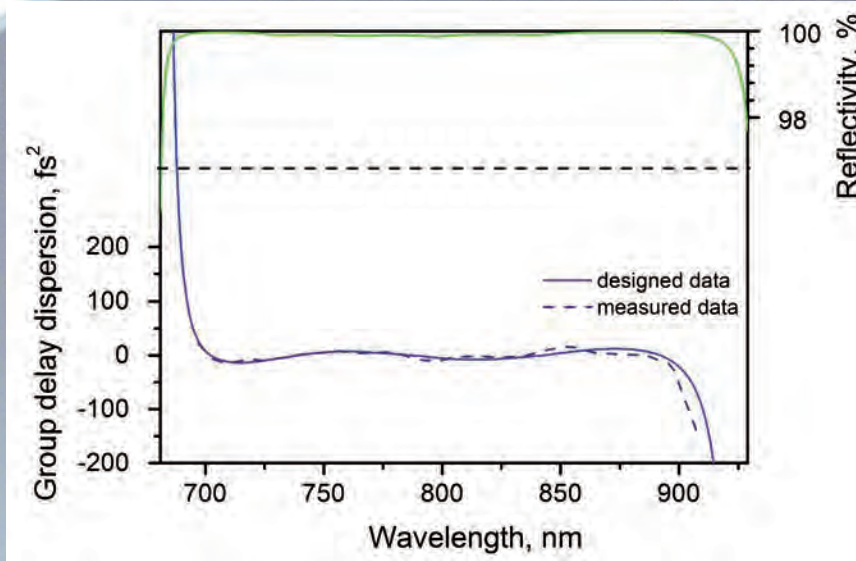


Details	
Description of the design	Broad-band high-reflection mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	900 nm
Central wavelength	800 nm
Nominal GDD	0 fs ²
Minimum Reflectance	> 99.99 %



BROAD-BAND HIGH-REFLECTION MIRROR CM 81



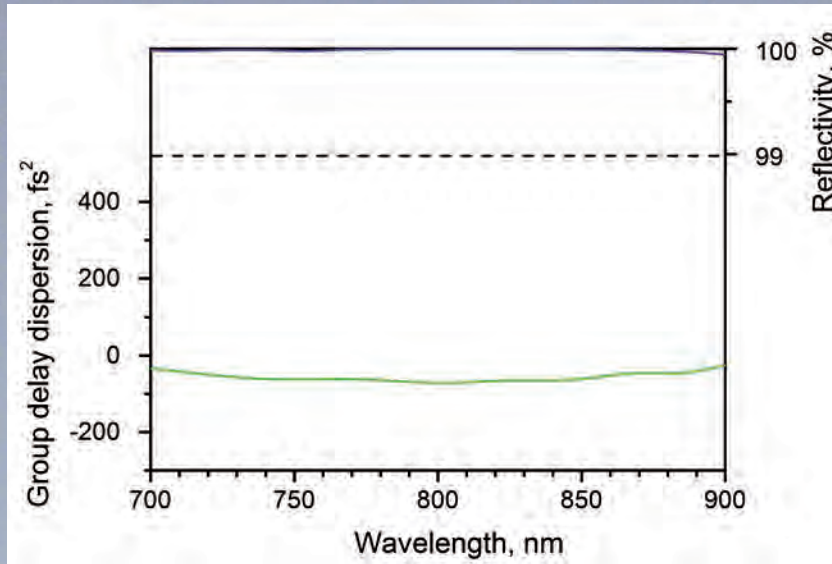
Details	
Description of the design	Broad-band high-reflection mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	900 nm
Central wavelength	800 nm
Nominal GDD	0 fs ²
Nominal GDD maximum deviation	15 fs ²
Minimum Reflectance	> 99.95 %

* not constant over defined working range



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM83



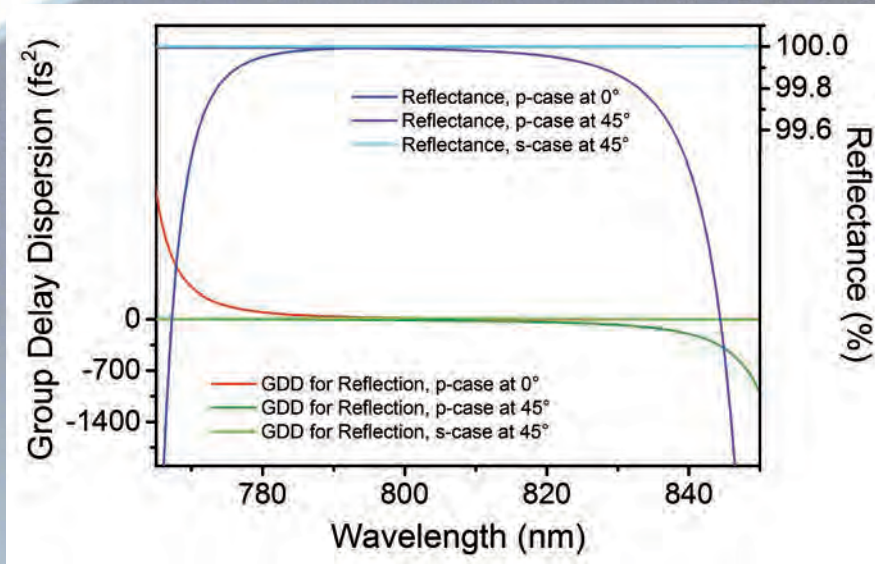
Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	900 nm
Central wavelength	800 nm
Nominal GDD	-50 fs ²
Nominal GDD maximum deviation	20 fs ²
Minimum Reflectance	> 99.95 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR CM 1321_RC2



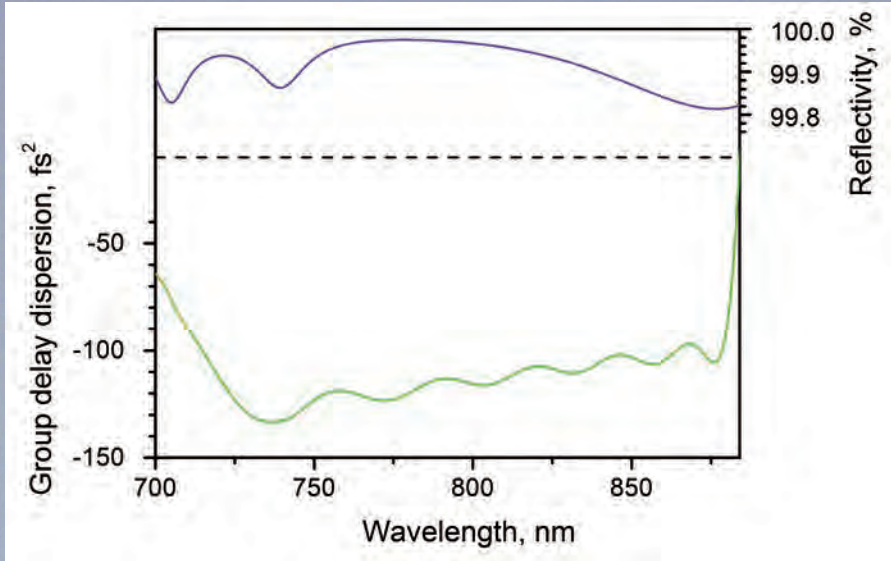
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0, 45
Polarization regime (primary spectral range)	s, p

Spectral category	IR
Spectral working range low end	770 nm
Spectral working range high end	840 nm
Central wavelength	805 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR CM 101



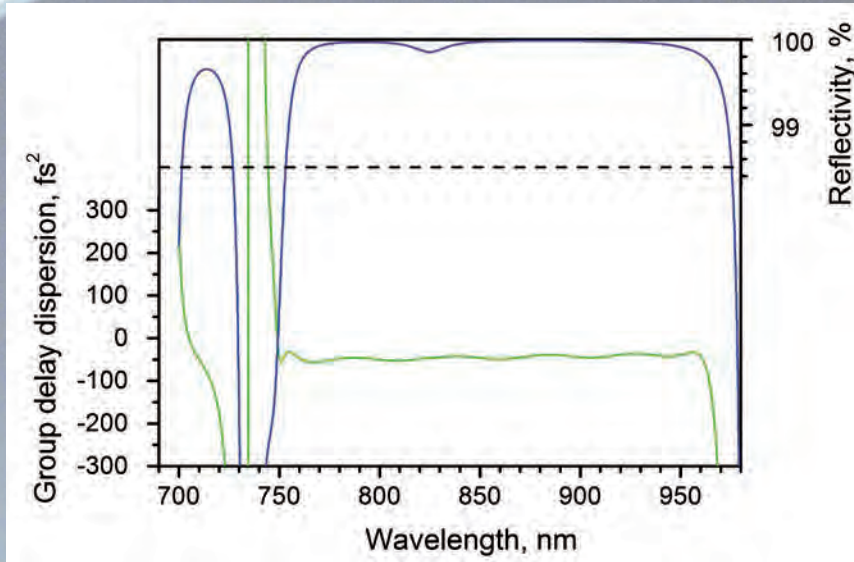
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	730 nm
Spectral working range high end	880 nm
Central wavelength	805 nm
Nominal GDD	-115 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY PC 148

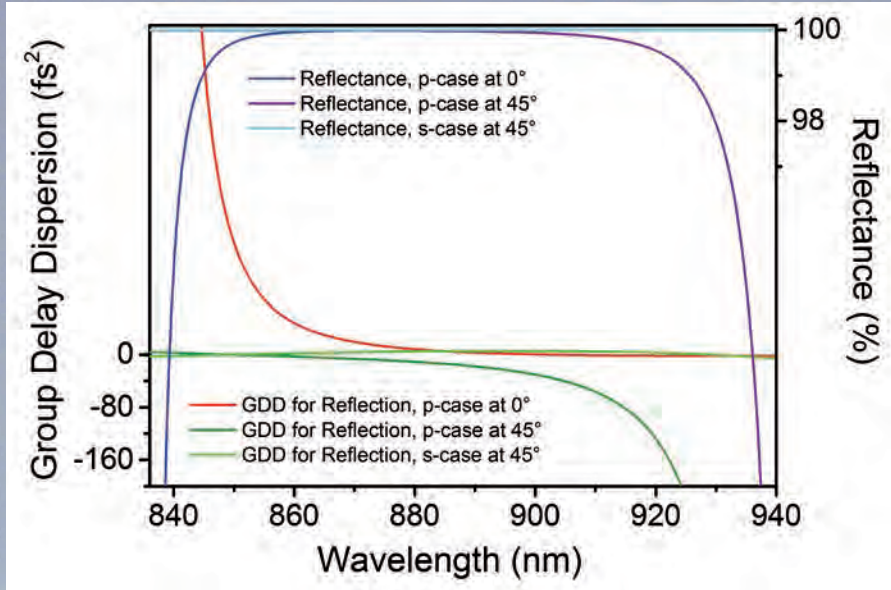


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	760 nm
Spectral working range high end	960 nm
Central wavelength	860 nm
Nominal GDD	-50 fs ²
Minimum Reflectance	> 99.8 %



HIGH REFLECTIVE MIRROR CM 1322_RC2



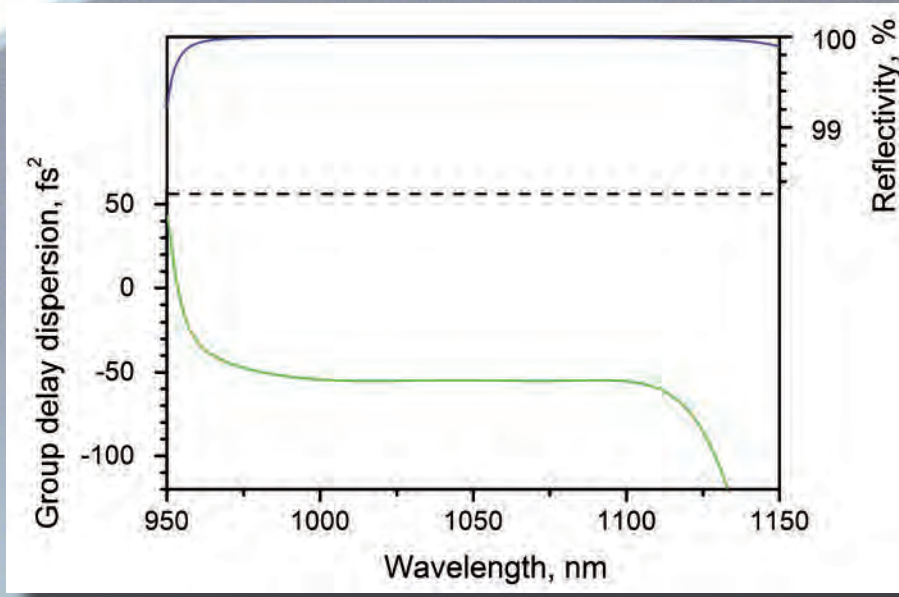
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0, 45
Polarization regime (primary spectral range)	s, p

Spectral category	IR
Spectral working range low end	850 nm
Spectral working range high end	920 nm
Central wavelength	885 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	> 99.5 %

* not constant over defined working range

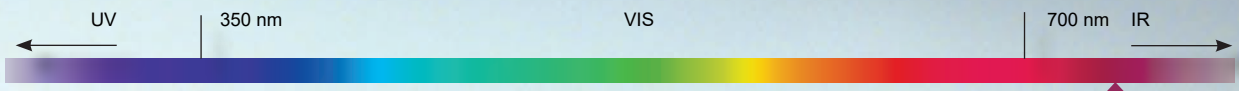


DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM130

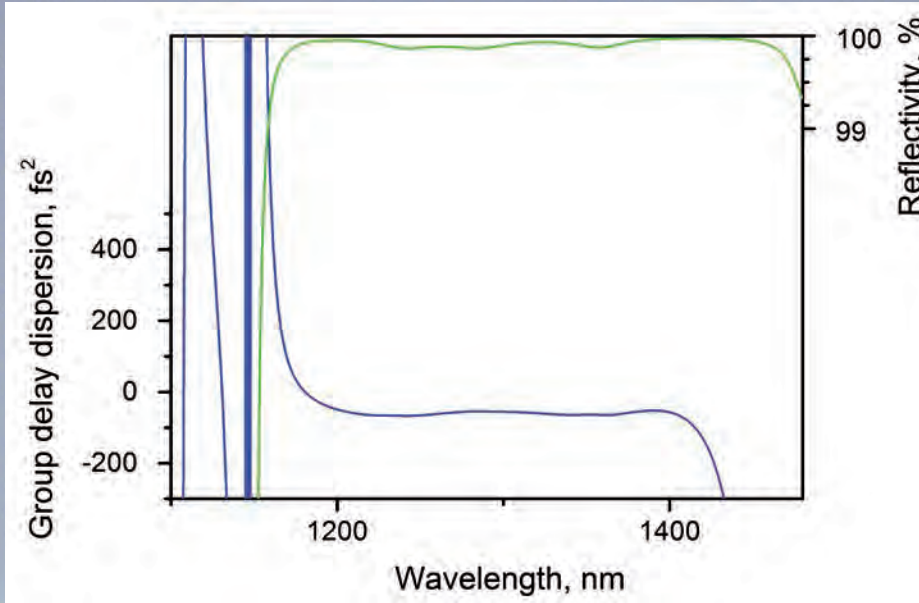


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	970 nm
Spectral working range high end	1120 nm
Central wavelength	1045 nm
Nominal GDD	-50 fs ²
Minimum Reflectance	> 99.8 %



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM55

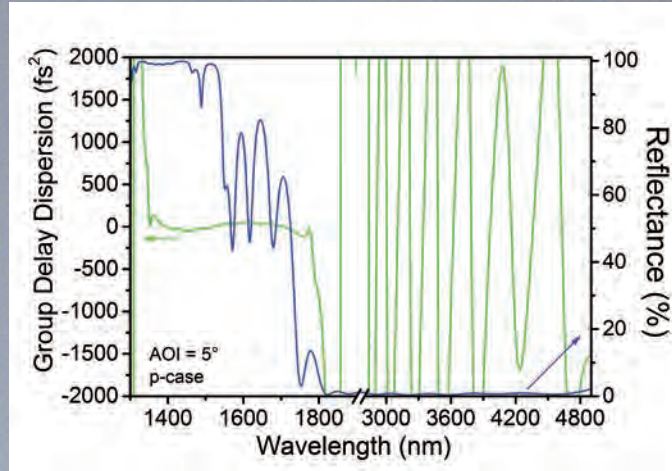


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	1200 nm
Spectral working range high end	1400 nm
Central wavelength	1300 nm
Nominal GDD	-60 fs ²
Minimum Reflectance	> 99.8 %



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY IR 1502



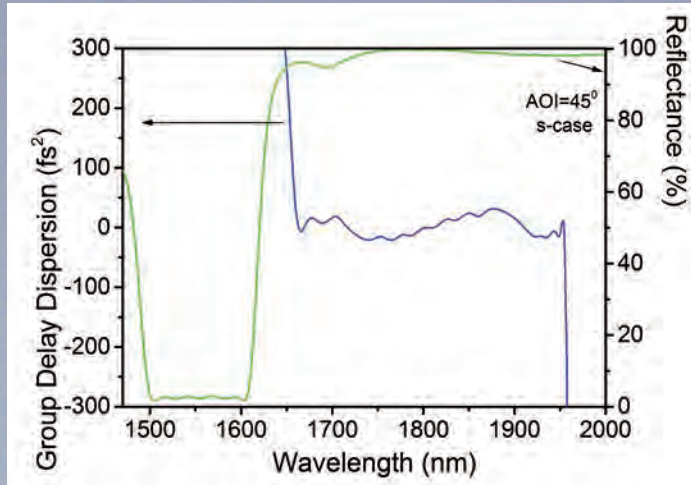
Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
First working range	
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	1380 nm
Spectral working range high end	1760 nm

Central wavelength	1570 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum reflectance	98.50 %
Second working range	
Second spectral working range low end	2800.0 nm
Second spectral working range high end	4800.0 nm
Polarization regime	s
Minimum transmittance	5.00 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1401



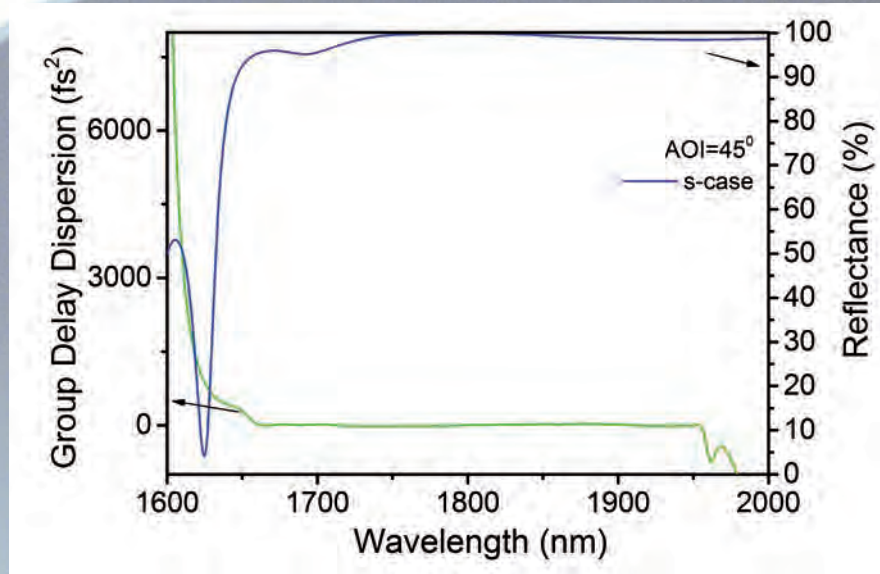
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	IR
Spectral working range low end	1650 nm
Spectral working range high end	1950 nm

Central wavelength	1800 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum reflectance	> 95 %
Second working range	
Second spectral working range low end	1520.0 nm
Second spectral working range high end	1600.0 nm
Polarization regime	s
Minimum transmittance	95 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1401_RC2



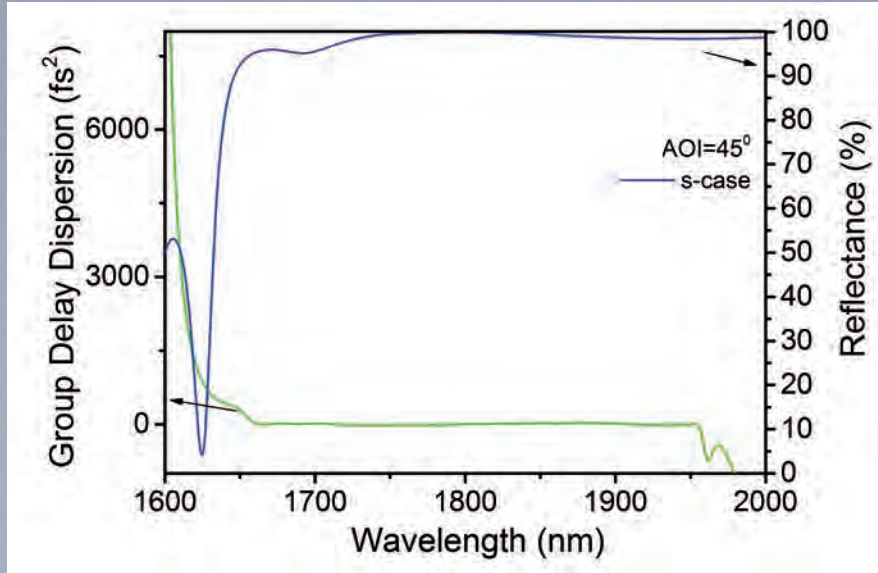
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	1650 nm
Spectral working range high end	1950 nm
Central wavelength	1800 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 95 %

* not constant over defined working range



BROAD-BAND DISPERSIVE MIRROR IR 1401_RC2



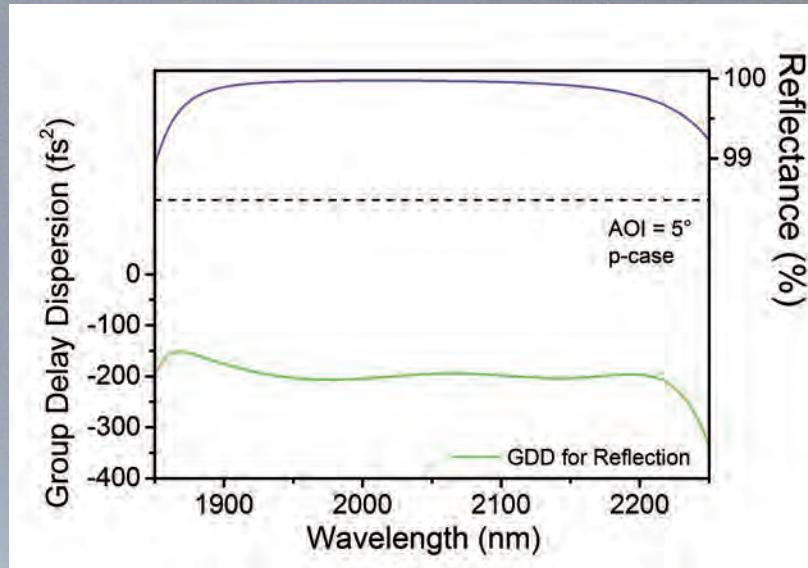
Details	
Description of the design	Broad-band dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	1650 nm
Spectral working range high end	1950 nm
Central wavelength	1800 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 95 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR CM 1531



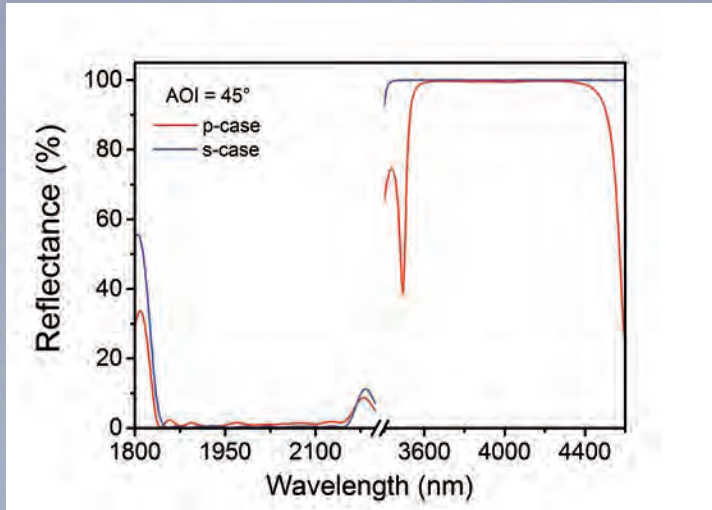
Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	1900 nm
Spectral working range high end	2200 nm
Central wavelength	2050 nm
Nominal GDD	-200 fs ² *
Minimum Reflectance	> 99.70 %

* not constant over defined working range



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY IR 1501



Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	IR
Spectral working range low end	3500 nm

Spectral working range high end	4500 nm
Central wavelength	4000 nm
Minimum reflectance	99 %
Second working range	
Second spectral working range low end	1950.0 nm
Second spectral working range high end	2050.0 nm
Polarization regime	s
Minimum transmittance	3 %

* not constant over defined working range





High-dispersive mirrors

High-dispersive mirrors

The high-dispersive mirrors can substitute a prism compressor. This unprecedented combination of high dispersion and low loss over a sizeable bandwidth with multilayer structures opens the prospects for femtosecond CPA systems equipped with a compact, alignment-insensitive all-mirror compressors providing compensation of GDD as well as higher-order dispersion. HDs have many distinct advantages:

- more compact laser system
- increased throughput
- improved temporal stability
- shorter output pulses.

Hundreds of kHz-rate Ti:sapphire femtosecond CPA lasers are in use all over the world. Their operation relies on the stretching and recompressing the pulses before and after amplification. Currently, complex, rather lossy and alignment sensitive optical systems based on prisms and/or diffraction gratings are employed for this purpose. HD mirrors demonstrate that the required dispersion up to orders of 10000 fs^2 can be introduced by a set of high-dispersive multilayer dielectric mirrors. It has been demonstrated by employing HD mirrors technology in μJ -level femtosecond Yb:YAG laser oscillators.

Customers are able to reach the Fourier-limit of 19 fs output pulses by replacing the prism compressor with highly-dispersive mirrors. The maximum nominal dispersion is inversely proportional to the mirror bandwidth.

Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
HD16, HD30

Further, a variety of mirrors is available for pulse compression of Yb-based laser systems. By compensating the dispersion of microscope objectives in biophotonics applications highly-dispersive mirrors help to deliver femtosecond pulses on target.

Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
HD64, HD73

Apart from applications at around 800 and 1030 nm wavelength, UltraFast Innovations can supply highly dispersive mirrors for virtually any part of the optical spectrum with desired bandwidth. All mirror compression solutions are also available as dedicated, fully characterized mirror compression units within a compact housing.

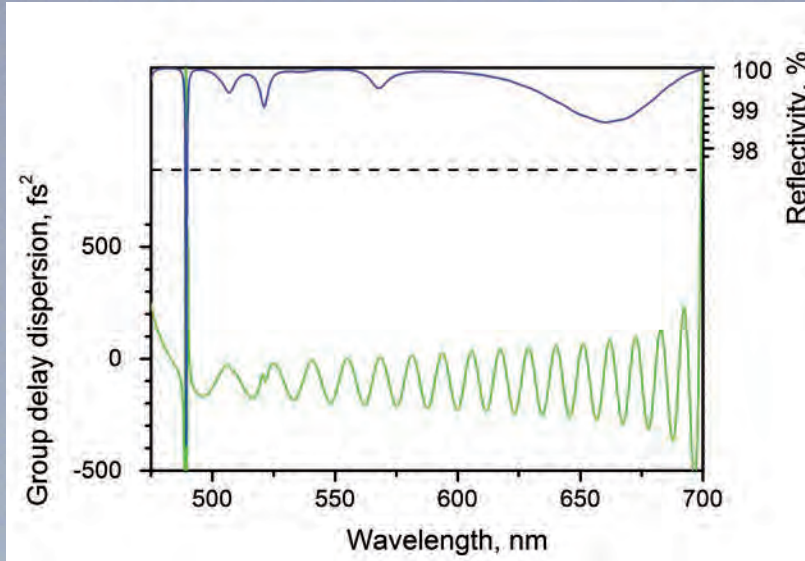
Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
HD40, HD58, D59, HD90, IR15

Applications - Cavity mirrors in high-energy femtosecond oscillators:
Femtosecond pulse compression
Compensation of microscope objectives
Chirped-pulse oscillators
Thin-disk oscillators
All mirror compression solutions are also available as dedicated, fully characterized mirror compression units within a compact housing.

**See also literature
for further information and application:**

- V. Pervak et al. Opt. Express 17 19204 (2009)
- P. Dombi et al. Optics Express 17, 20598 (2009)
- O. Pronin et al. Op. Lett. 36, 4746 (2011)
- O. Pronin et al. Opt. Lett. 37, 3543 (2012)
- V. Pervak et al. Opt. Express, 20, 4503 (2012)
- S. Naumov et al. New J. Physics 7 216 (2005)
- V. Pervak et al. Opt. Express 16 10220 (2008)

HIGH DISPERSIVE MIRROR HD 69



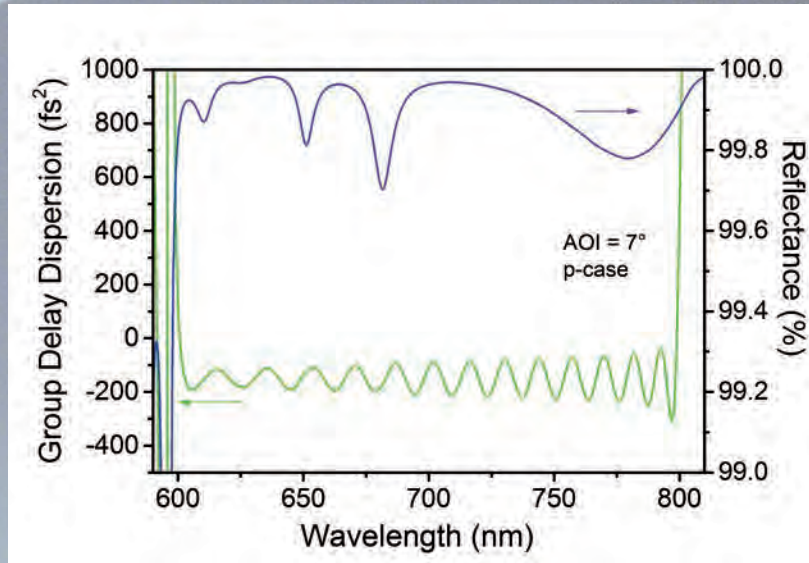
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	VIS

Spectral working range low end	500 nm
Spectral working range high end	700 nm
Central wavelength	600 nm
Nominal GDD	-100 fs ² *
Nominal GDD maximum deviation	250 fs ²
Minimum Reflectance	> 98 %

* not constant over defined working range



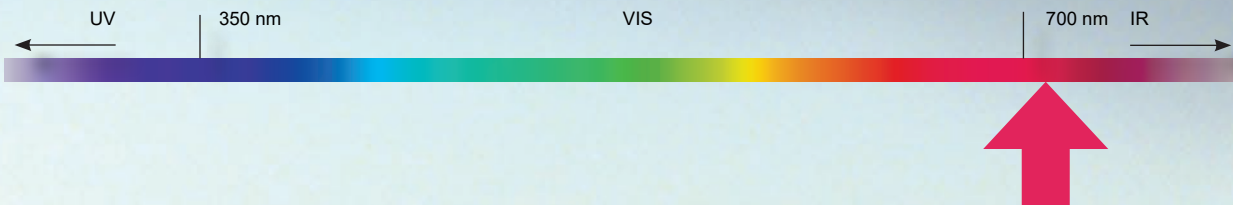
HIGH DISPERSIVE MIRROR HD 1601_RC2



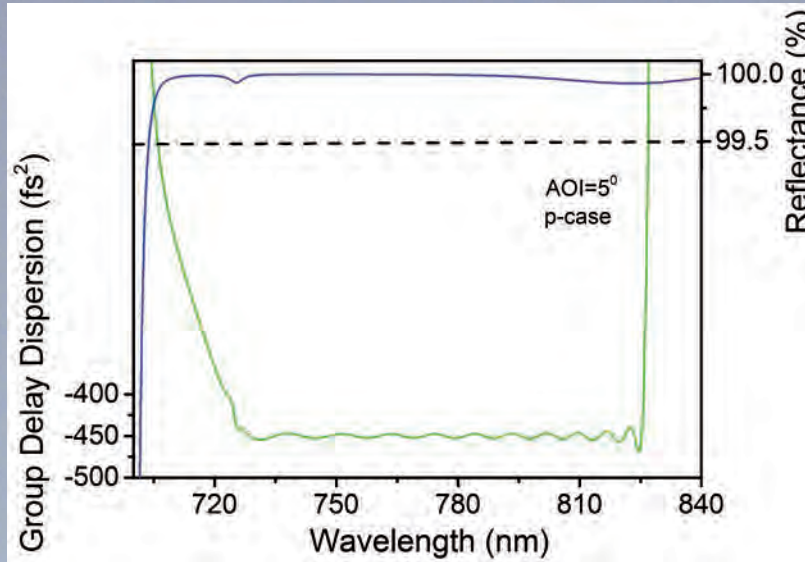
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	600 nm
Spectral working range high end	800 nm
Central wavelength	700 nm
Nominal GDD	-150 fs ² *
Minimum Reflectance	99.50 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD1401_RC1



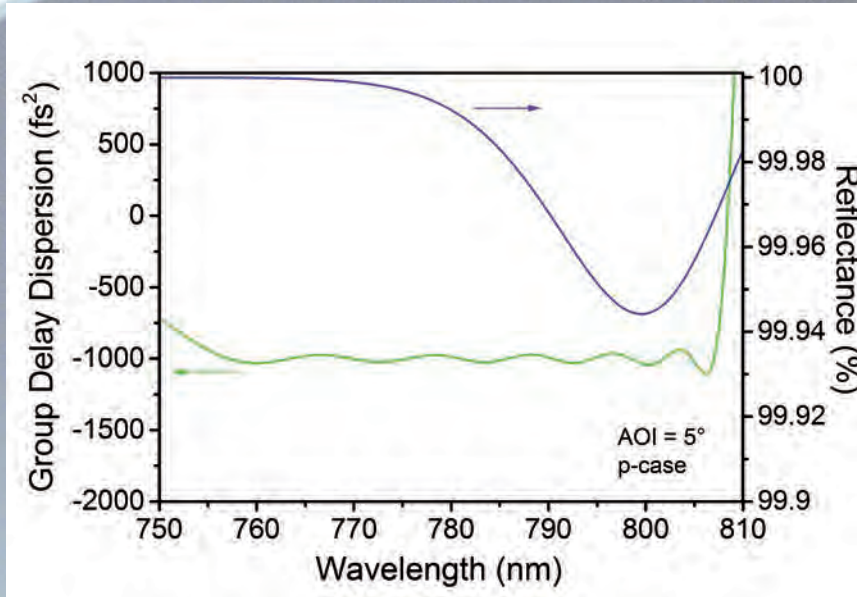
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	725 nm
Spectral working range high end	825 nm
Central wavelength	775 nm
Nominal GDD	-450 fs ² *
Nominal GDD maximum deviation	300 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 1607



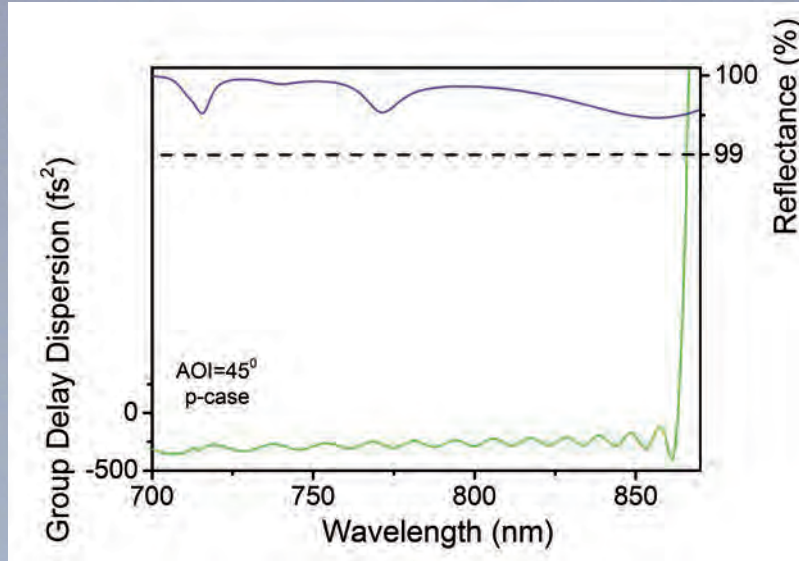
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	760 nm
Spectral working range high end	800 nm
Central wavelength	780 nm
Nominal GDD	-1000 fs ² *
Minimum Reflectance	99.90 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 1342



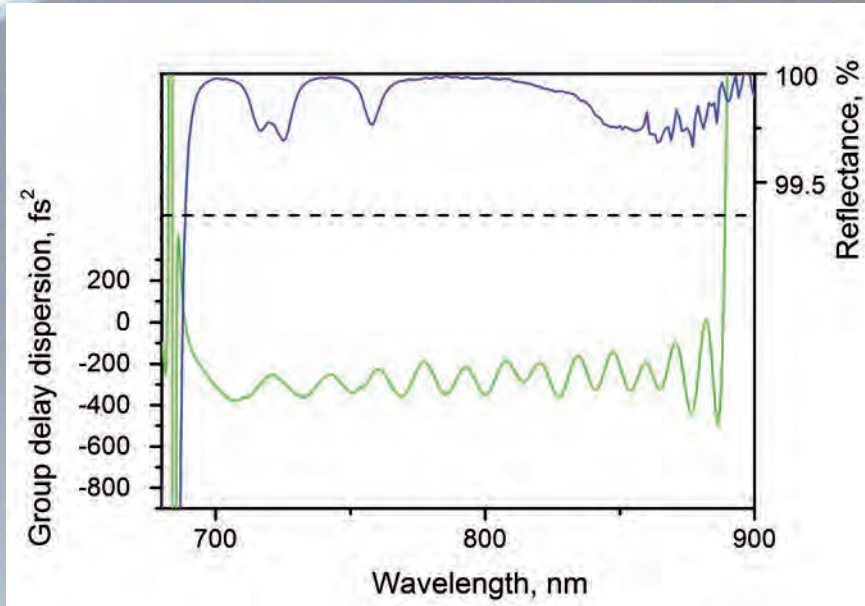
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	860 nm
Central wavelength	780 nm
Nominal GDD	-275 fs ² *
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 99.5 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 58



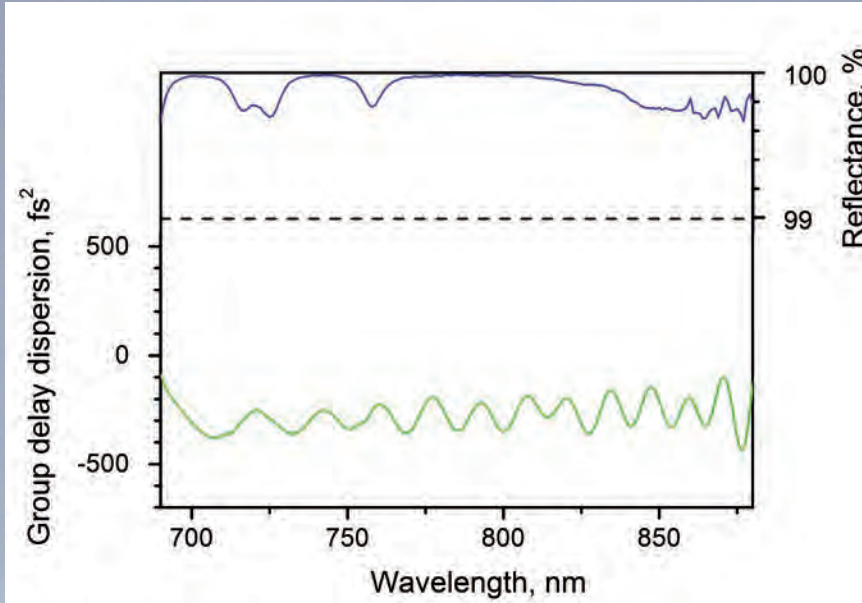
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	690 nm
Spectral working range high end	880 nm
Central wavelength	785 nm
Nominal GDD	-275 fs ² *
Nominal GDD maximum deviation	150 fs ²
Minimum Reflectance	> 99.7 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 67



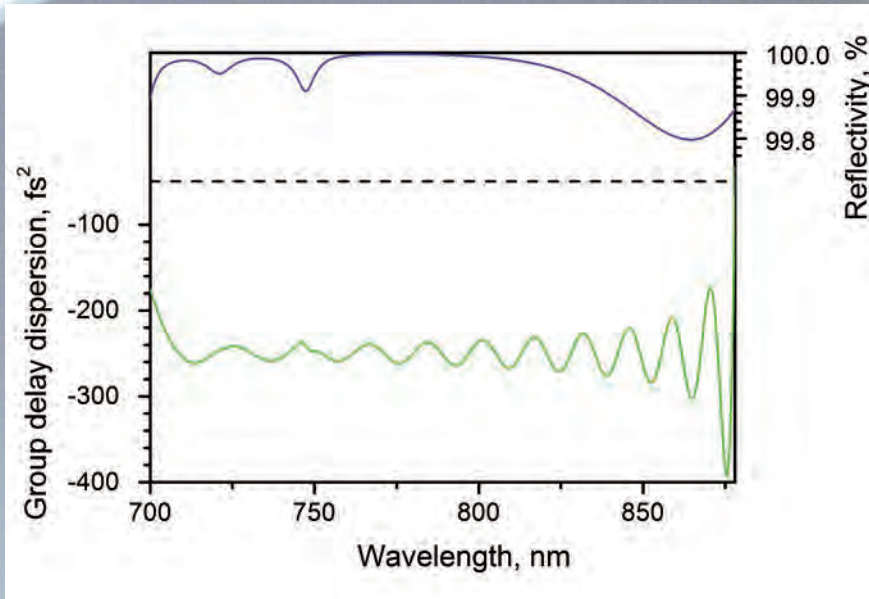
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	690 nm
Spectral working range high end	880 nm
Central wavelength	785 nm
Nominal GDD	-320 fs ² *
Nominal GDD maximum deviation	150 fs ²
Minimum Reflectance	> 99.7 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 116



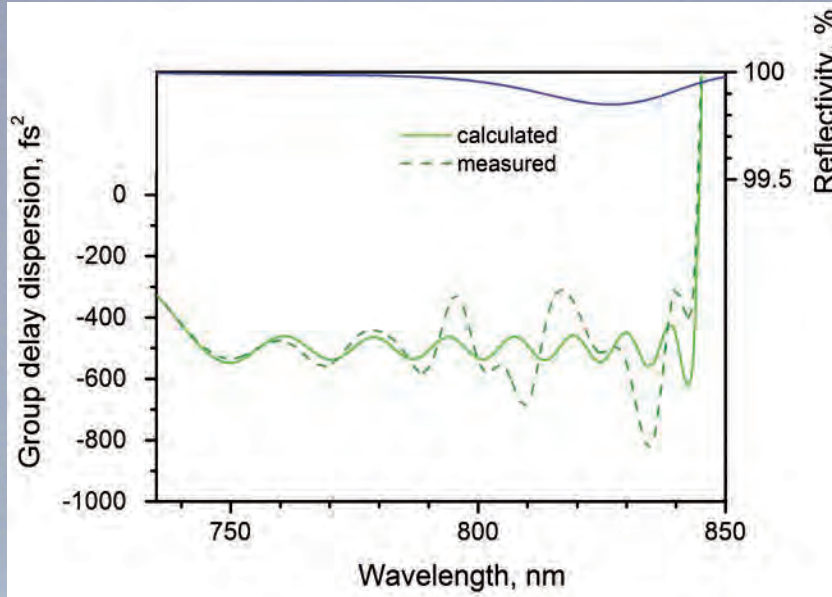
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	870 nm
Central wavelength	785 nm
Nominal GDD	-250 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 31



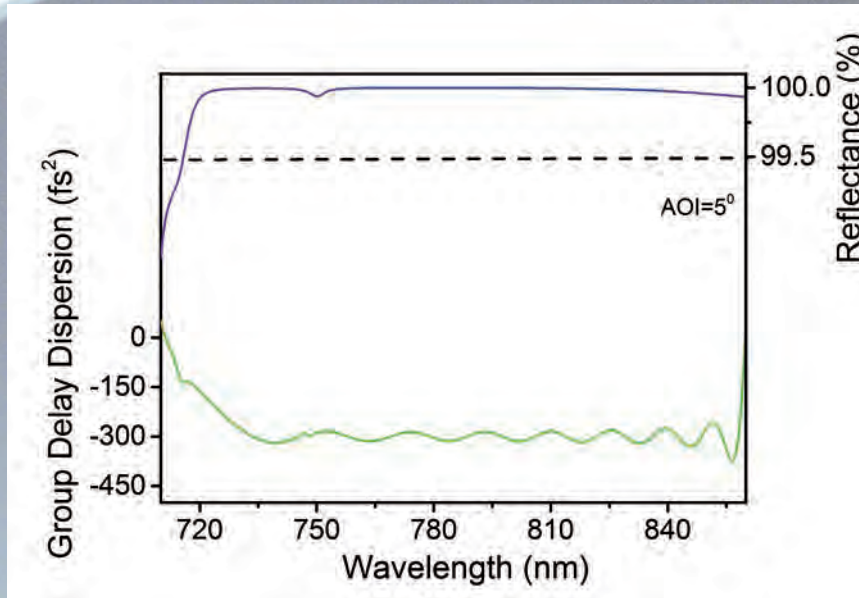
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	10
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	730 nm
Spectral working range high end	840 nm
Central wavelength	785 nm
Nominal GDD	-500 fs ² *
Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD1403_RC2

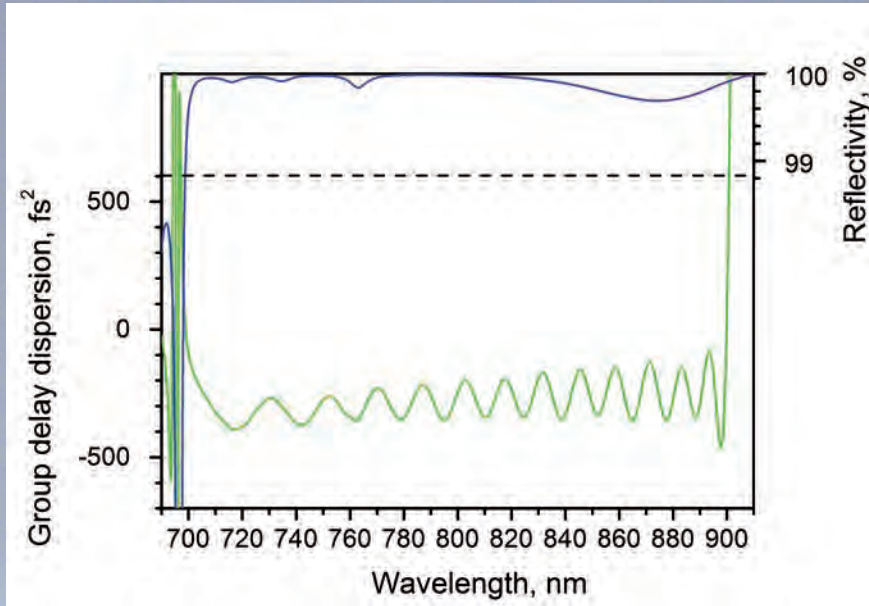


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p
Spectral category	IR

Spectral working range low end	720 nm
Spectral working range high end	850 nm
Central wavelength	785 nm
Nominal GDD	-300 fs ²
Minimum Reflectance	> 99.8 %



HIGH DISPERSIVE MIRROR HD 111

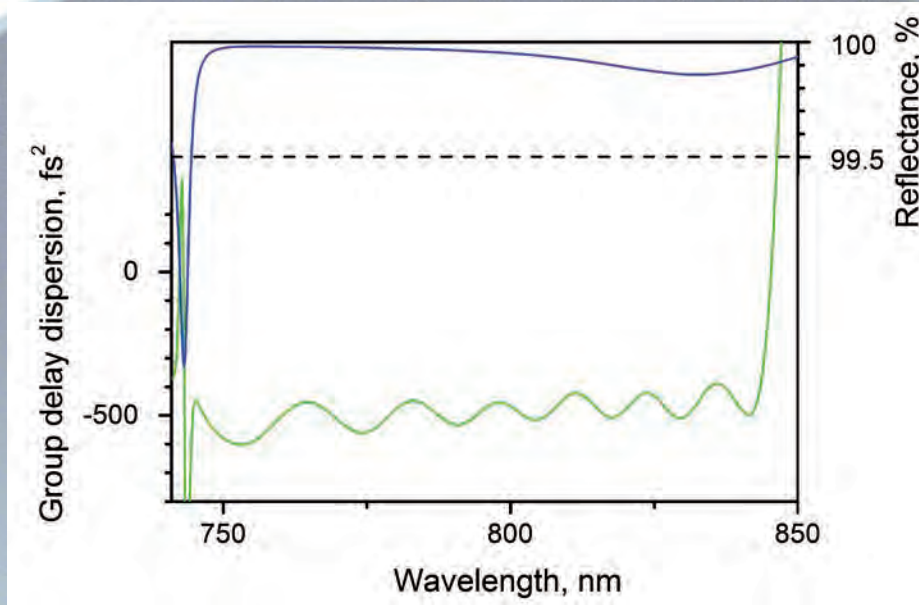


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	710 nm
Spectral working range high end	880 nm
Central wavelength	795 nm
Nominal GDD	-270 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99.8 %



HIGH DISPERSIVE MIRROR RHD 4



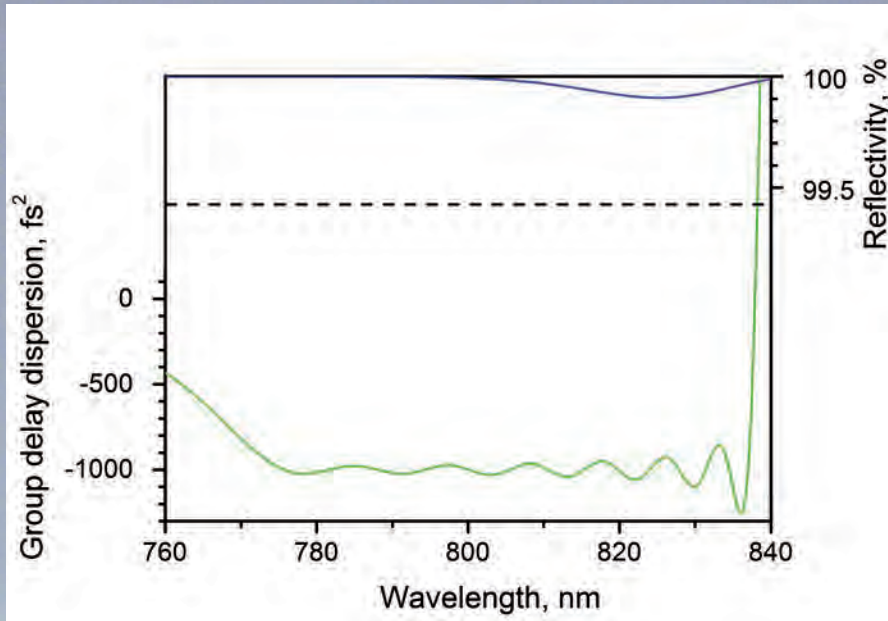
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	10
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	840 nm
Central wavelength	795 nm
Nominal GDD	-500 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 68



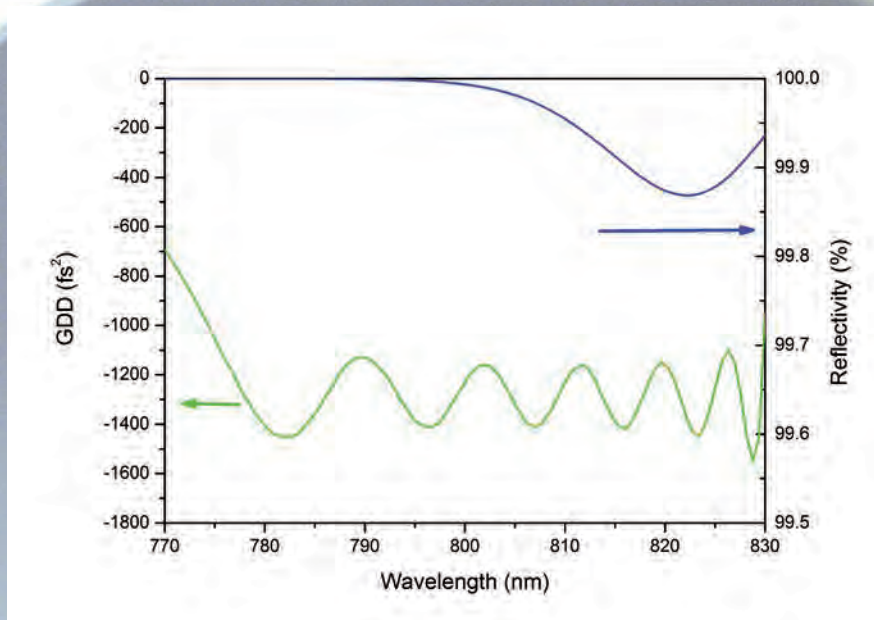
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	775 nm
Spectral working range high end	835 nm
Central wavelength	805 nm
Nominal GDD	-1000 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 15



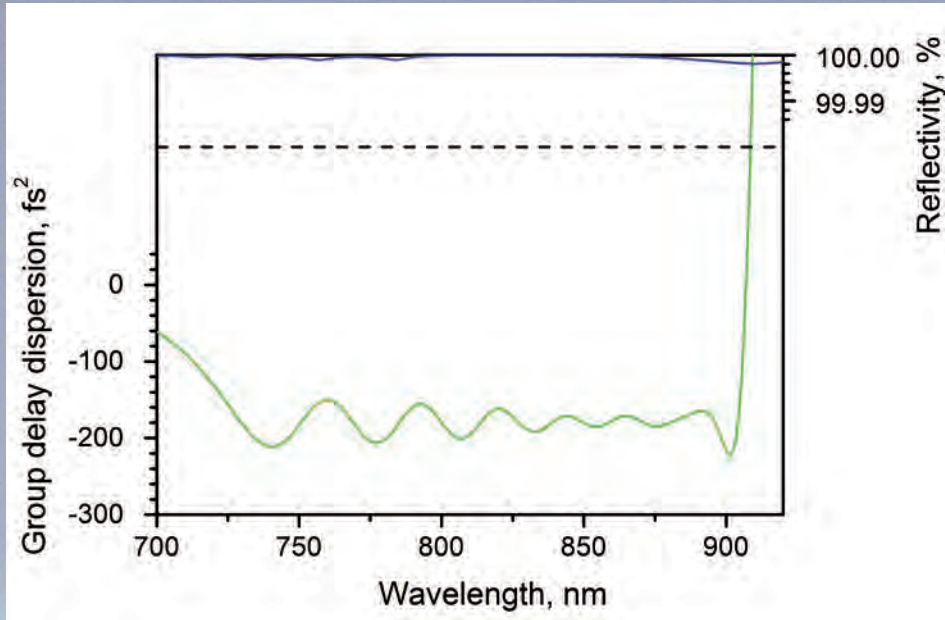
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	780 nm
Spectral working range high end	830 nm
Central wavelength	805 nm
Nominal GDD	-1300 fs ² *
Nominal GDD maximum deviation	300 fs ²
Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 1321



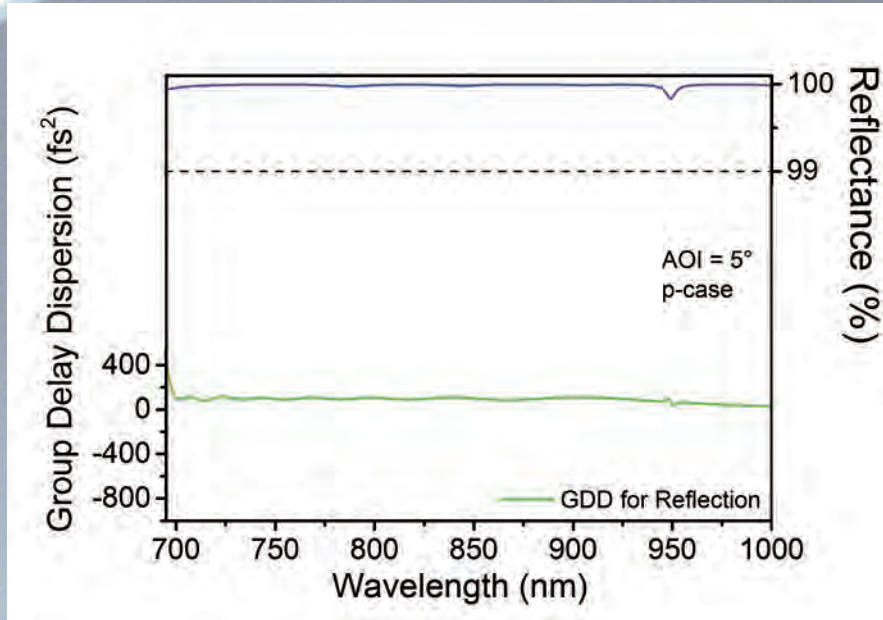
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	730 nm
Spectral working range high end	900 nm
Central wavelength	815 nm
Nominal GDD	-180 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	> 99.99 %

* not constant over defined working range



MIRROR WITH HIGH POSITIVE DISPERSION HD 1561



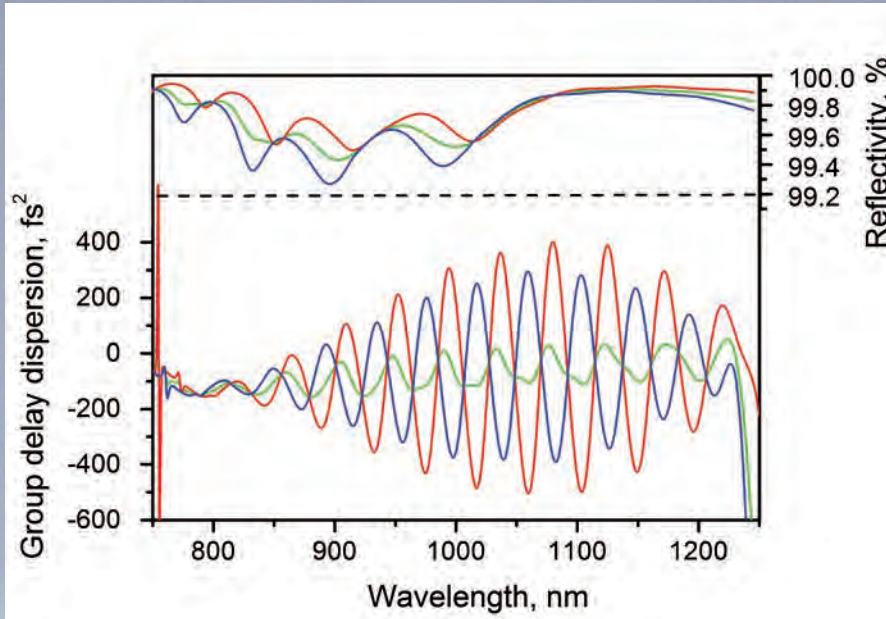
Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High (positive) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	710 nm
Spectral working range high end	980 nm
Central wavelength	845 nm
Nominal GDD	100 fs ² *
Minimum Reflectance	> 99.8 %

* not constant over defined working range



BROAD-BAND DOUBLE-ANGLE DISPERSIVE MIRROR HD 301



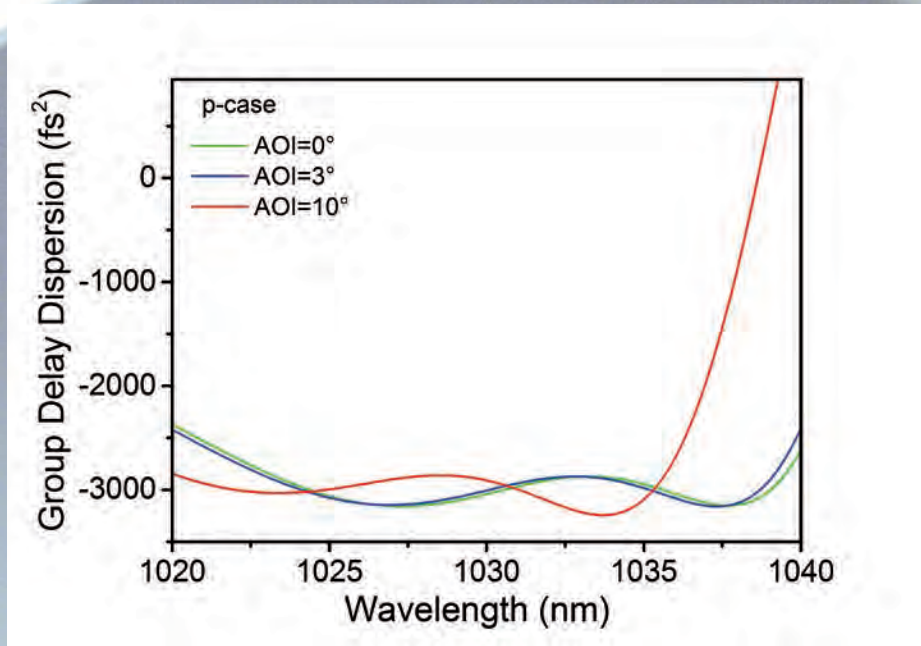
Details	
Description of the design	Broad-band double-angle dispersive mirror
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Second angle of incidence	20
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	770 nm
Spectral working range high end	1220 nm
Central wavelength	995 nm
Nominal GDD	-100 fs ² *
Nominal GDD maximum deviation	60 fs ²
Minimum Reflectance	> 99.2 %

* not constant over defined working range



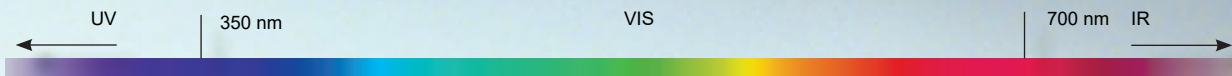
HIGH DISPERSIVE MIRROR HD 73



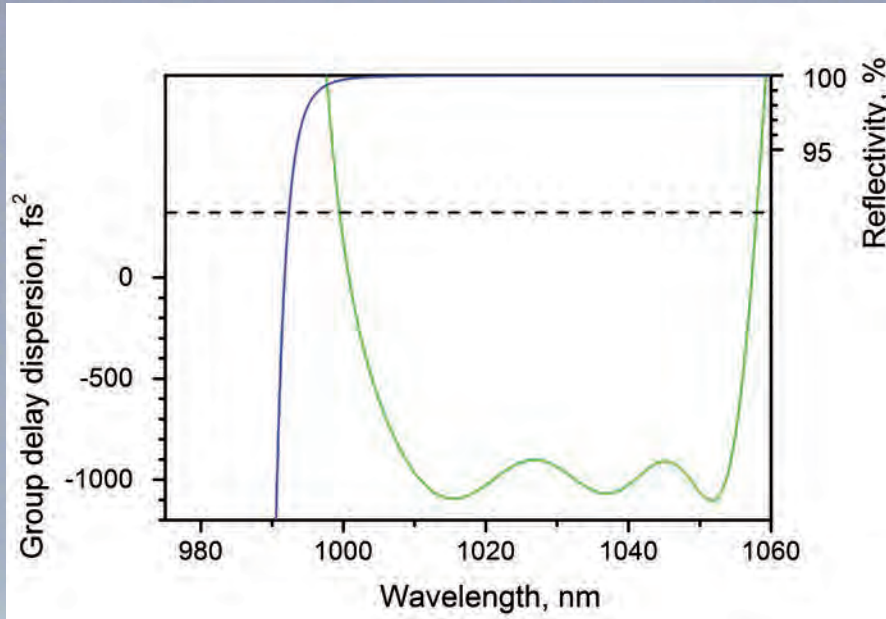
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	1027 nm
Spectral working range high end	1033 nm
Central wavelength	1030 nm
Nominal GDD	-3000 fs ² *
Minimum Reflectance	99.93 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 64



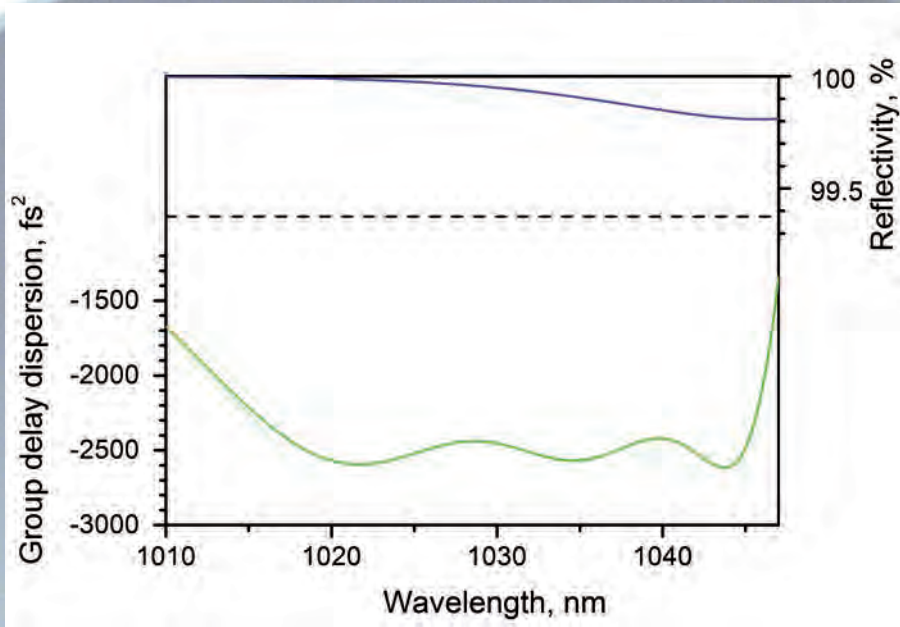
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1010 nm
Spectral working range high end	1050 nm
Central wavelength	1030 nm
Nominal GDD	-1000 fs ² *
Nominal GDD maximum deviation	150 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 40

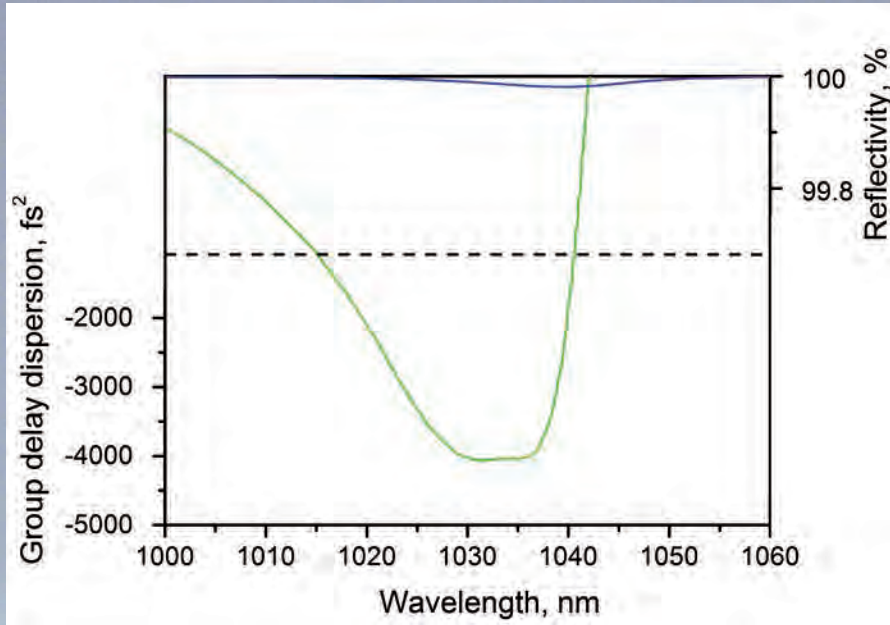


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1020 nm
Spectral working range high end	1040 nm
Central wavelength	1030 nm
Nominal GDD	-2500 fs ²
Minimum Reflectance	> 99.8 %



HIGH DISPERSIVE MIRROR HD 51

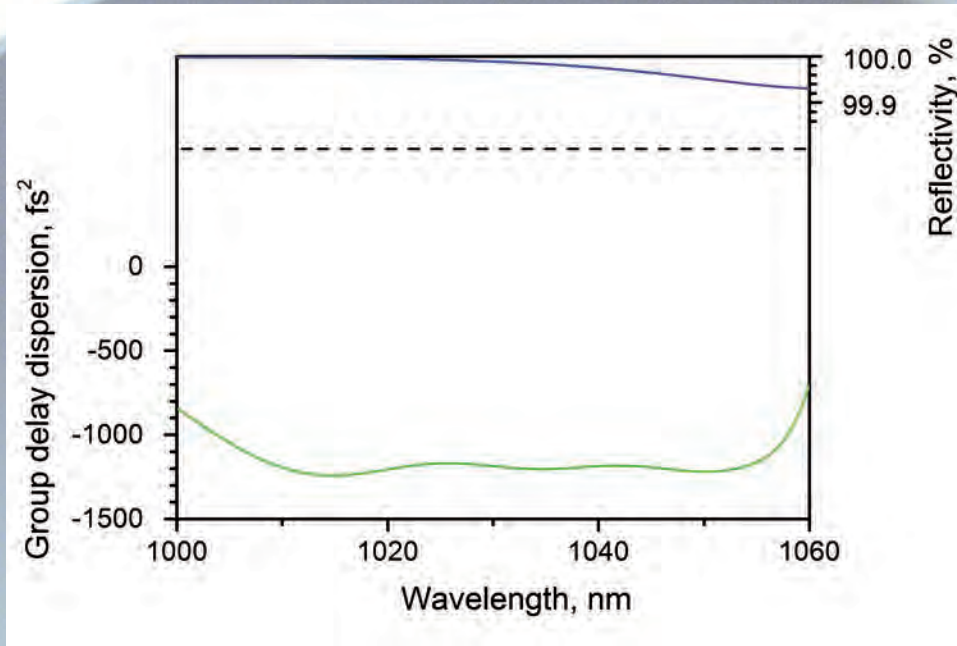


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1028 nm
Spectral working range high end	1037 nm
Central wavelength	1032 nm
Nominal GDD	-4000 fs ²
Minimum Reflectance	> 99.9 %



HIGH DISPERSIVE MIRROR HD 122

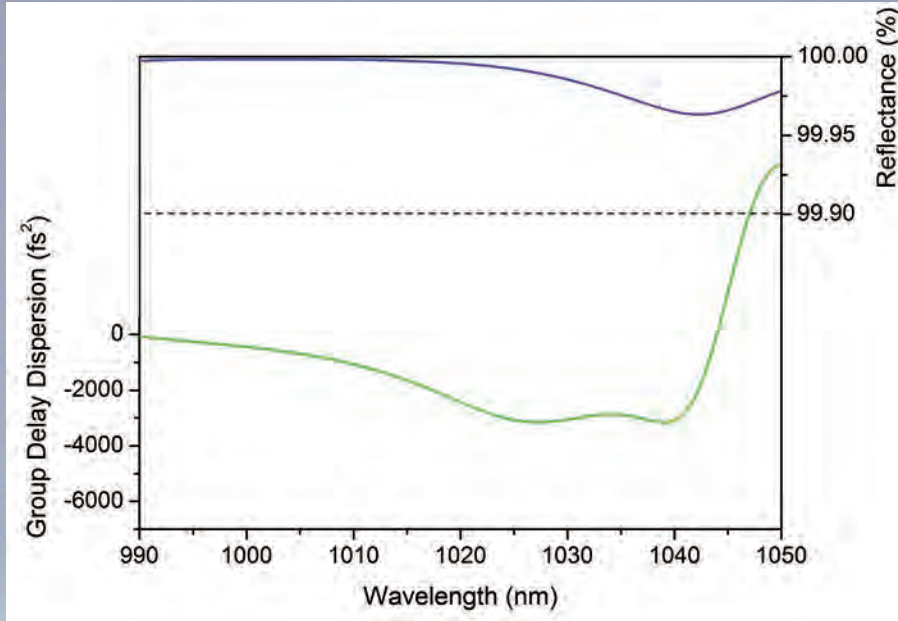


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	8
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	1010 nm
Spectral working range high end	1055 nm
Central wavelength	1032,5 nm
Nominal GDD	-1200 fs ²
Minimum Reflectance	> 99.9 %



HIGH DISPERSIVE MIRROR HD 73

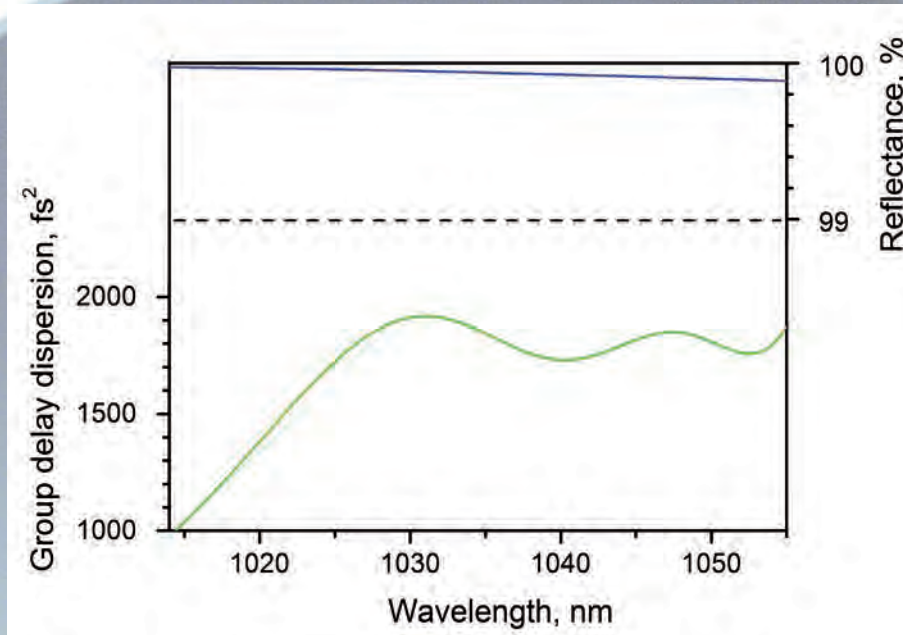


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	1027 nm
Spectral working range high end	1030 nm
Central wavelength	1033 nm
Nominal GDD	-3000 fs ²
Minimum Reflectance	> 99.8 %



HIGH DISPERSIVE MIRROR HD 103



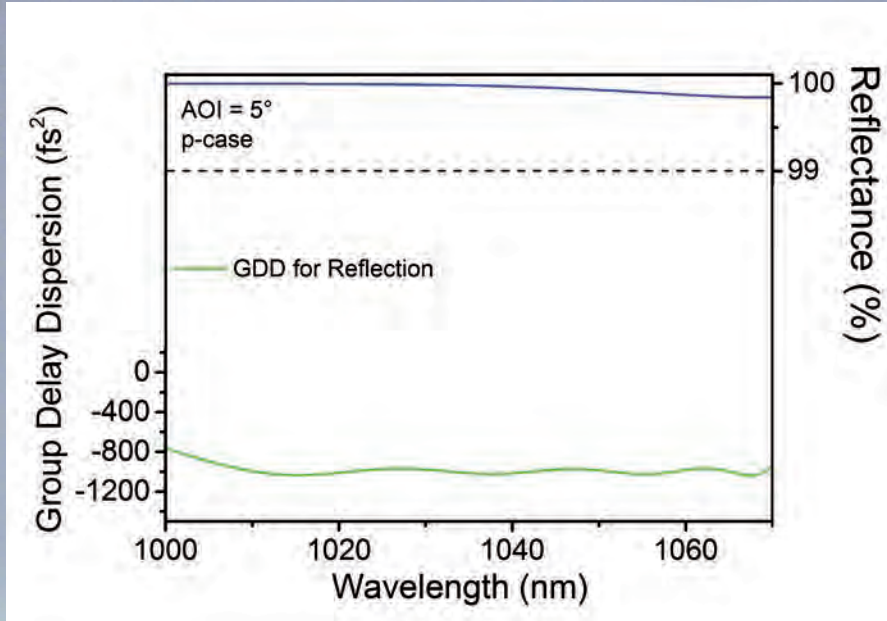
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (positive) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1030 nm
Spectral working range high end	1050 nm
Central wavelength	1035 nm
Nominal GDD	1750 fs ² *
Nominal GDD maximum deviation	300 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 1565



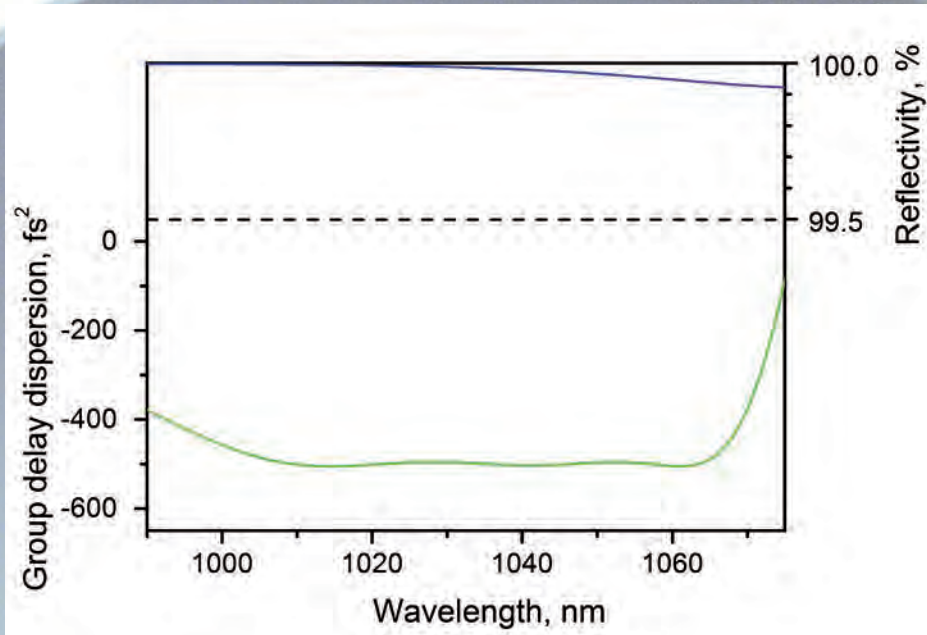
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	1010 nm
Spectral working range high end	1060 nm
Central wavelength	1035 nm
Nominal GDD	-1000 fs ² *
Minimum Reflectance	98.80 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 59

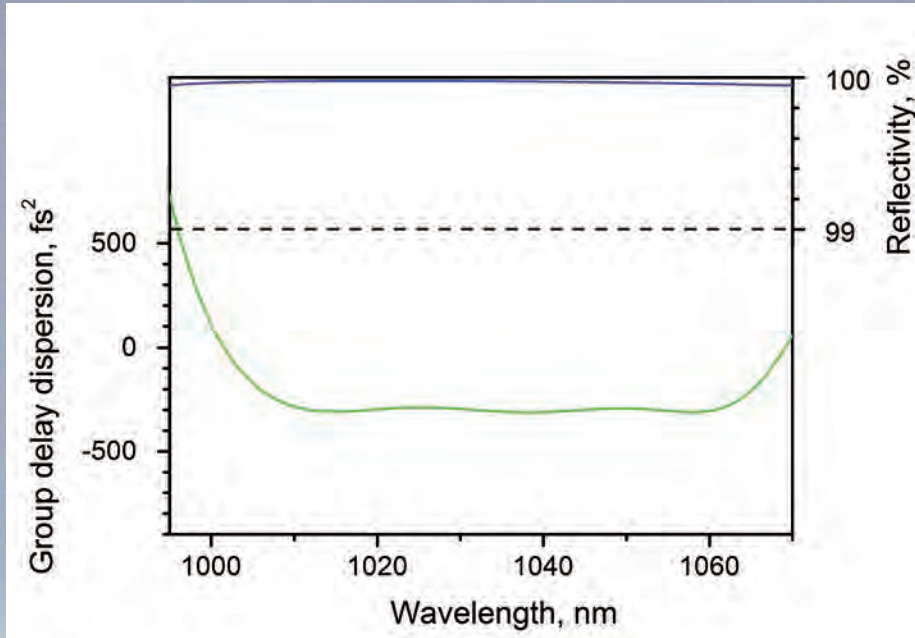


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1000 nm
Spectral working range high end	1060 nm
Central wavelength	1035 nm
Nominal GDD	-500 fs ²
Minimum Reflectance	> 99.9 %



HIGH DISPERSIVE MIRROR HD 123

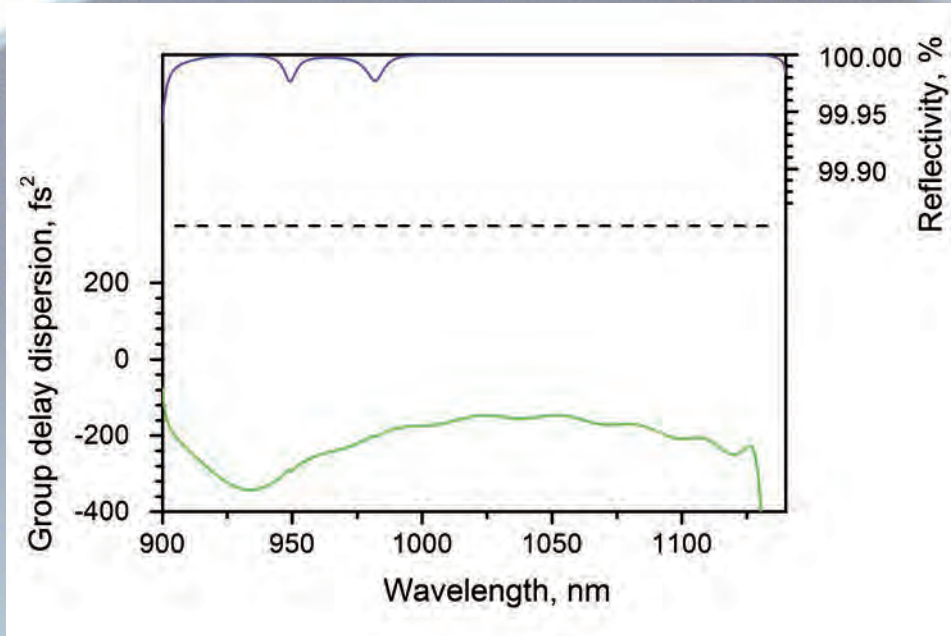


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	8
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	1010 nm
Spectral working range high end	1060 nm
Central wavelength	1035 nm
Nominal GDD	-300 fs ²
Minimum Reflectance	> 99.9 %



HIGH DISPERSIVE MIRROR HD 120



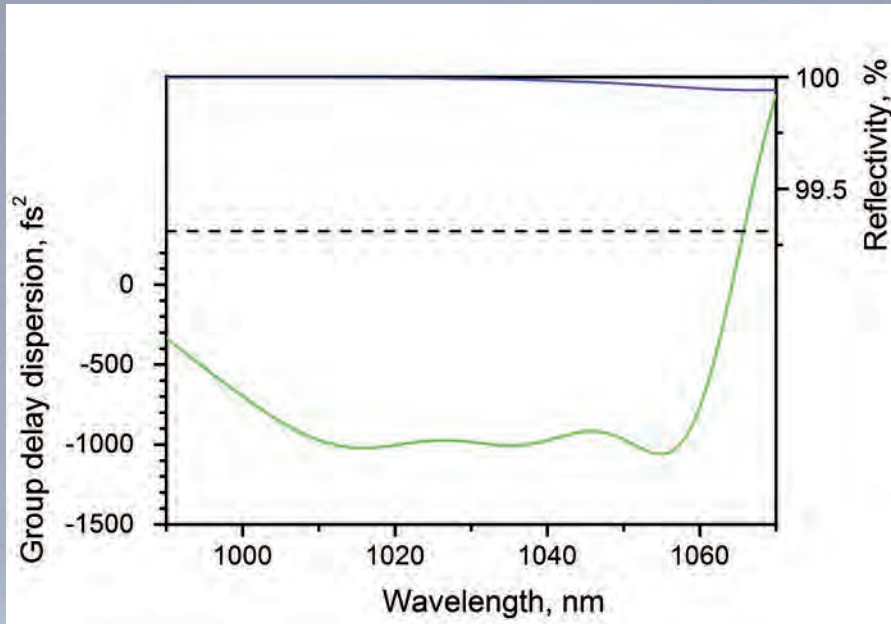
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	950 nm
Spectral working range high end	1120 nm
Central wavelength	1035 nm
Nominal GDD	-200 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	> 99.95 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 121



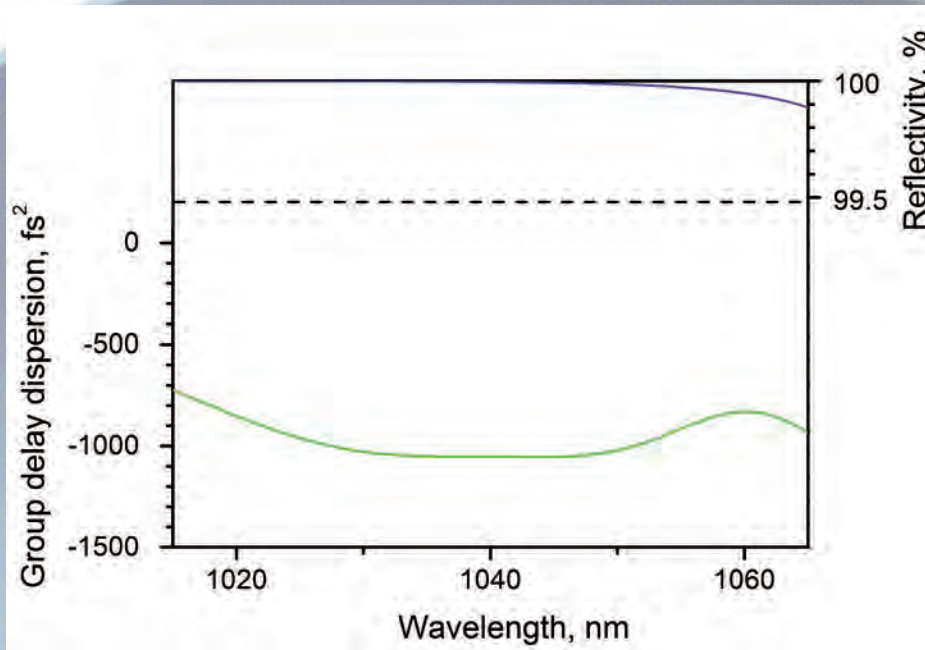
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	1010 nm
Spectral working range high end	1050 nm
Central wavelength	1037 nm
Nominal GDD	-1000 fs ² *
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 61

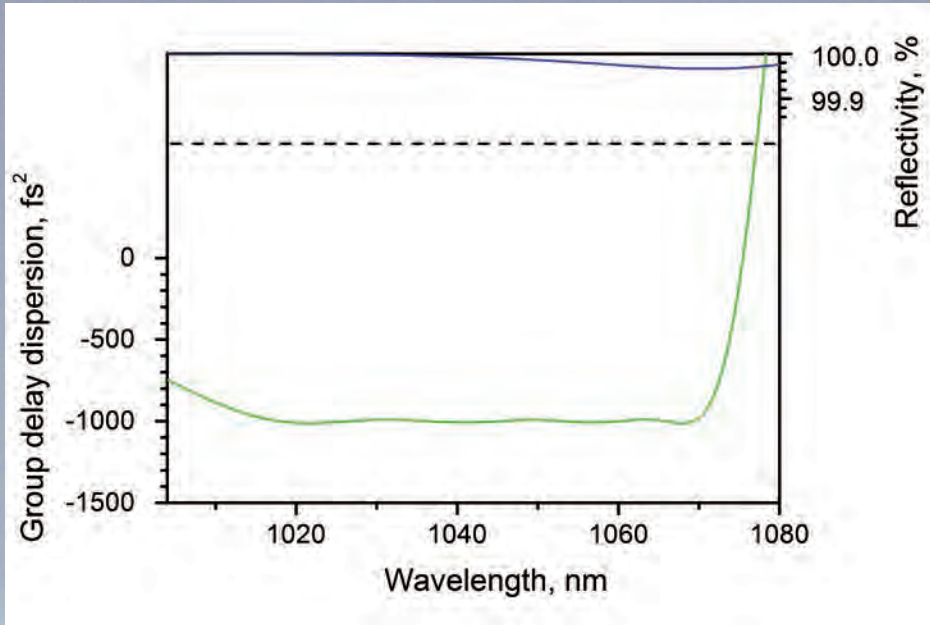


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1020 nm
Spectral working range high end	1060 nm
Central wavelength	1040 nm
Nominal GDD	-1000 fs ²
Minimum Reflectance	> 99.9 %



HIGH DISPERSIVE MIRROR HD 1310

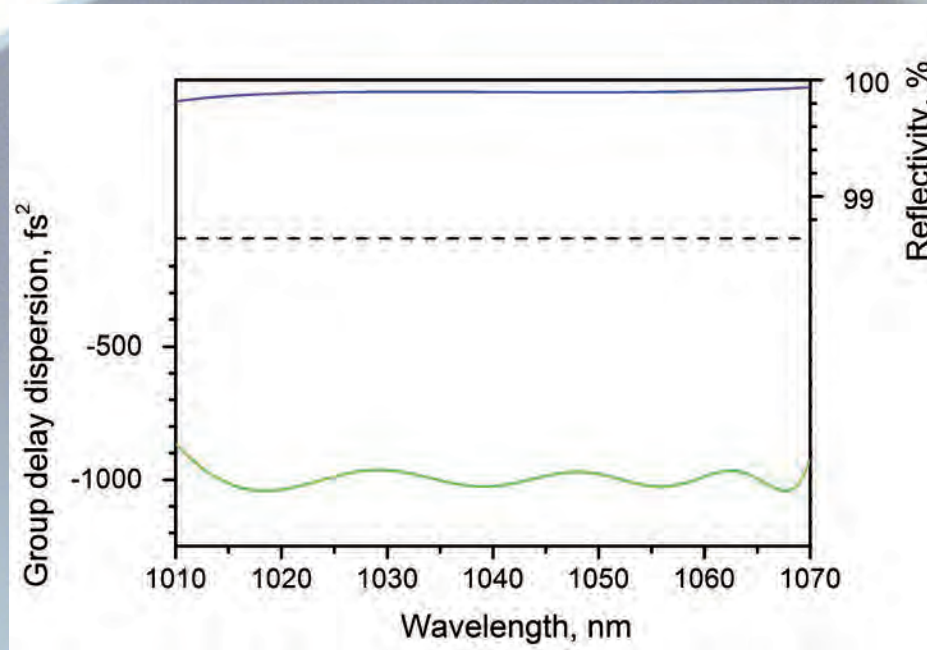


Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	1010 nm
Spectral working range high end	1070 nm
Central wavelength	1040 nm
Nominal GDD	-1000 fs ²
Minimum Reflectance	> 99.95 %



HIGH DISPERSIVE MIRROR HD 65



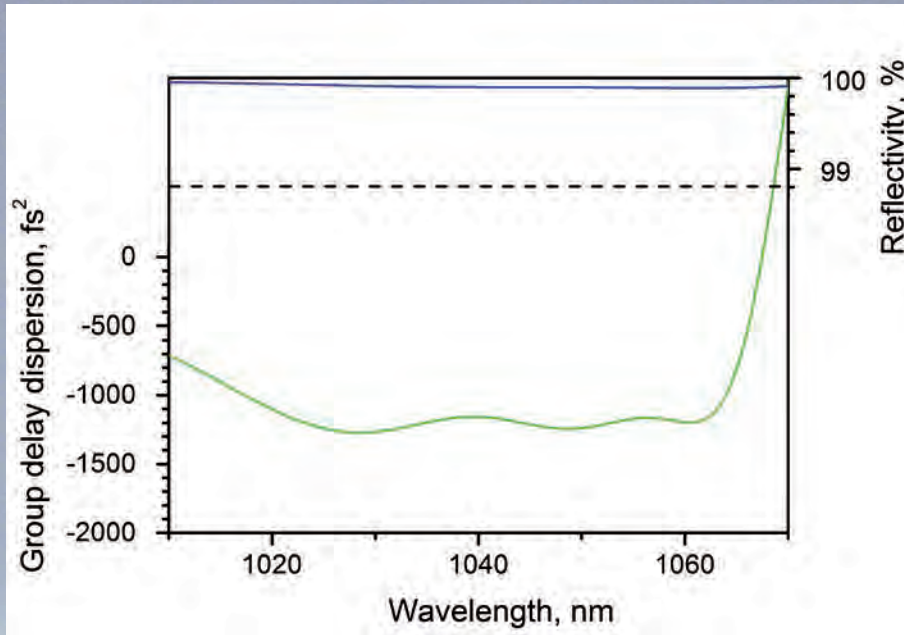
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1010 nm
Spectral working range high end	1070 nm
Central wavelength	1040 nm
Nominal GDD	-1000 fs ² *
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 90



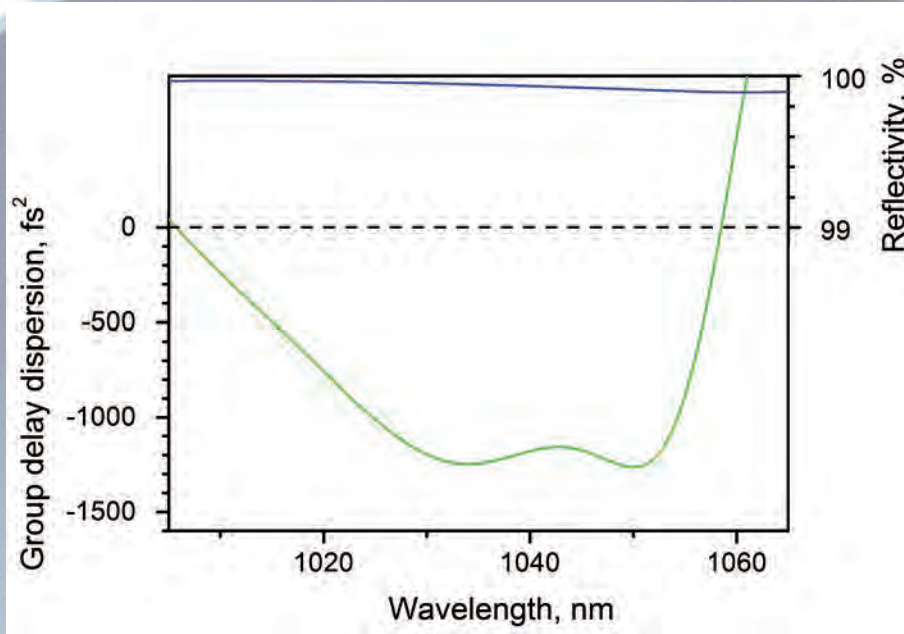
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1020 nm
Spectral working range high end	1060 nm
Central wavelength	1040 nm
Nominal GDD	-1200 fs ² *
Nominal GDD maximum deviation	70 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



HIGH DISPERSIVE MIRROR HD 86



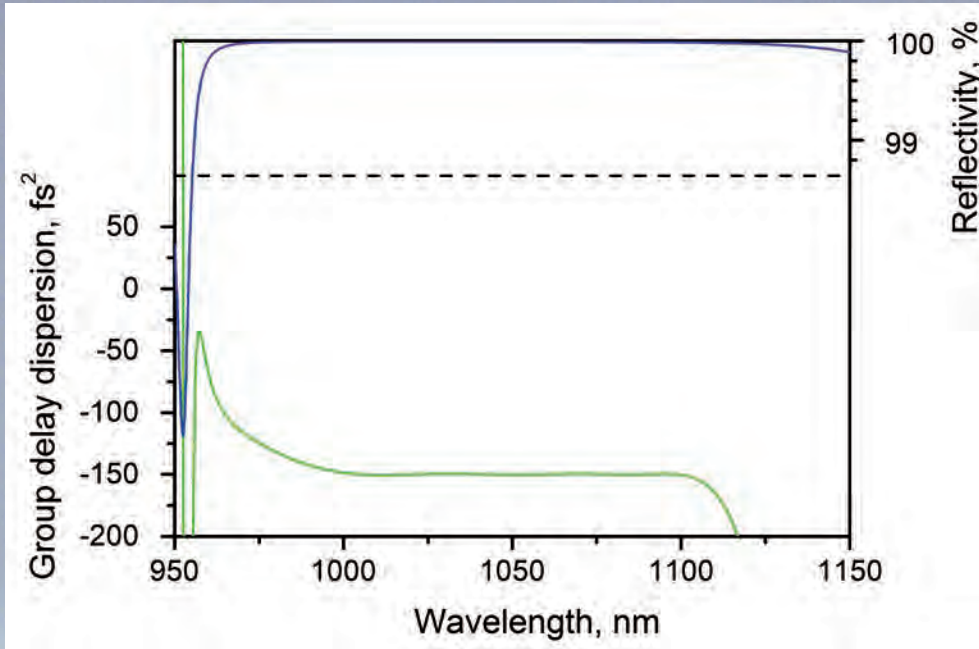
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1030 nm
Spectral working range high end	1050 nm
Central wavelength	1040 nm
Nominal GDD	-1200 fs ² *
Nominal GDD maximum deviation	70 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



DISPERSIVE MIRROR WITH HIGH REFLECTIVITY CM150

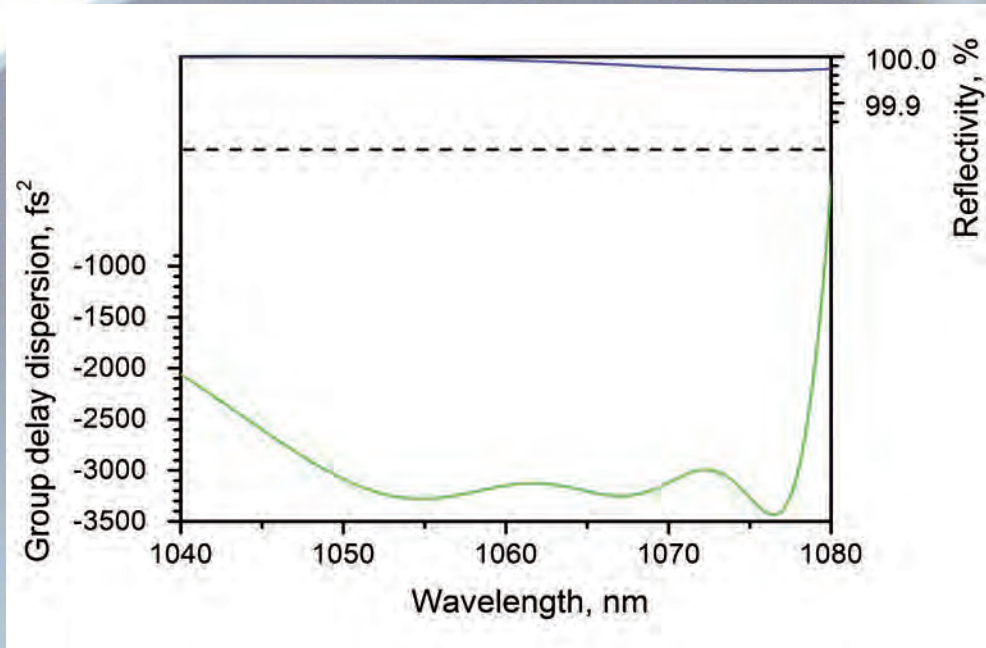


Details	
Description of the design	Dispersive mirror with high reflectivity
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	980 nm
Spectral working range high end	1100 nm
Central wavelength	1050 nm
Nominal GDD	-150 fs ²
Minimum Reflectance	> 99.9 %



HIGH DISPERSIVE MIRROR HD 1312



Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1050 nm
Spectral working range high end	1075 nm
Central wavelength	1064 nm
Nominal GDD	-3200 fs ² *
Nominal GDD maximum deviation	500 fs ²
Minimal Reflectance	> 99.9 %

* not constant over defined working range



Beam splitters

BEAM SPLITTERS

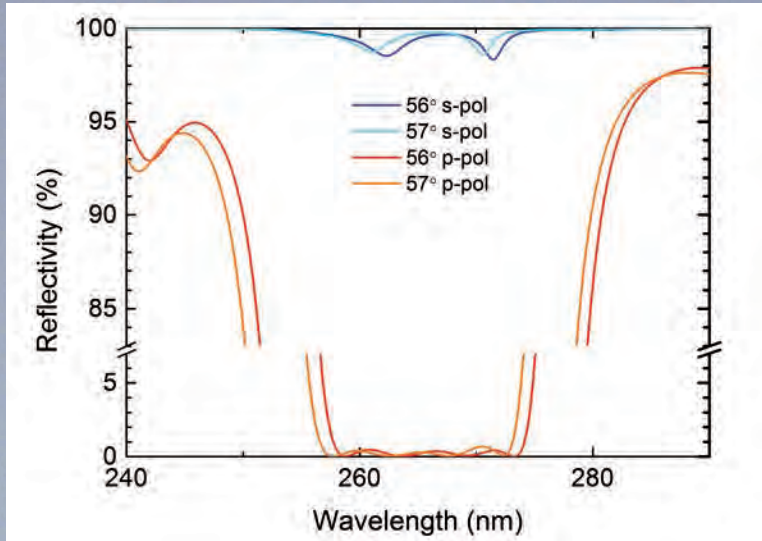
This type of coating provides the possibility to split light (short pulse) in portion. It might be important when only one high power source is available, but two experiments have to be performed simultaneously. BS transmits part of energy of short pulse without introducing additional phase changes. Rest of energy will be reflected without introducing changes to the pulse phase.

Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
BS101, BS1201, BS1202, BS32, BS45, BS71, BS_NP, F1311

See also literature for further information and application:

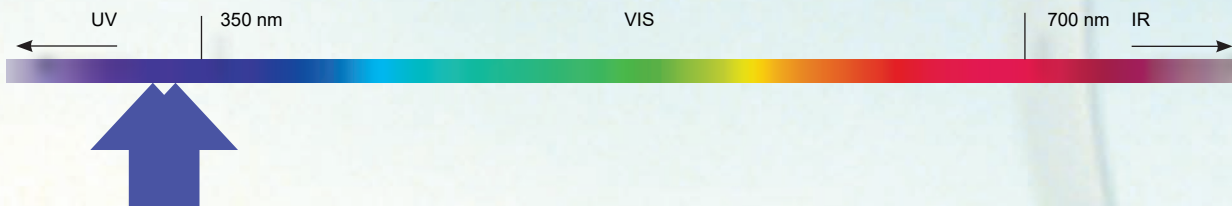
- M. Th. Hassan et al. Rev. Sci. Instrum. 83, 111301 (2012)
- A. Wirth et al. Science, 334, 195 (2011)
- E. Goulielmakis et al. Science. 317, 769 (2007)

THIN-FILM POLARIZER TFP 11

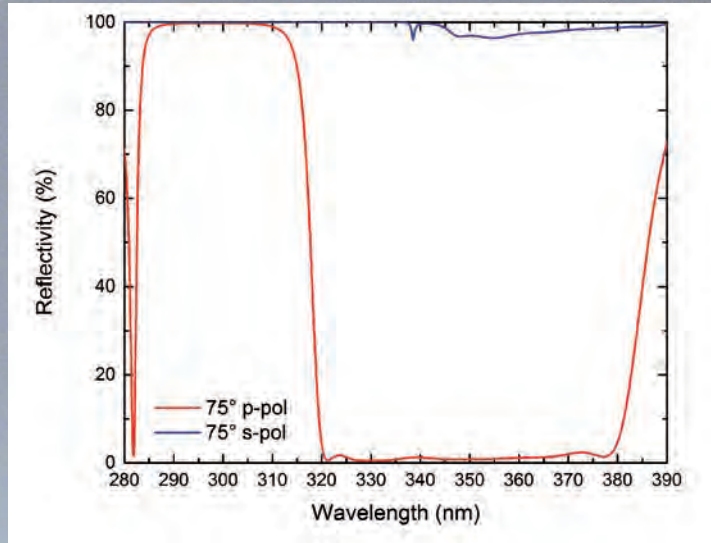


Details	
Description of the design	Thin-film polarizer
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	56
Polarization regime (primary spectral range)	s
Spectral category	UV
Spectral working range low end	258 nm

Spectral working range high end	274 nm
Central wavelength	266 nm
Minimum reflectance	95.00 %
Second working range	
Second spectral working range low end	258.0 nm
Second spectral working range high end	274.0 nm
Polarization regime	p
Minimum transmittance	95 %

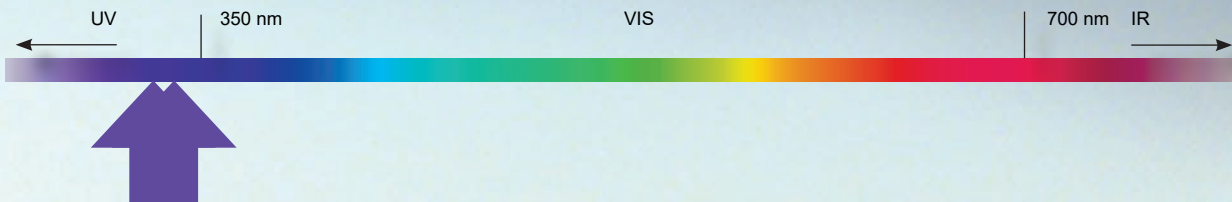


BEAM SPLITTER BS 1201

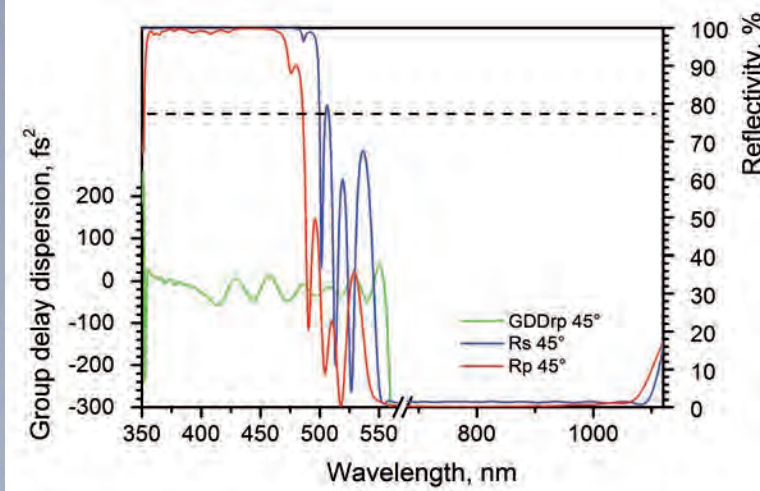


Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	75
Polarization regime (primary spectral range)	p
Spectral category	UV
Spectral working range low end	290 nm
Spectral working range high end	310 nm

Central wavelength	300 nm
Minimum reflectance	97 %
Second working range	
Second spectral working range low end	320.0 nm
Second spectral working range high end	380.0 nm
Polarization regime (second working range)	p
Minimum transmittance	97 %



BEAM SPLITTER BS 41



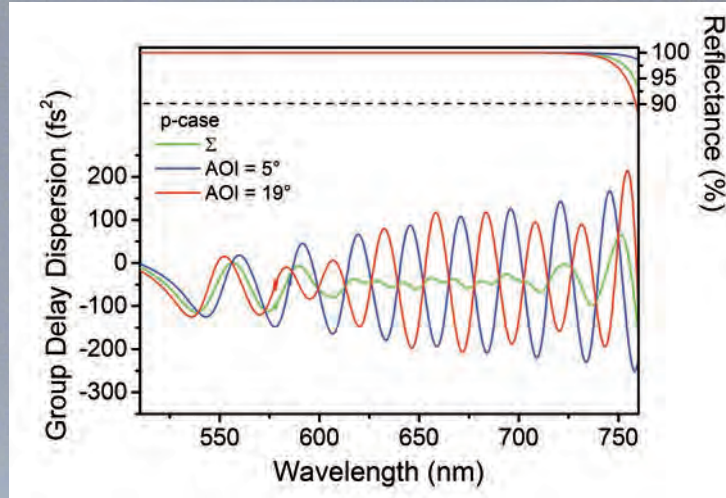
Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	375 nm
Spectral working range high end	460 nm

Central wavelength	417 nm
Nominal GDD	-20 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum reflectance	98.00 %
Second working range	
Second spectral working range low end	700.0 nm
Second spectral working range high end	1100.0 nm
Polarization regime	p
Minimum transmittance	99 %

* not constant over defined working range

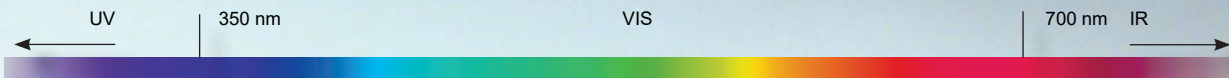


BEAM SPLITTER BS 1501

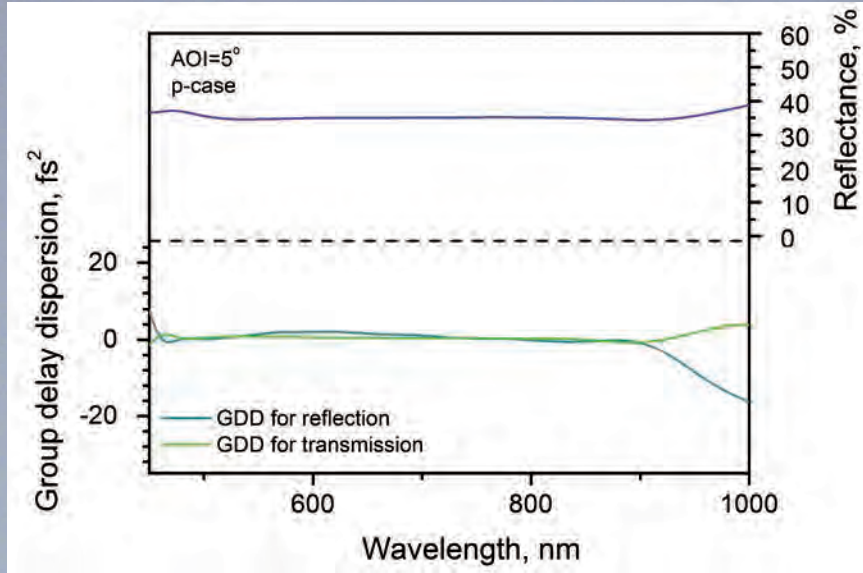


Details	
Description of the design	Beam splitter GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	5
Second angle of incidence	19
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	750 nm

Central wavelength	625 nm
Nominal GDD	-40 fs ²
Minimum reflectance	99 %
Minimum reflectance	99 %
Second working range	
Second spectral working range low end	780.0 nm
Second spectral working range high end	1000.0 nm
Polarization regime	p
Minimum reflectance	5 %
Minimum transmittance	95 %



BEAM SPLITTER BS 71

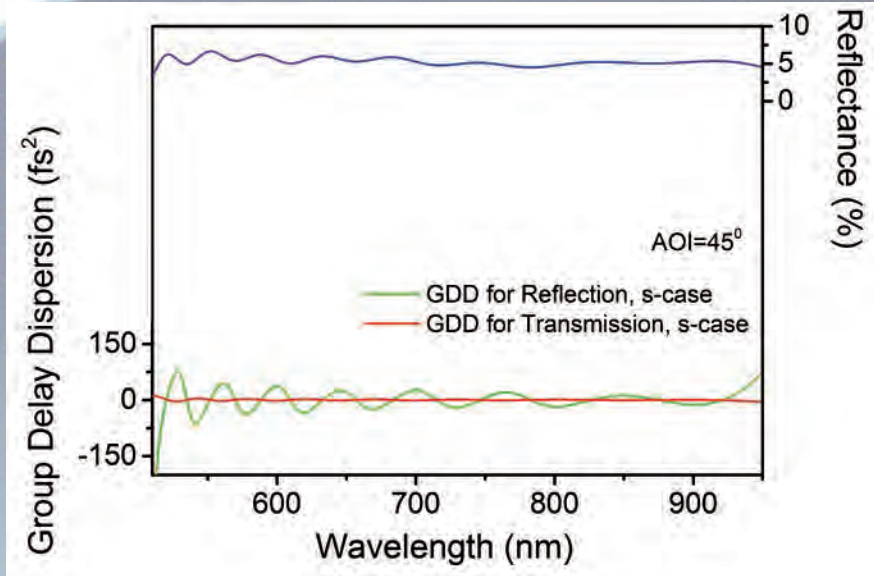


Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	525 nm
Spectral working range high end	925 nm
Central wavelength	725 nm
Nominal GDD	0 fs ²
Minimum reflectance	33.00 %
Maximum reflectance	37 %



BEAM SPLITTER BS 1412

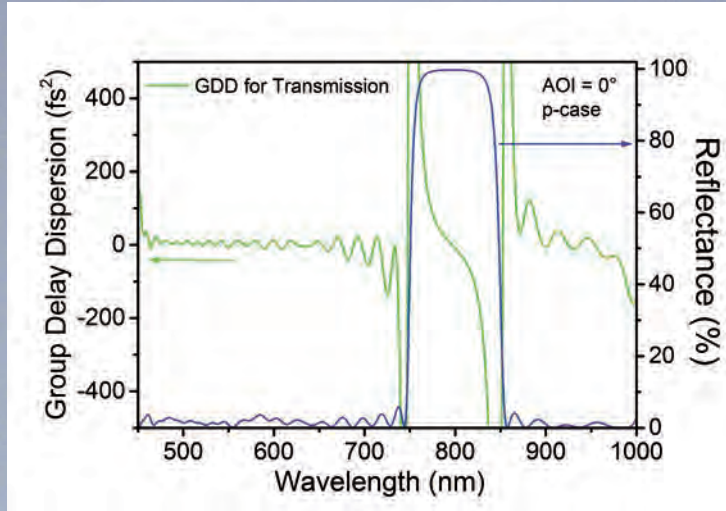


Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	500 nm
Spectral working range high end	950 nm
Central wavelength	725 nm
Reflectance	5 %



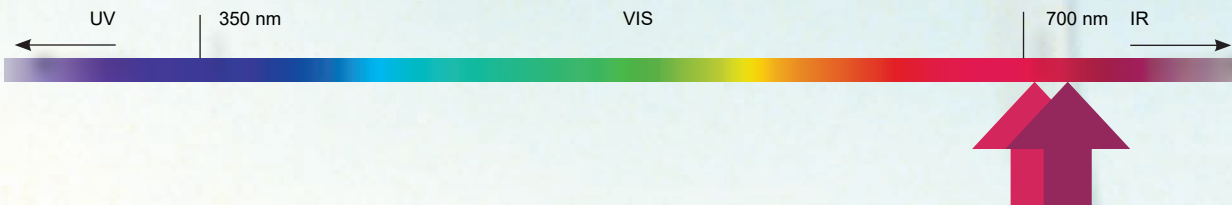
BEAM SPLITTER F 1551



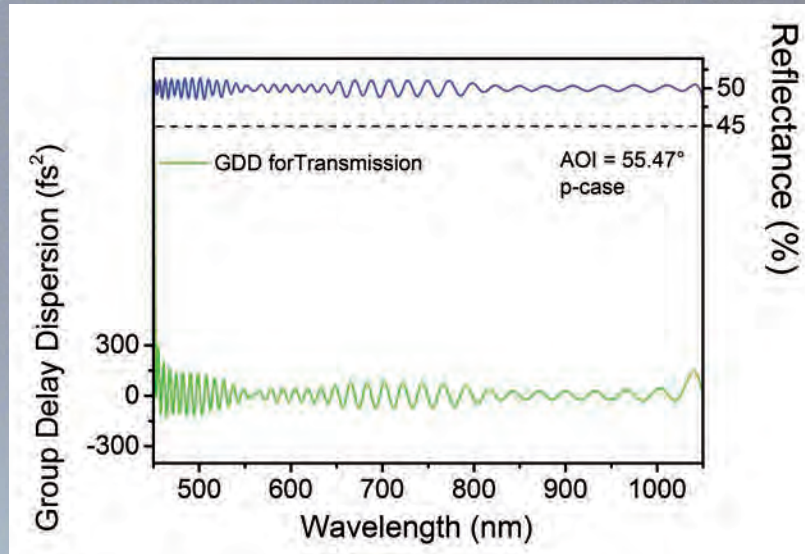
Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	450 nm

Spectral working range high end	1000 nm
Central wavelength	725 nm
Nominal GDD	0 fs ² *
Maximum reflectance	5 %
Second working range	
Second spectral working range low end	770 nm
Second spectral working range high end	830 nm
Polarization regime	p
Minimum reflectance	97 %

* not constant over defined working range



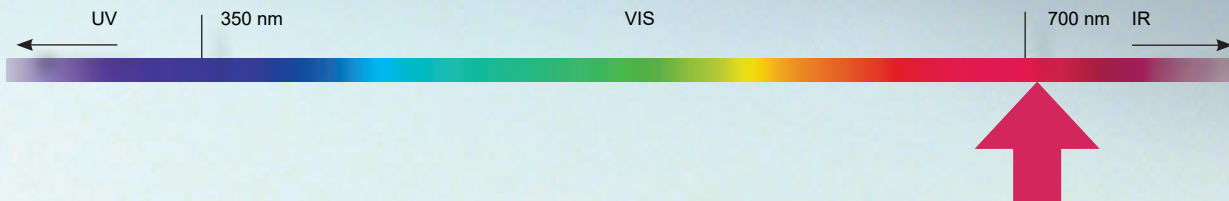
BEAM SPLITTER BS 1504



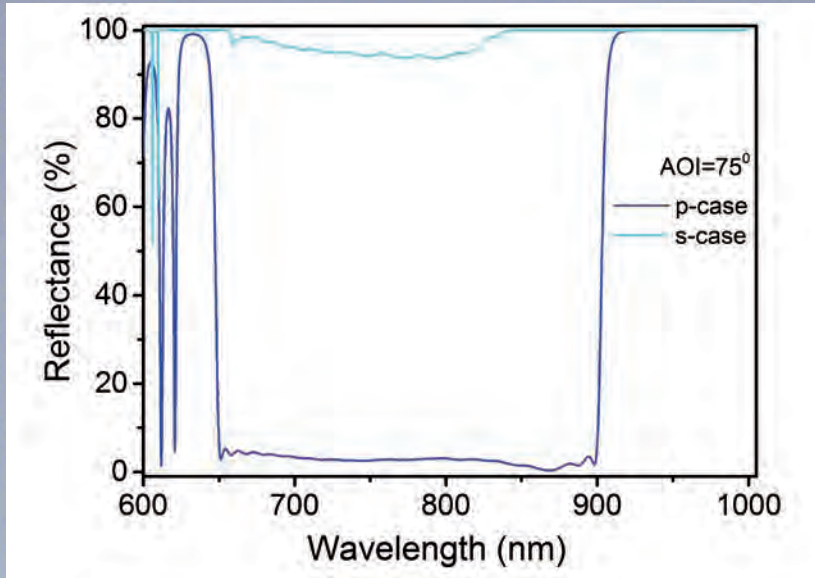
Details	
Description of the design	Beam splitter, GDD = 0 fs^2
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	55
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR

Spectral working range low end	450 nm
Spectral working range high end	1050 nm
Central wavelength	750 nm
Nominal GDD	0 fs^2 *
Nominal GDD maximum deviation	0 fs^2
Minimum reflectance	50 %
Minimum transmission	50 %

* not constant over defined working range



THIN-FILM POLARIZER F1402_RC1

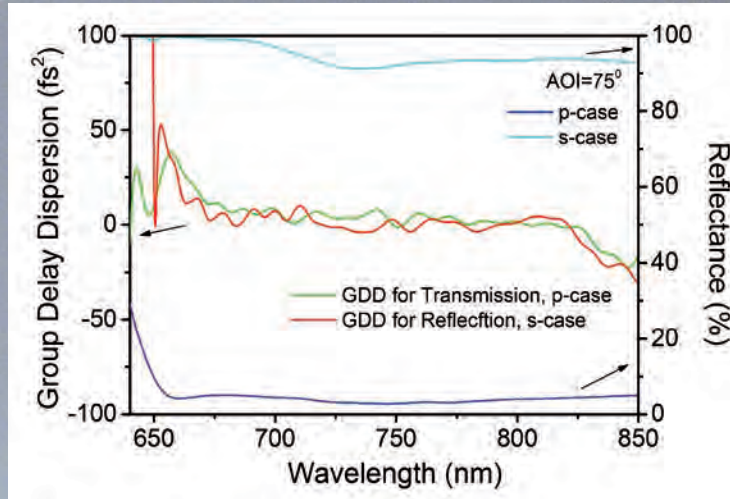


Details	
Description of the design	Thin-film polarizer
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	IR
Spectral working range low end	650 nm

Spectral working range high end	900 nm
Central wavelength	775 nm
Minimum reflectance	90.00 %
Second working range	
Second spectral working range low end	650.0 nm
Second spectral working range high end	900.0 nm
Polarization regime	p
Maximum reflectance	5 %



THIN-FILM POLARIZER F1402_RC2



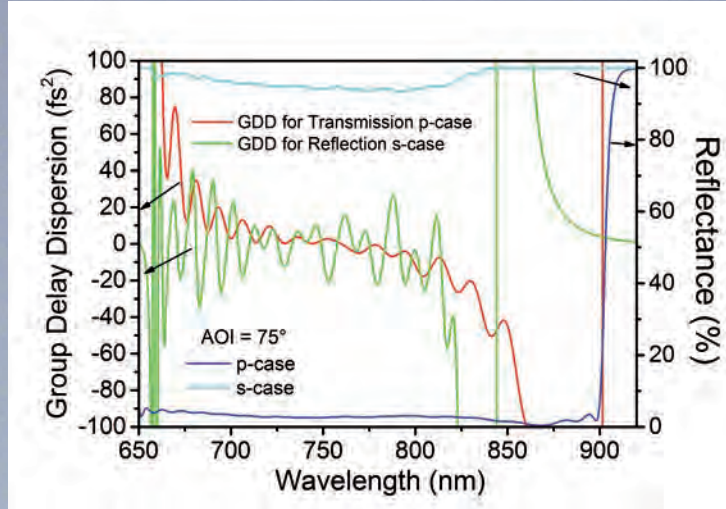
Details	
Description of the design	Thin-film polarizer
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	75
Polarization regime (primary spectral range)	s
Spectral category	IR
Spectral working range low end	650 nm
Spectral working range high end	900 nm

Central wavelength	775 nm
Nominal GDD	0 fs ²
Nominal GDD maximum deviation	25 fs ²
Minimum reflectance	90 %
Second working range	
Second spectral working range low end	650.0 nm
Second spectral working range high end	900.0 nm
Polarization regime	p
Minimum transmittance	93 %

* not constant over defined working range



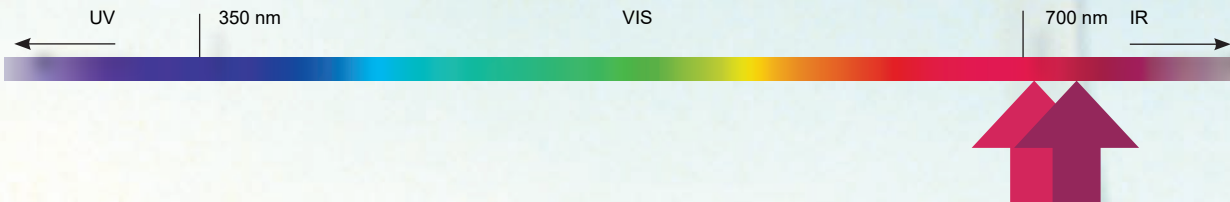
THIN-FILM POLARIZER F 1502



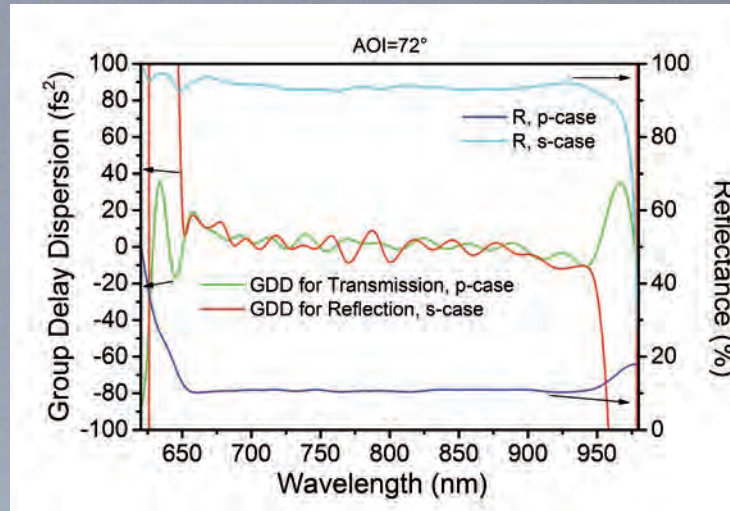
Details	
Description of the design	Thin-film polarizer
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	75
Polarization regime (primary spectral range)	s
Spectral category	VIS-IR
Spectral working range low end	650 nm

Spectral working range high end	900 nm
Central wavelength	775 nm
Nominal GDD	0 fs ² *
Minimum reflectance	93 %
Second working range	
Second spectral working range low end	650 nm
Second spectral working range high end	950 nm
Polarization regime	p
Minimum reflectance	5 %

* not constant over defined working range



BEAM SPLITTER F 1601



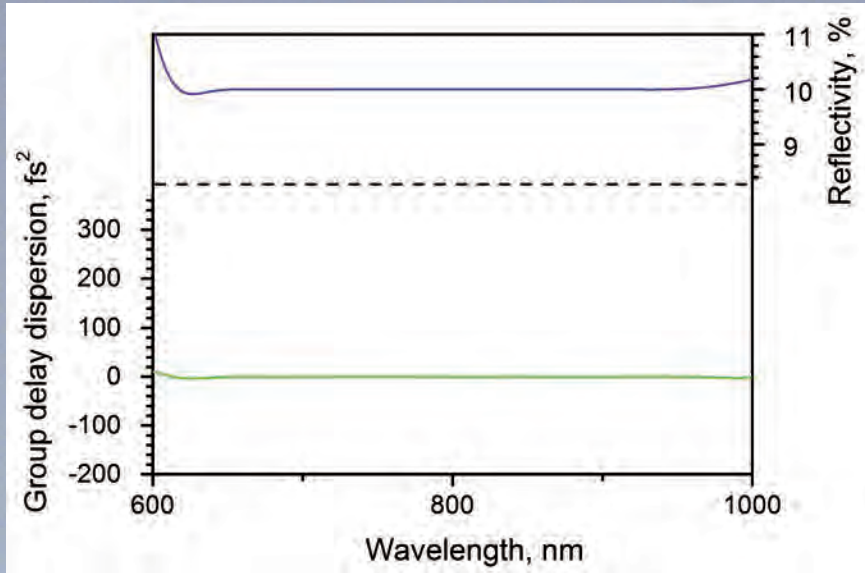
Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Mirror
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	72
Polarization regime (primary spectral range)	s
Spectral category	VIS-IR
Spectral working range low end	650 nm
Spectral working range high end	950 nm

Central wavelength	800 nm
Nominal GDD	0 fs ² *
Minimum transmission	90 %
Second working range	
Second spectral working range low end	650 nm
Second spectral working range high end	950 nm
Polarization regime	p
Minimum reflectance	20 %
Minimum transmittance	80 %

* not constant over defined working range



BEAM SPLITTER BS 32

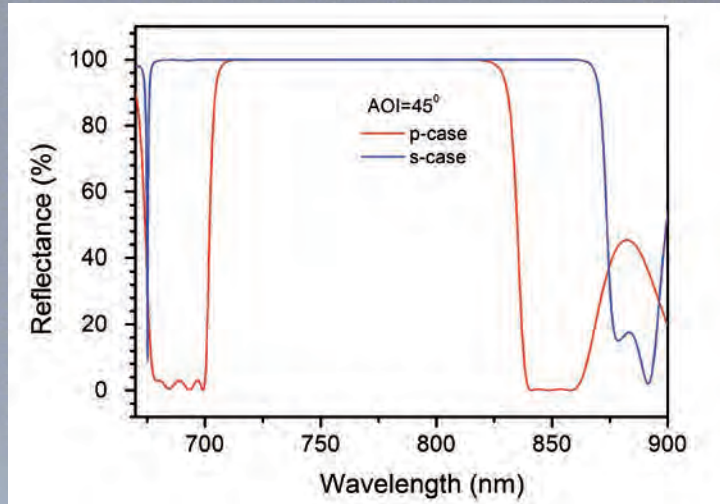


Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	625 nm
Spectral working range high end	975 nm
Central wavelength	800 nm
Nominal GDD	0 fs ²
Minimum reflectance	9 %
Maximum reflectance	11 %



BEAM SPLITTER BS 1311_RC2

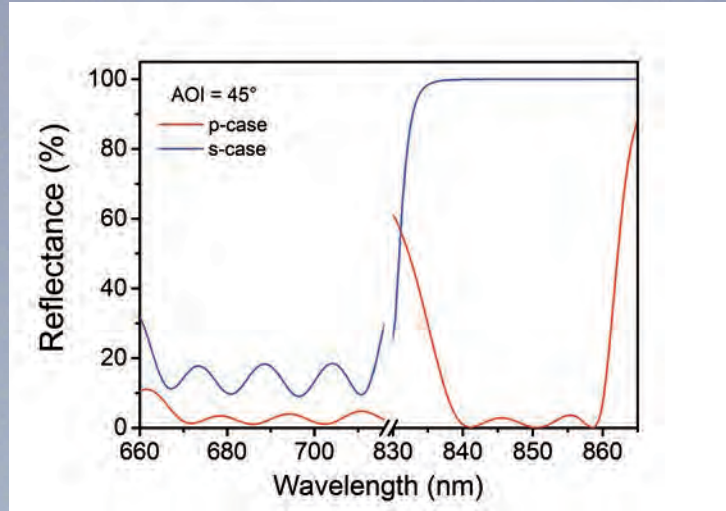


Details	
Description of the design	Thin-film polarizer
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	IR
Spectral working range low end	840 nm
Spectral working range high end	860 nm

Central wavelength	850 nm
Minimum reflectance	98 %
Second working range	
Second spectral working range low end	840.0 nm
Second spectral working range high end	860.0 nm
Polarization regime (second working range)	p
Minimum reflectance	2 %
Minimum transmittance	98 %



BEAM SPLITTER BS 1551

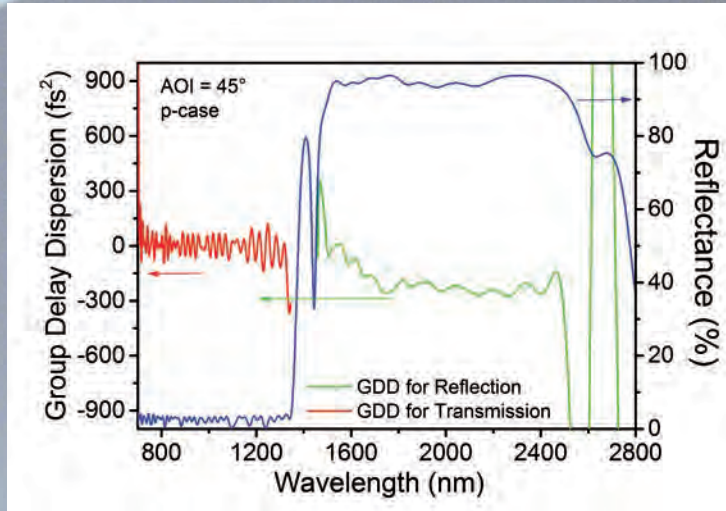


Details	
Description of the design	Beam splitter GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	VIS-IR
Spectral working range low end	845 nm

Spectral working range high end	855 nm
Central wavelength	850 nm
Minimum reflectance	99 %
Second working range	
Second spectral working range low end	845.0 nm
Second spectral working range high end	855.0 nm
Polarization regime	p
Minimum reflectance	5 %



BEAM SPLITTER BS 1503



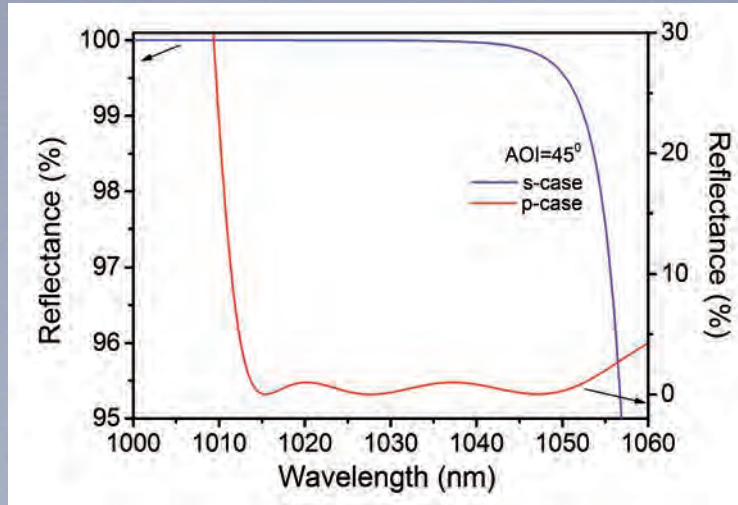
Details	
Description of the design	Beam splitter GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	700 nm
Spectral working range high end	1350 nm

Central wavelength	1025 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	0 fs ²
Minimum transmission	95 %
Second working range	
Second spectral working range low end	1500.0 nm
Second spectral working range high end	2300.0 nm
Polarization regime	p
Minimum reflectance	92 %

* not constant over defined working range



BEAM SPLITTER BS 1202

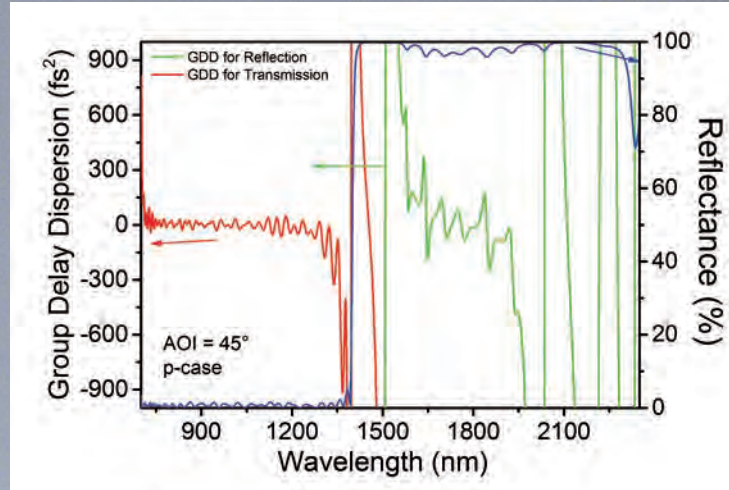


Details	
Description of the design	Thin-film polarizer
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	1015 nm
Spectral working range high end	1050 nm

Central wavelength	1032 nm
Minimum reflectance	0.00 %
Maximum reflectance	1 %
Minimum transmission	99 %
Second working range	
Second spectral working range low end	1015.0 nm
Second spectral working range high end	1050.0 nm
Polarization regime (second working range)	s
Minimum reflectance	95 %



BEAM SPLITTER BS 1502



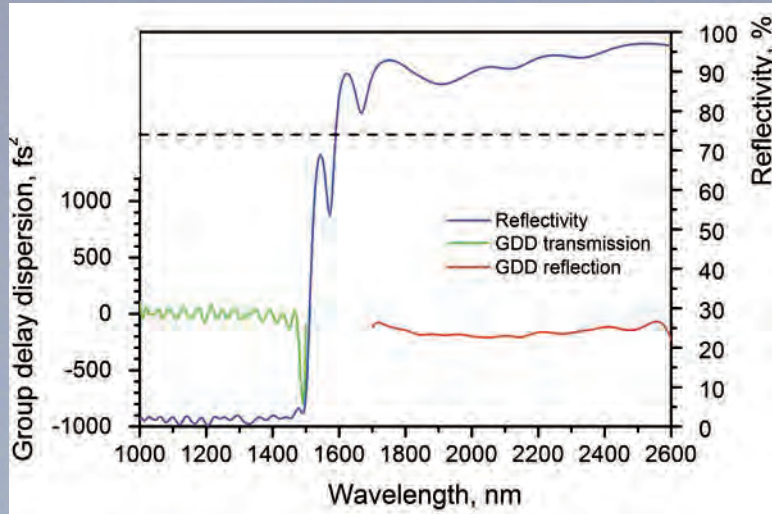
Details	
Description of the design	Beam splitter GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	700 nm
Spectral working range high end	1400 nm
Central wavelength	1050 nm

Nominal GDD	0 fs ^{2*}
Nominal GDD maximum deviation	0 fs ²
Minimum transmission	95 %
Second working range	
Second spectral working range low end	1400.0 nm
Second spectral working range high end	2300.0 nm
Polarization regime	p
Minimum reflectance	95 %
Minimum transmittance	5 %

* not constant over defined working range



BEAM SPLITTER BSIR 3

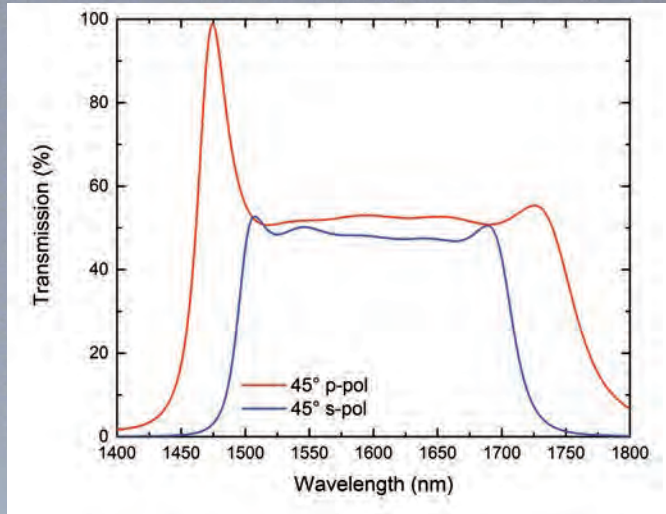


Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	1000 nm

Spectral working range high end	1500 nm
Central wavelength	1250 nm
Minimum transmission	95 %
Second working range	
Second spectral working range low end	1700.0 nm
Second spectral working range high end	2600.0 nm
Polarization regime	p
Minimum reflectance	> 85 %



BEAM SPLITTER BS_NP

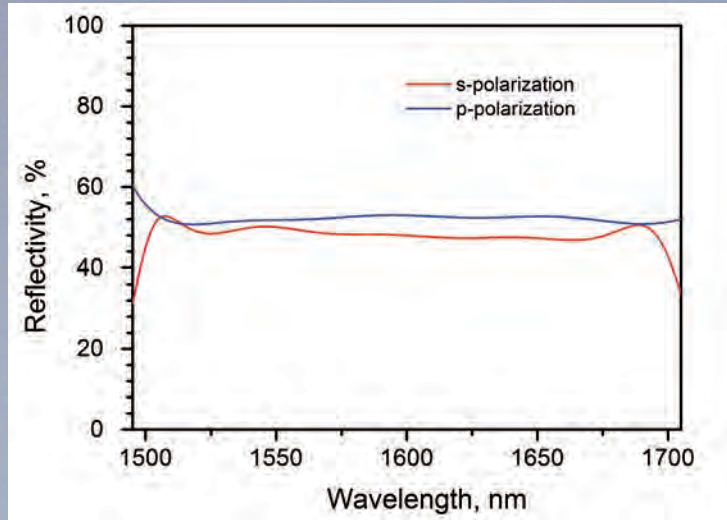


Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	1500 nm
Spectral working range high end	1700 nm

Central wavelength	1600 nm
Minimum reflectance	45 %
Minimum transmission	55 %
Second working range	
Second spectral working range low end	1500.0 nm
Second spectral working range high end	1700.0 nm
Polarization regime (second working range)	s
Minimum reflectance	55 %
Minimum transmittance	45 %



BEAM SPLITTER BS 45deg

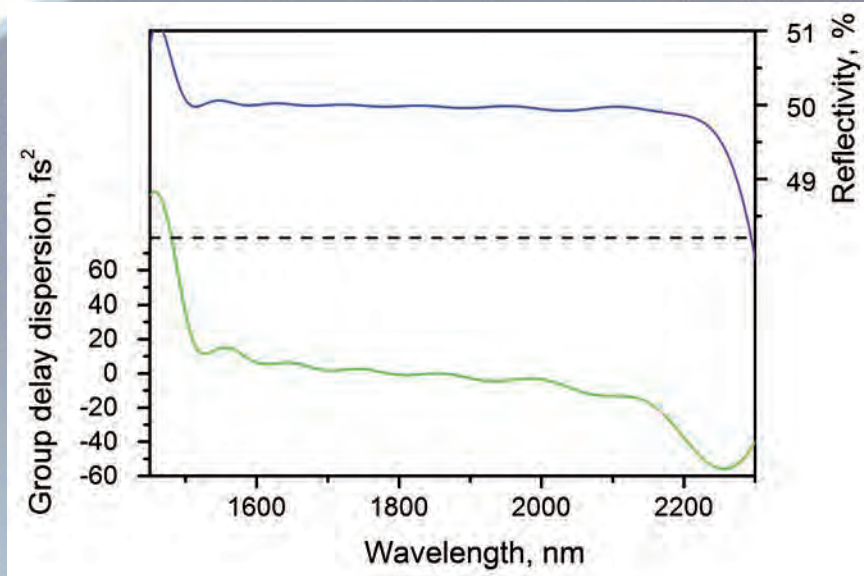


Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	1520 nm
Spectral working range high end	1680 nm

Central wavelength	1600 nm
Minimum reflectance	45 %
Maximum reflectance	55 %
Minimum transmission	50 %
Second working range	
Second spectral working range low end	1500.0 nm
Second spectral working range high end	1700.0 nm
Polarization regime	p
Minimum reflectance	50 %



BEAM SPLITTER BS 101



Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1550 nm
Spectral working range high end	2150 nm
Central wavelength	1850 nm
Nominal GDD	0 fs ^{2*}
Minimum reflectance	50 %
Minimum transmission	50 %

* not constant over defined working range



Ultra-high reflection mirrors

Mirrors with a reflectivity exceeding 99.99 % are at the limits of current coating developments. Our magnetron sputtering facility offers the best technology for ultra-high reflection mirrors due to the extremely dense layers. More than 99.997 % reflection over a bandwidth of 200 nm or more can be achieved.

Characterization of these mirrors is performed in a cavity ring-down measurement device with ppm-level precision. Broadband ultra-high-reflection mirrors cover bandwidth of more than 200 nm.

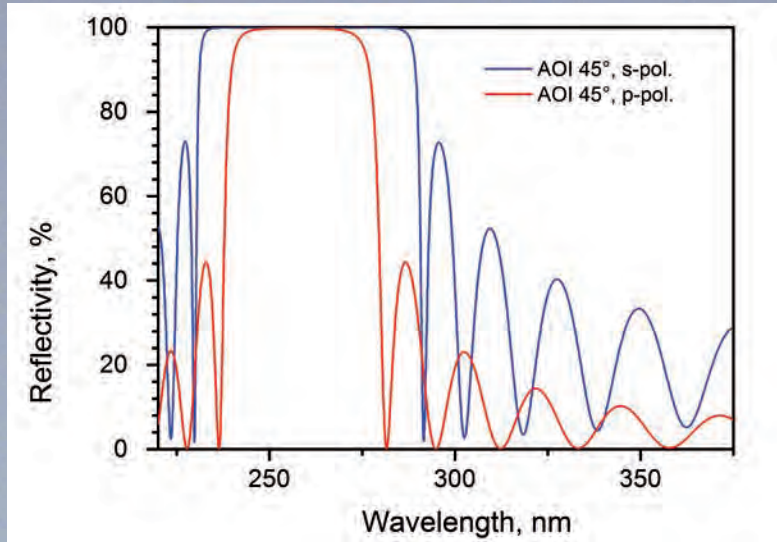
Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
UHR31

Applications
High-finesse cavities for cw laser stabilization and efficient frequency conversion
Enhancement cavities for pulsed lasers

**See also literature
for further information and application:**

- H. Carstens et al Optics Express, Vol. 21, Issue 9, pp. 11606-11617 (2013)
- M. K. Trubetskov et al. Optics Express 18, 27613-27618 (2010)

UV HIGH REFLECTOR HR 257

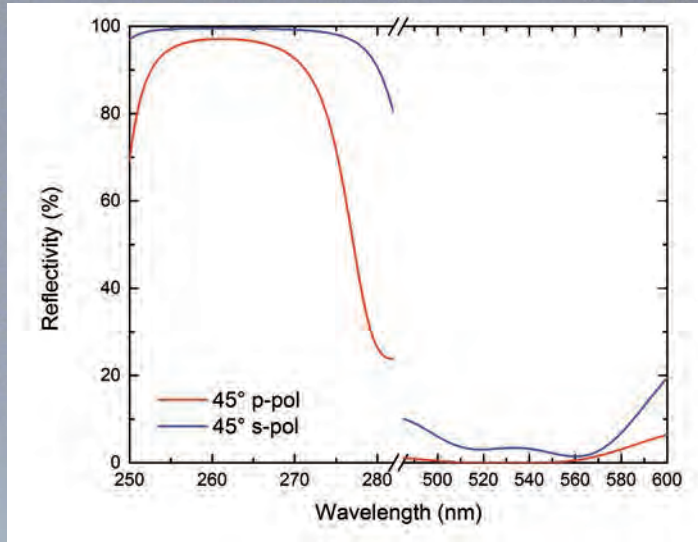


Details	
Description of the design	UV high-reflector
Type	Mirror
Subtype	HR (high-reflection) mirror
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	UV
Spectral working range low end	235 nm

Spectral working range high end	285 nm
Central wavelength	260 nm
Minimum reflectance	99 %
Second working range	
Second spectral working range low end	245.0 nm
Second spectral working range high end	270.0 nm
Polarization regime	p
Minimum reflectance	99 %

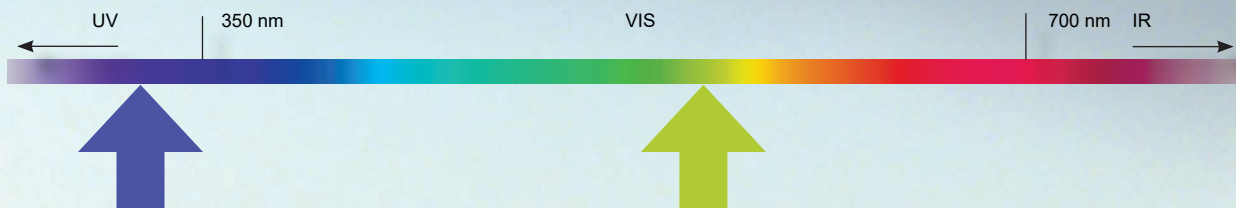


DICHROIC MIRROR HR 266

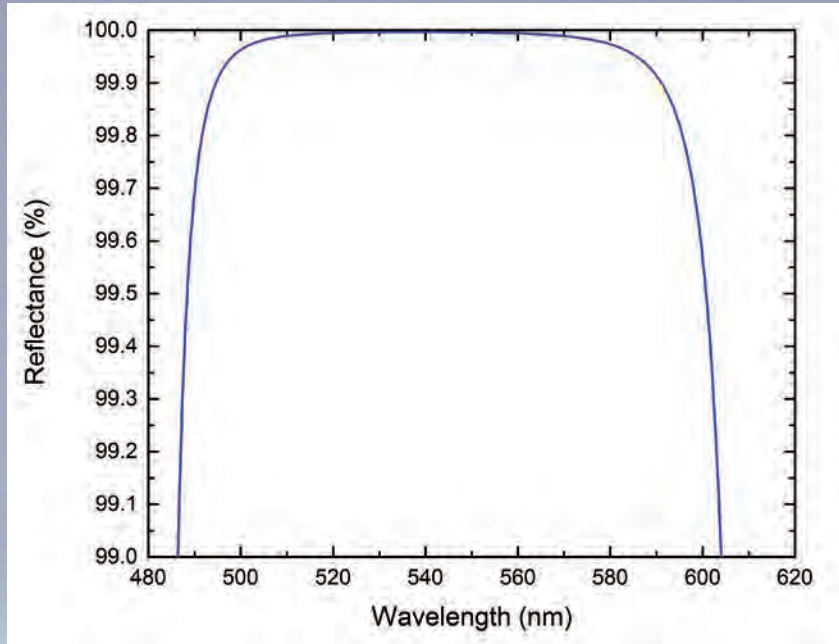


Details	
Description of the design	Dichroic mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	UV
Spectral working range low end	255 nm

Spectral working range high end	275 nm
Central wavelength	265 nm
Minimum reflectance	98 %
Second working range	
Second spectral working range low end	510.0 nm
Second spectral working range high end	550.0 nm
Polarization regime	p
Minimum reflectance	0 %
Minimum transmittance	98 %



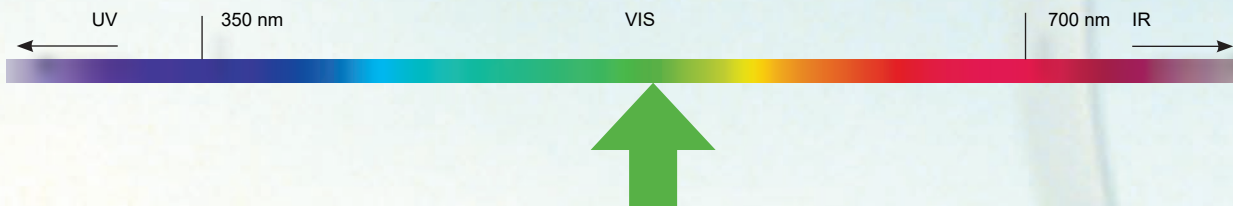
HIGH REFLECTIVE MIRROR UHR 1301



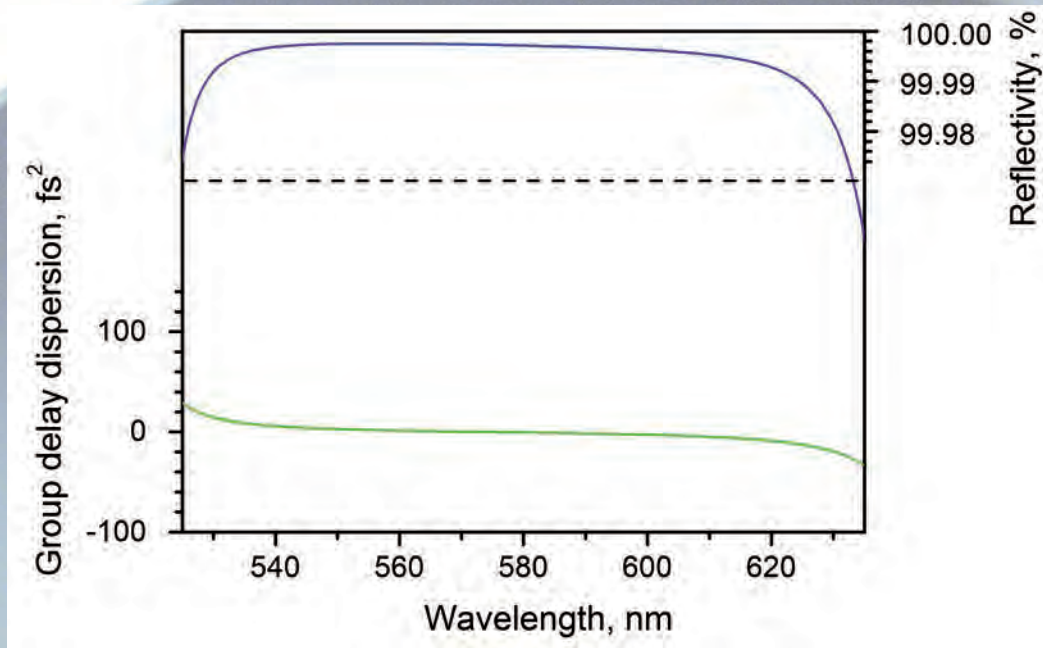
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p

Spectral category	VIS
Spectral working range low end	500 nm
Spectral working range high end	580 nm
Central wavelength	540 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	> 99.95 %

* not constant over defined working range



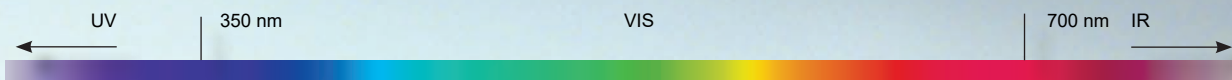
HIGH REFLECTIVE MIRROR UHR 35



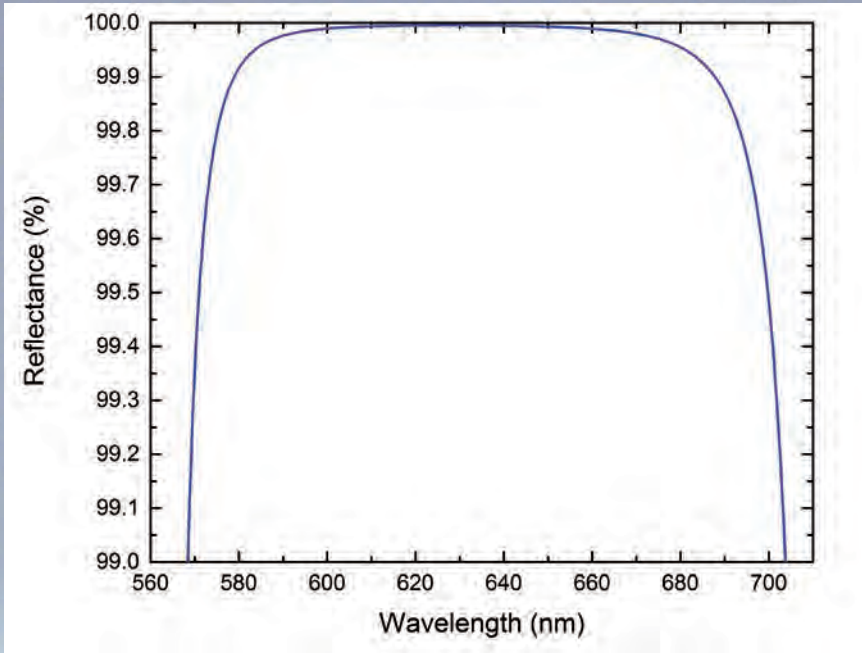
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	VIS

Spectral working range low end	530 nm
Spectral working range high end	625 nm
Central wavelength	577 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.98 %

* not constant over defined working range



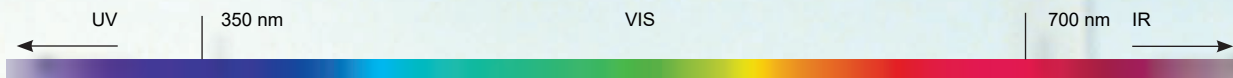
HIGH REFLECTIVE MIRROR UHR 1302



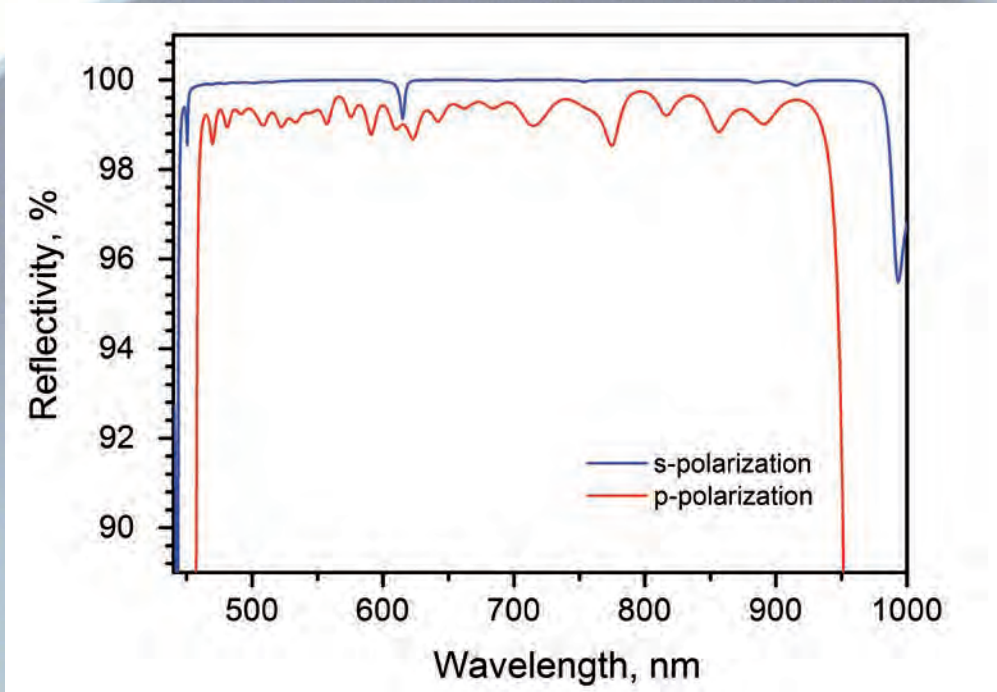
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	P

Spectral category	VIS
Spectral working range low end	580 nm
Spectral working range high end	680 nm
Central wavelength	630 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	> 99.98 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR HRVLT

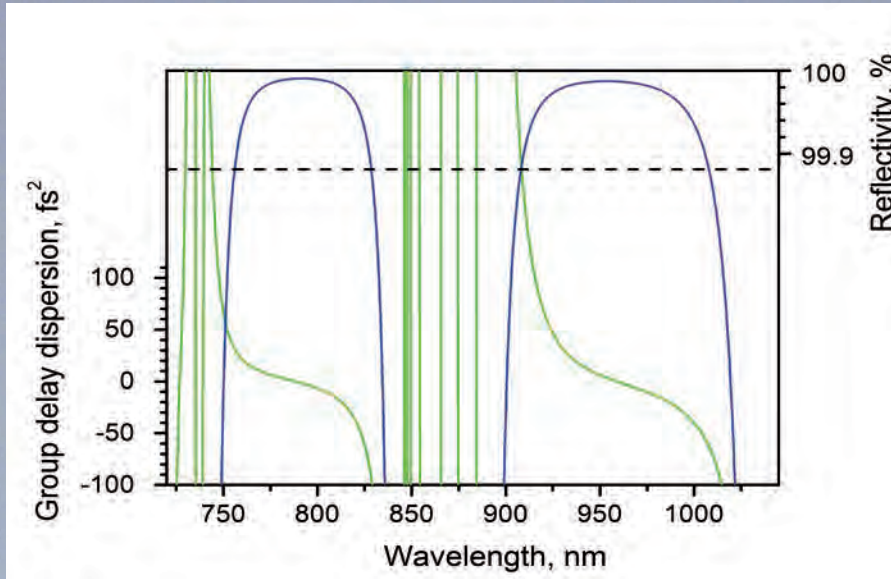


Details	
Description of the design	High-reflectice mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s, p

Spectral category	VIS-IR
Spectral working range low end	460 nm
Spectral working range high end	940 nm
Central wavelength	700 nm
Minimum Reflectance	> 98 %



HIGH REFLECTIVE MIRROR UHR 23

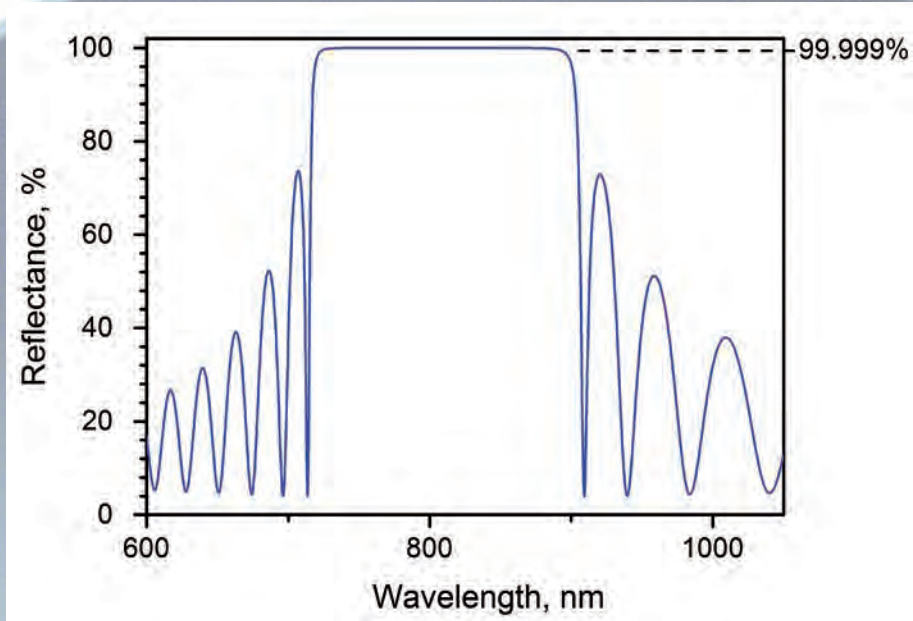


Details	
Description of the design	TOD dichroic mirror
Type	Mirror
Subtype	TOD mirror
First working range	
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p
Spectral category	IR

Spectral working range low end	760 nm
Spectral working range high end	810 nm
Central wavelength	785 nm
Minimum reflectance	> 99.95 %
Second working range	
Second spectral working range low end	925.0 nm
Second spectral working range high end	1000.0 nm
Minimum reflectance	> 99.95 %



HIGH REFLECTIVE MIRROR UHR 99



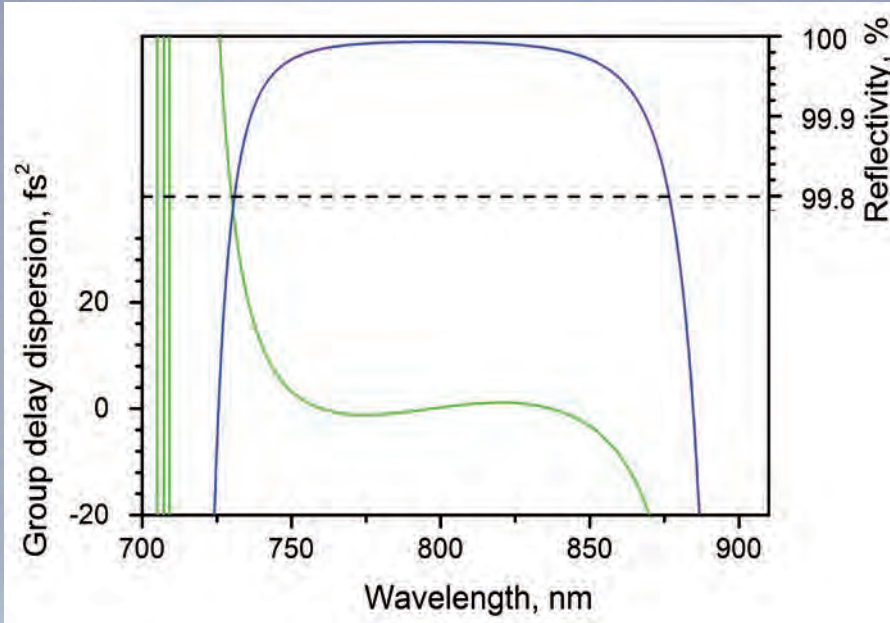
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	840 nm
Central wavelength	795 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.99 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR UHR 24



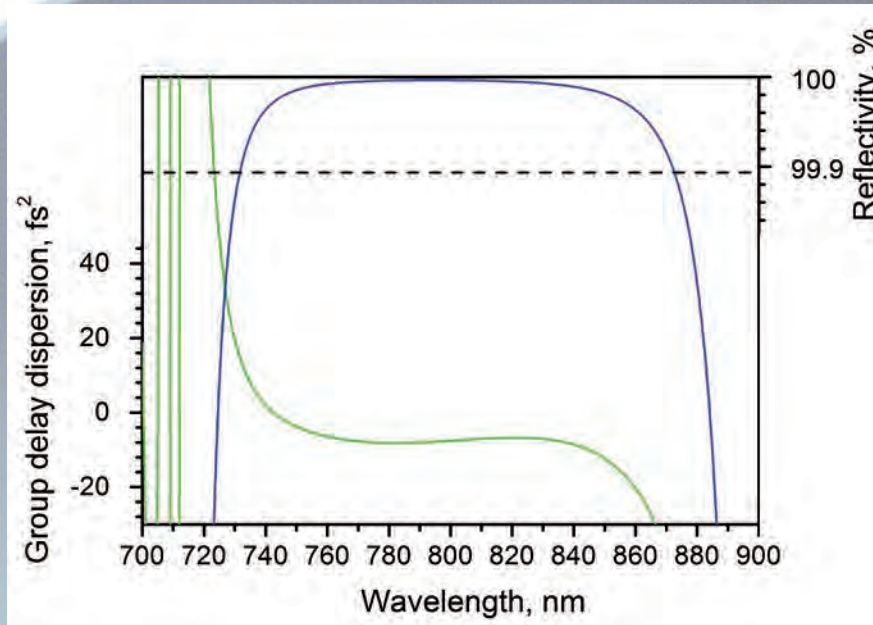
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	850 nm
Central wavelength	800 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.98 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR UHR 21



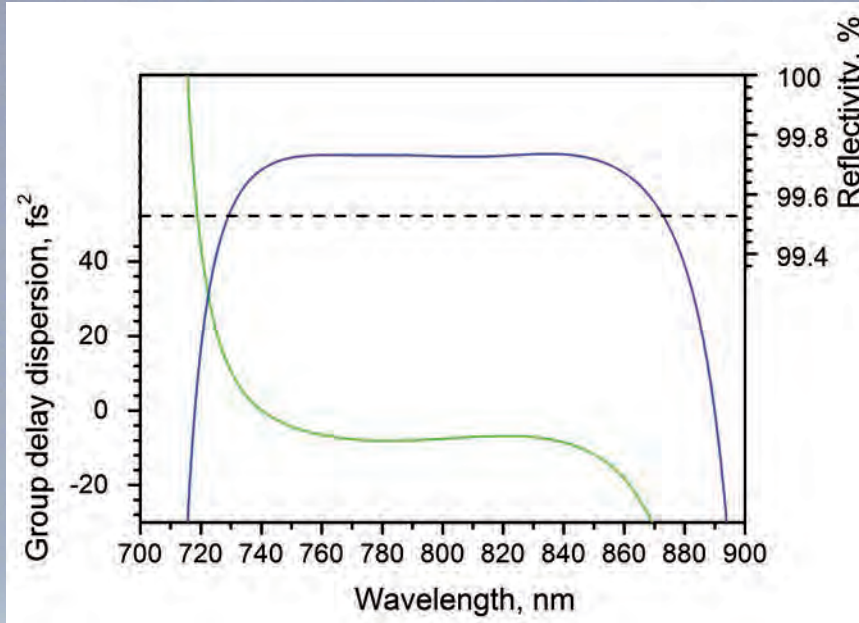
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	IR

Spectral working range low end	750 nm
Spectral working range high end	850 nm
Central wavelength	800 nm
Nominal GDD	-8 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.95 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR UHR 22



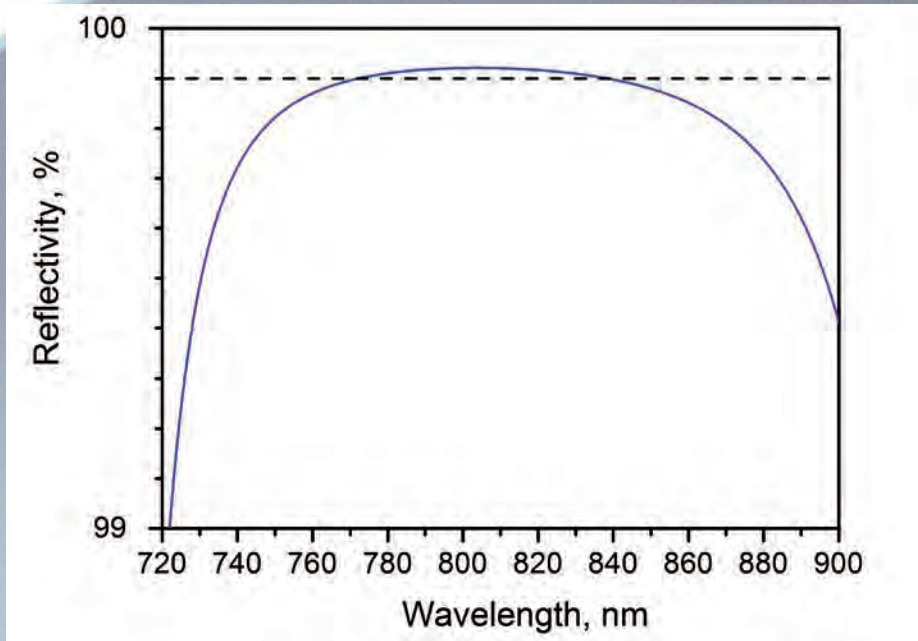
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	2
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	850 nm
Central wavelength	800 nm
Nominal GDD	-7 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.7 %

* not constant over defined working range



BROAD-BAND HIGH-REFLECTIVE MIRROR HR 1201

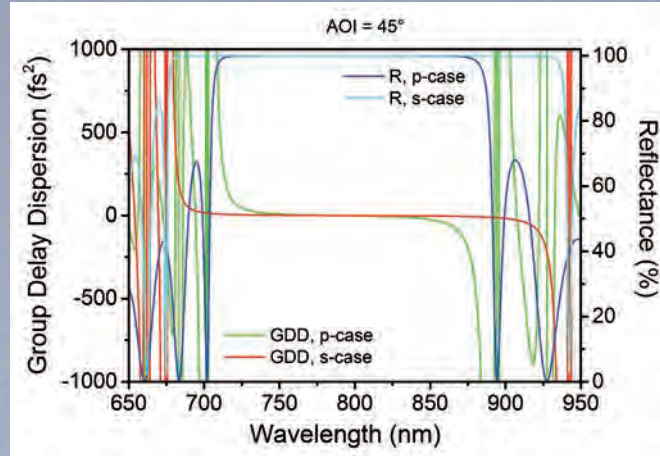


Details	
Description of the design	Broad-band high-reflection mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	IR
Spectral working range low end	720 nm
Spectral working range high end	900 nm
Central wavelength	810 nm
Maximum reflectance	99.9 %



HIGH REFLECTIVE MIRROR HR 1511



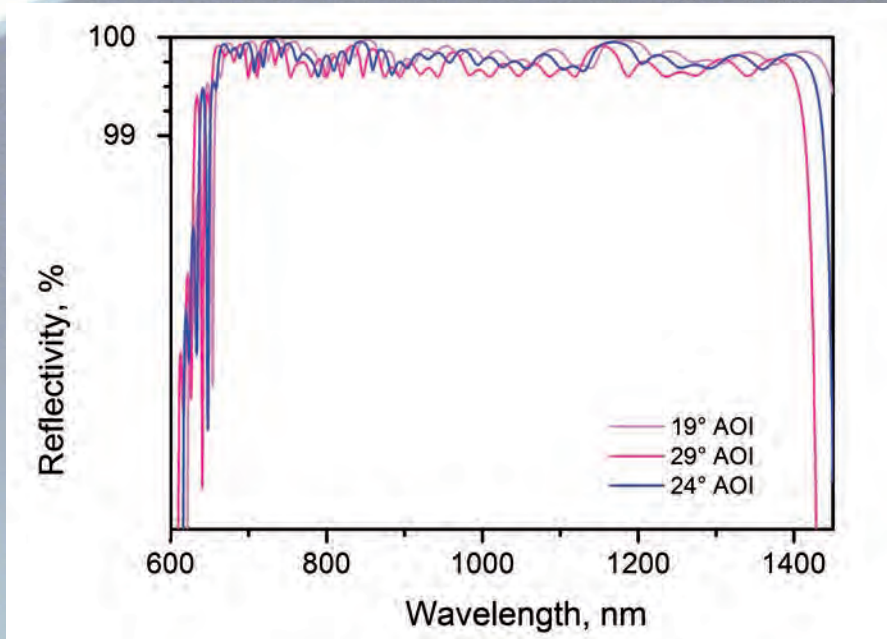
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	VIS-IR
Spectral working range low end	1032 nm
Spectral working range high end	1038 nm

Central wavelength	1035 nm
Nominal GDD	0 fs ² *
Minimum reflectance	99.9 %
Second working range	
Second spectral working range low end	730 nm
Second spectral working range high end	860 nm
Polarization regime	p
Minimum transmittance	99.9 %

* not constant over defined working range



BROAD-BAND HIGH-REFLECTIVE MIRROR HR 24

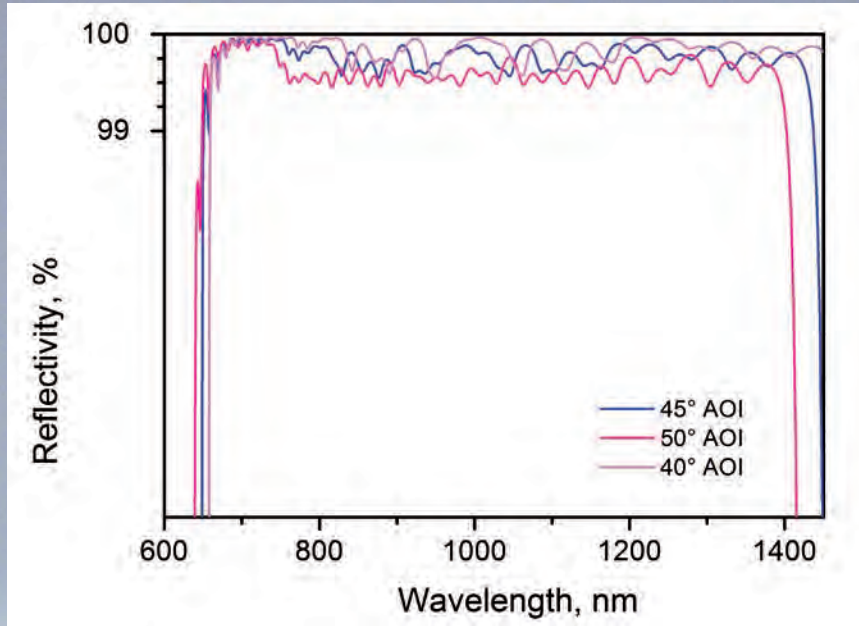


Details	
Description of the design	Broad-band high-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	19, 24, 29
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	660 nm
Spectral working range high end	1400 nm
Central wavelength	1030 nm
Minimum Reflectance	> 99.5 %



BROAD-BAND HIGH-REFLECTIVE MIRROR HR 45

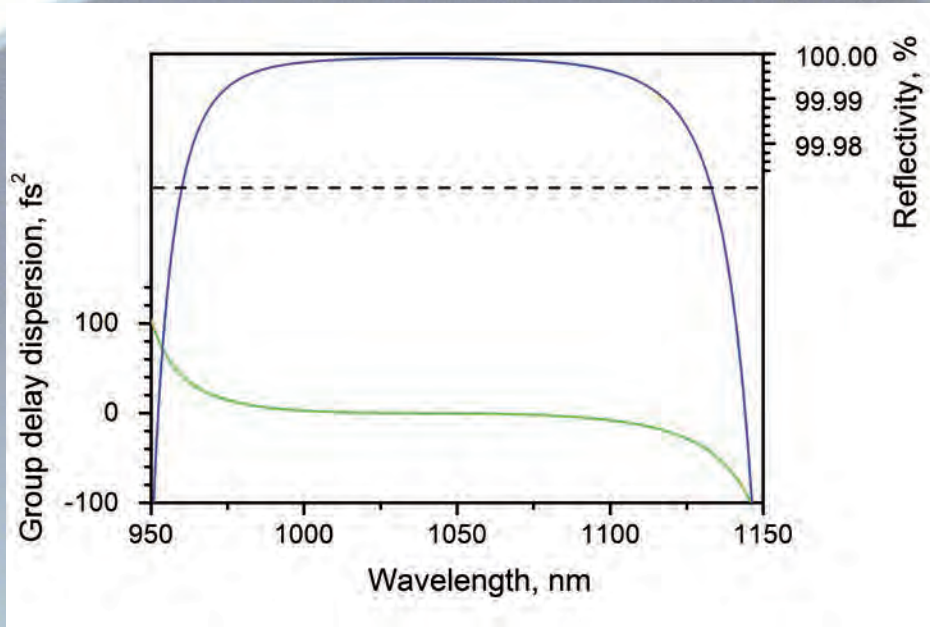


Details	
Description of the design	Broad-band high-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	40, 45, 50
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	660 nm
Spectral working range high end	1400 nm
Central wavelength	1030 nm
Minimum Reflectance	> 99.5 %



HIGH REFLECTIVE MIRROR UHR 11



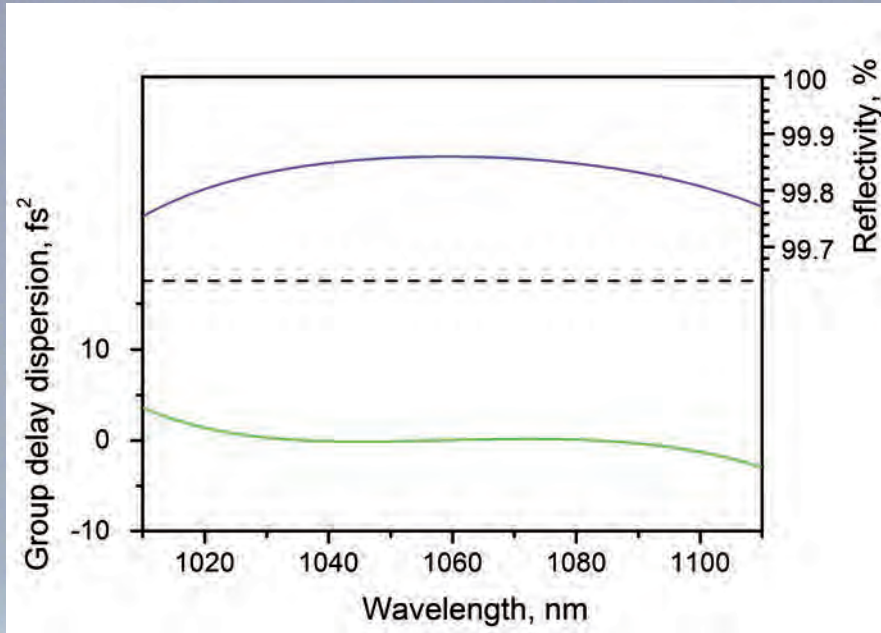
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	970 nm
Spectral working range high end	1120 nm
Central wavelength	1045 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.99 %

* not constant over defined working range



HIGH REFLECTIVE MIRROR UHR 17



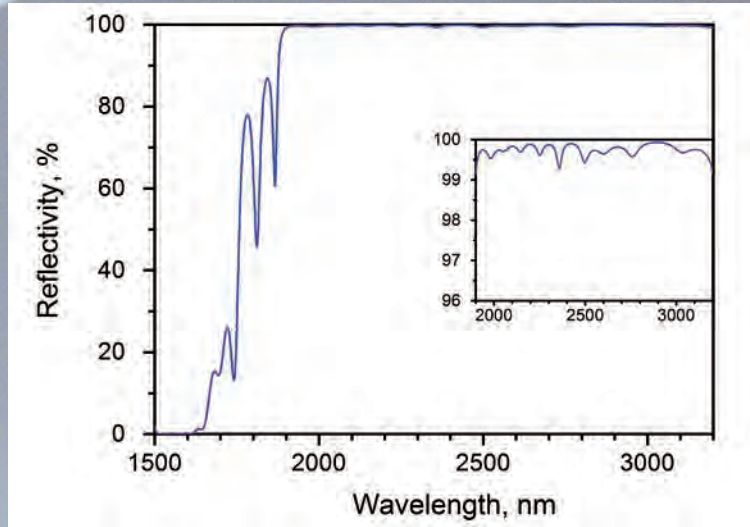
Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	3
Polarization regime (primary spectral range)	P
Spectral category	IR

Spectral working range low end	1010 nm
Spectral working range high end	1110 nm
Central wavelength	1060 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum Reflectance	> 99.8 %

* not constant over defined working range



DICHROIC MIRROR IR 13

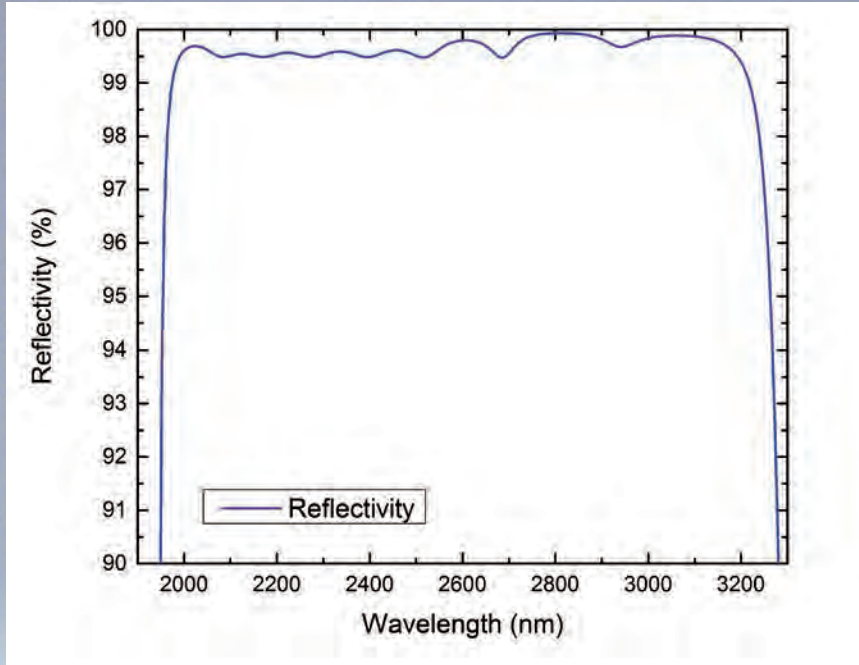


Details	
Description of the design	Dichroic mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
First working range	
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P
Spectral category	IR
Spectral working range low end	1900 nm

Spectral working range high end	3200 nm
Central wavelength	2550 nm
Minimum reflectance	99.00 %
Second working range	
Second spectral working range low end	1510.0 nm
Second spectral working range high end	1610.0 nm
Polarization regime	p
Minimum transmittance	99 %



BROAD-BAND HIGH-REFLECTIVE MIRROR HRIR1

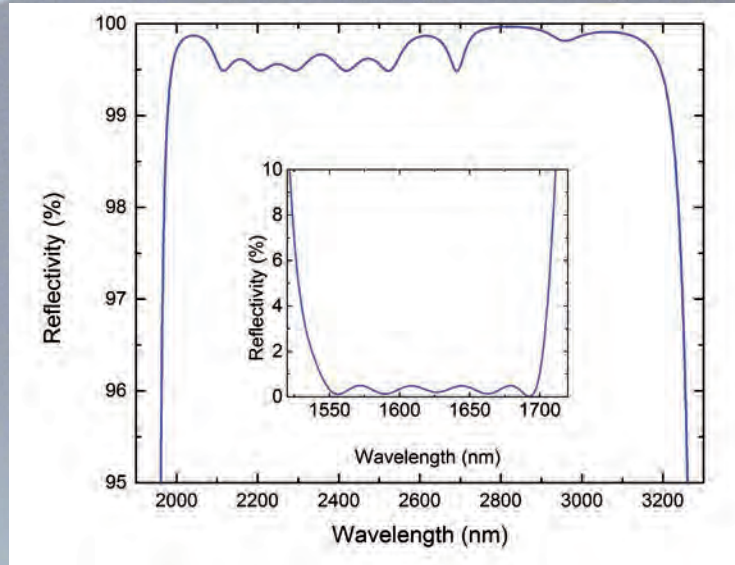


Details	
Description of the design	Broad-band high-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1990 nm
Spectral working range high end	3200 nm
Central wavelength	2595 nm
Minimum Reflectance	> 99.5 %



DICHROIC MIRROR HRIR2



Details		Spectral working range high end	3200 nm
Description of the design	Dichroic mirror	Central wavelength	2600 nm
Type	Mirror	Minimum reflectance	99.00 %
Subtype	HR (high-reflection) mirror	Second working range	
First working range		Second spectral working range low end	1550.0 nm
Angle of Incidence in degrees	5	Second spectral working range high end	1700.0 nm
Polarization regime (primary spectral range)	p	Polarization regime	p
Spectral category	IR	Minimum transmittance	98 %
Spectral working range low end	2000 nm		



Spectral filters

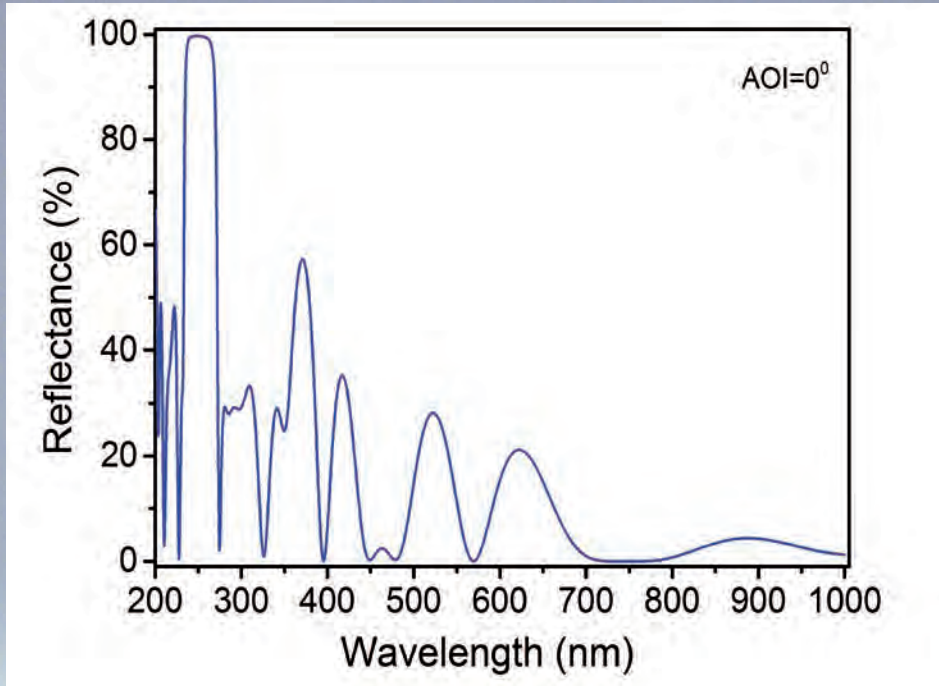
In contrary to BS, filters split the light depending on the wavelength. Our spectral filters support short pulses application. Reflected or transmitted pulses remain as short as prior passing BS.

By using such spectral filters researcher from Prof. Krausz group were able to build so called Wavesythesizer. We are able to split irradiation from 250 to 1100 nm on four channels: 250-290, 290-350, 350-500, 500-1100. The phase of reflected und transmitted light is controlled in the way the irradiation recombines spatially and temporally from all four channels resulting in generating sub-optical-cycle pulse.

**See also literature
for further information and application**

- M. Hassan et al. Review of Scientific Instruments 83, 111301 (2012)
- A. Wirth et al. Science 334, 195 (2011)

HIGH REFLECTIVE MIRROR F 1403

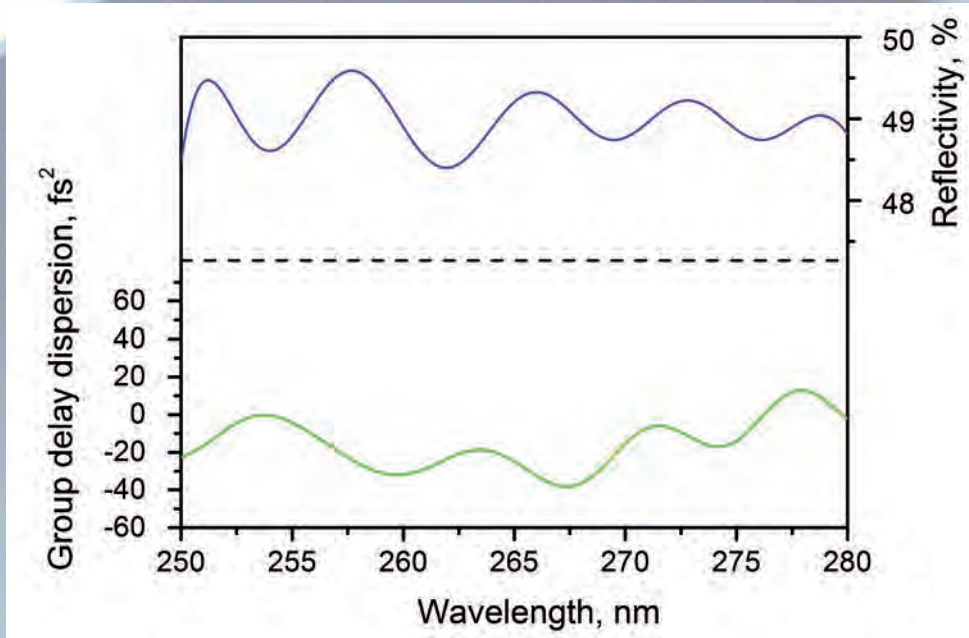


Details	
Description of the design	High-reflective mirror
Type	Mirror
Subtype	HR (high-reflection) mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	UV
Spectral working range low end	240 nm
Spectral working range high end	260 nm
Central wavelength	250 nm
Minimum Reflectance	> 95 %



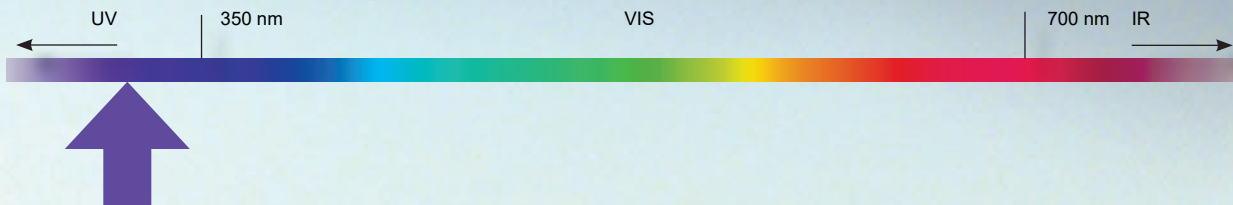
BEAM SPLITTER F 1306



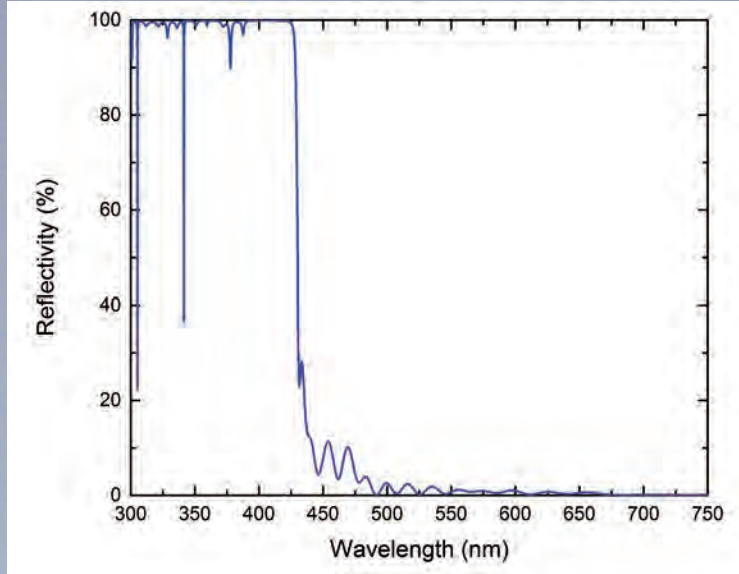
Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	UV

Spectral working range low end	250 nm
Spectral working range high end	280 nm
Central wavelength	265 nm
Nominal GDD	-20 fs ² *
Nominal GDD maximum deviation	20 fs ²
Minimum Reflectance	49 %
Minimum transmission	51 %

* not constant over defined working range

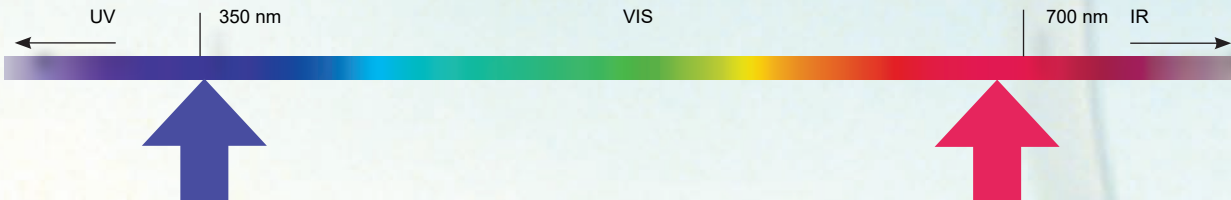


BEAM SPLITTER F 1310

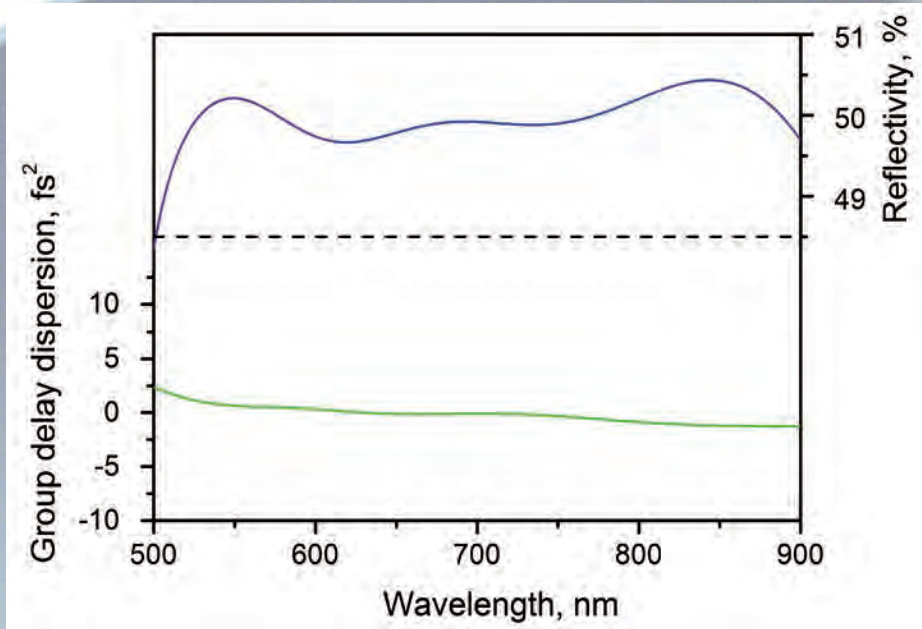


Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	UV-VIS
Spectral working range low end	300 nm

Spectral working range high end	430 nm
Central wavelength	365 nm
Minimum reflectance	90 %
Second working range	
Second spectral working range low end	430.0 nm
Second spectral working range high end	750.0 nm
Polarization regime	p
Minimum transmittance	90 %



BEAM SPLITTER F 1311



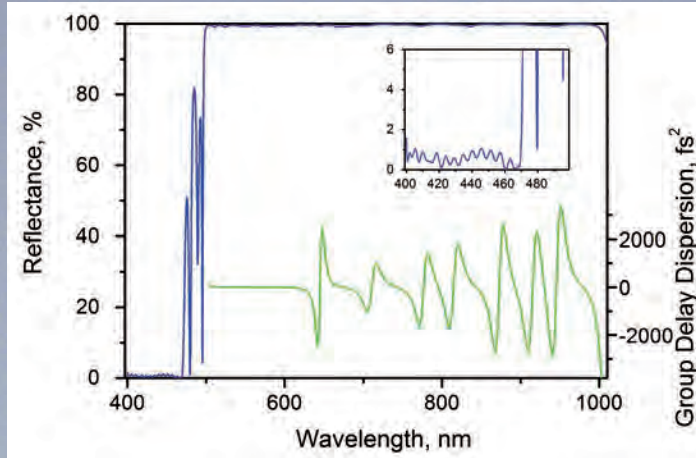
Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	VIS-IR

Spectral working range low end	500 nm
Spectral working range high end	850 nm
Central wavelength	675 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	2 fs ²
Minimum transmission	50 %

* not constant over defined working range



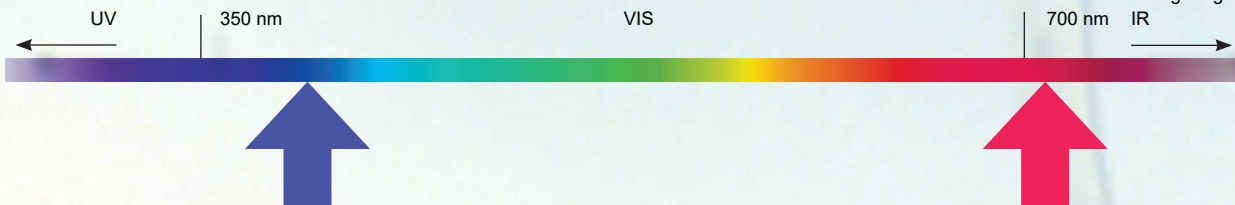
BEAM SPLITTER CM 71



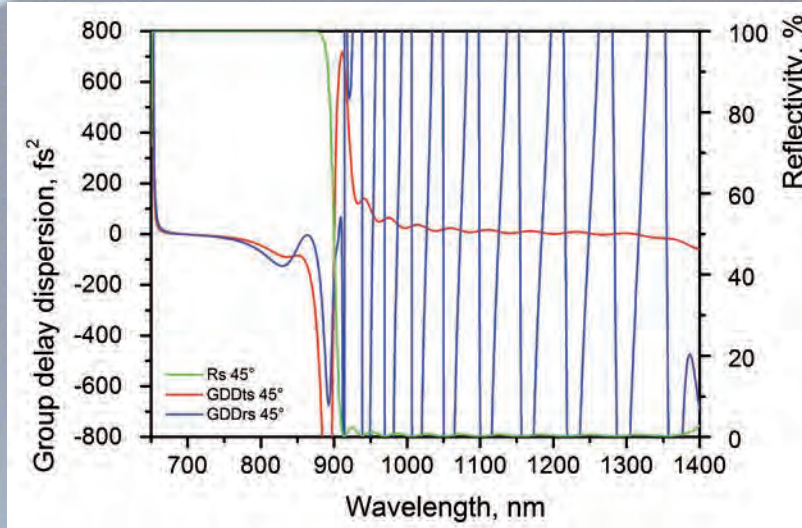
Details	
Description of the design	Beam splitter (dispersion controlled within 550-610 nm)
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	VIS-IR
Spectral working range low end	500 nm
Spectral working range high end	1000 nm

Central wavelength	750 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Minimum reflectance	99 %
Second working range	
Second spectral working range low end	400.0 nm
Second spectral working range high end	470.0 nm
Polarization regime	p
Minimum transmittance	98 %

* not constant over defined working range



BEAM SPLITTER F 1204



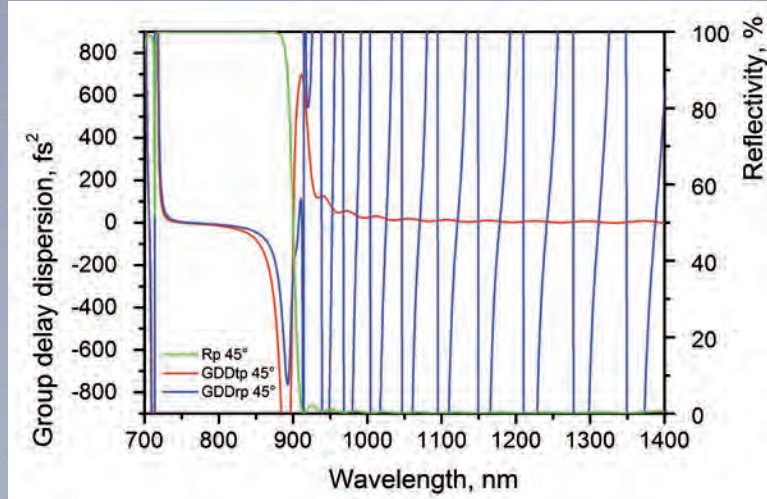
Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	IR
Spectral working range low end	650 nm

Spectral working range high end	900 nm
Central wavelength	775 nm
Nominal GDD	0 fs ² *
Minimum reflectance	99 %
Second working range	
Second spectral working range low end	900.0 nm
Second spectral working range high end	1400.0 nm
Polarization regime	s
Minimum transmittance	98 %

* not constant over defined working range



BEAM SPLITTER F 1203



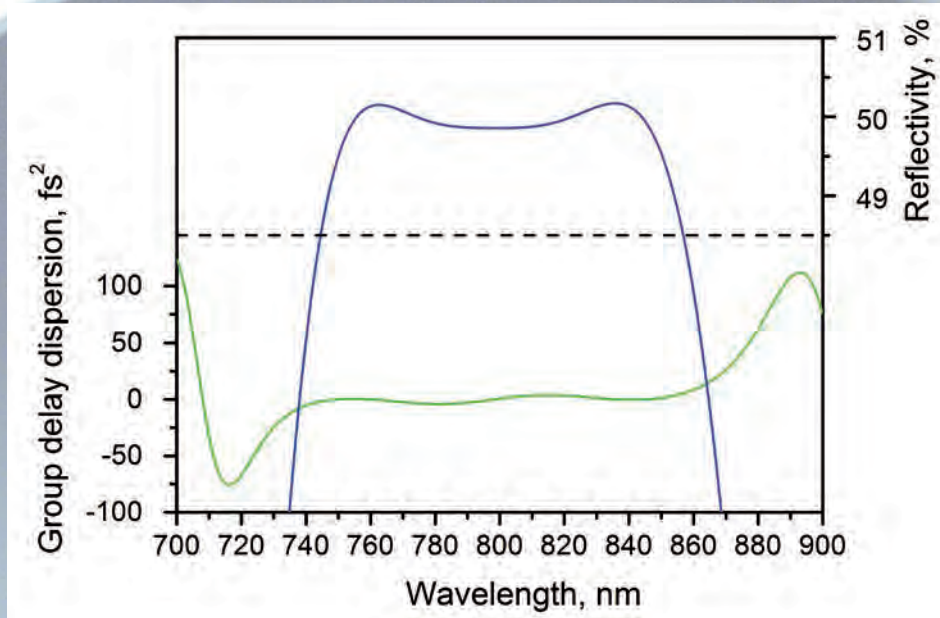
Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	720 nm
Spectral working range high end	880 nm

Central wavelength	800 nm
Nominal GDD	0 fs ²
Minimum reflectance	99.00 %
Second working range	
Second spectral working range low end	900.0 nm
Second spectral working range high end	1400.0 nm
Polarization regime	p
Minimum reflectance	0 %
Minimum transmittance	98 %

* not constant over defined working range



BEAM SPLITTER F 1307



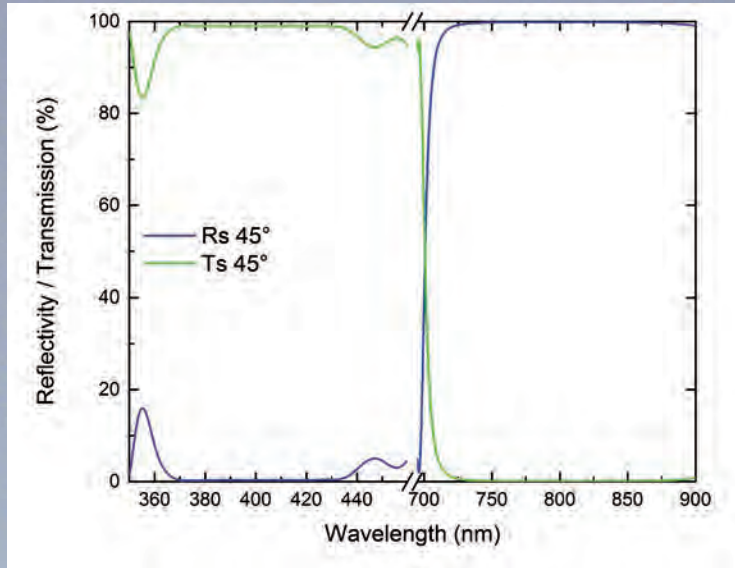
Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
Angle of Incidence in degrees	10
Polarization regime (primary spectral range)	p
Spectral category	IR

Spectral working range low end	750 nm
Spectral working range high end	850 nm
Central wavelength	800 nm
Nominal GDD	0 fs ² *
Nominal GDD maximum deviation	10 fs ²
Reflectance	50 %

* not constant over defined working range

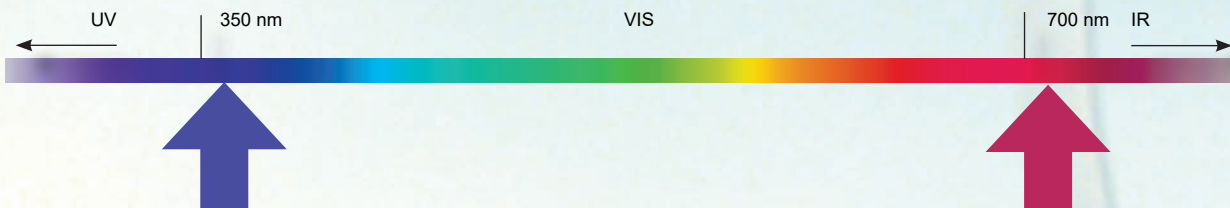


BEAM SPLITTER F 1309

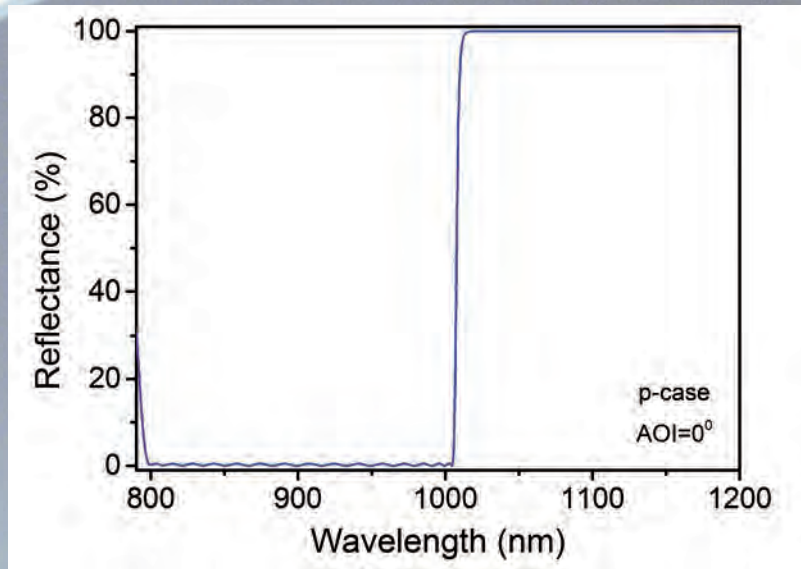


Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s
Spectral category	VIS-IR
Spectral working range low end	720 nm

Spectral working range high end	900 nm
Central wavelength	810 nm
Minimum reflectance	98 %
Second working range	
Second spectral working range low end	370.0 nm
Second spectral working range high end	430.0 nm
Polarization regime	s
Minimum reflectance	0 %
Minimum transmittance	98 %



BEAM SPLITTER F 1401

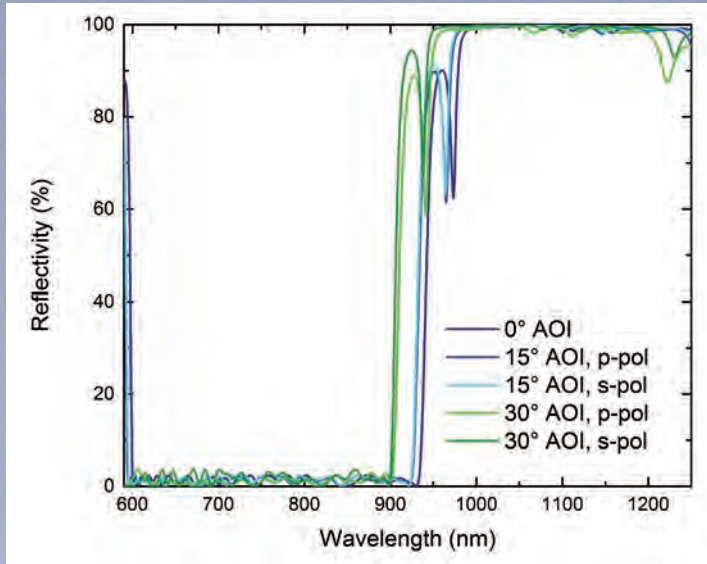


Details	
Description of the design	Beam splitter, GDD = 0 fs ²
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	15
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	800 nm

Spectral working range high end	1000 nm
Central wavelength	900 nm
Maximum reflectance	2 %
Second working range	
Second spectral working range low end	1000.0 nm
Second spectral working range high end	1200.0 nm
Polarization regime	p
Minimum reflectance	99 %



BEAM SPLITTER F 1308



Details	
Description of the design	Beam splitter
Type	Beam splitter
Subtype	BS (Beam splitter)
First working range	
Angle of Incidence in degrees	0, 15, 30
Polarization regime (primary spectral range)	s, p
Spectral category	VIS-IR
Spectral working range low end	950 nm

Spectral working range high end	1200 nm
Central wavelength	1075 nm
Minimum reflectance	98 %
Second working range	
Second spectral working range low end	600.0 nm
Second spectral working range high end	900.0 nm
Polarization regime	s, p
Minimum transmittance	98 %



Anti-reflection coating

There is a special coating called anti-reflection (AR) coating to avoid Fresnel reflection from the glass surfaces. For decades, AR coatings play an important role. All commercially available lenses and objective are coated with AR coating.

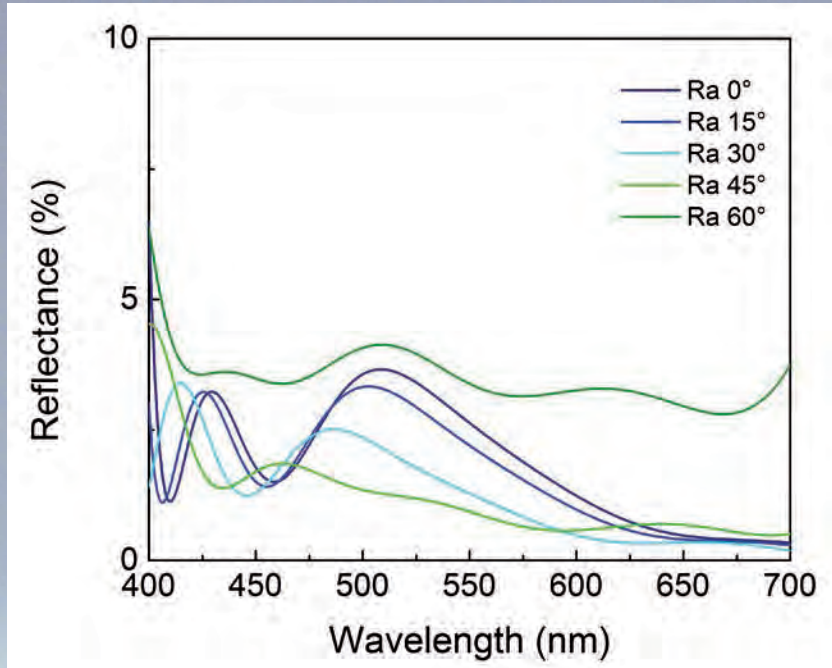
Ultrafast Innovations offers a broad range of AR coating. There is a major advantage using ARs from Ultrafast innovations which are optimized to have low GDD oscillations. Low GDD oscillations allow our customer to obtain short pulse with sub-2 fs duration.

Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
IRAR16, AR_PD1301

**See also literature
for further information and application:**

- T. Amotchkina et al Applied Optics 50, 6468 (2011)

BROAD-BAND ANTI-REFLECTION COATING AR 400

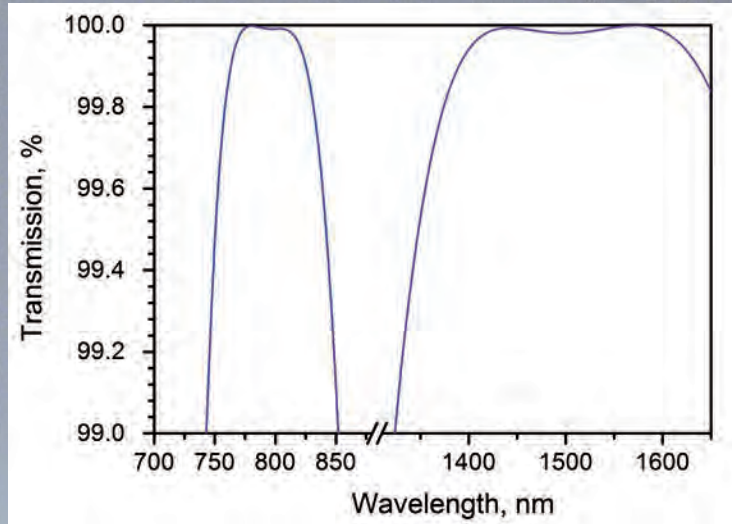


Details	
Description of the design	Broad-band anti-reflection coating
Type	AR coating
Subtype	Broad-band AR coating
Angle of Incidence in degrees	0-60
Polarization regime (primary spectral range)	s, p

Spectral category	VIS
Spectral working range low end	400 nm
Spectral working range high end	700 nm
Central wavelength	550 nm
Maximum reflectance	5 %



BROAD-BAND ANTI-REFLECTION COATING AR 770

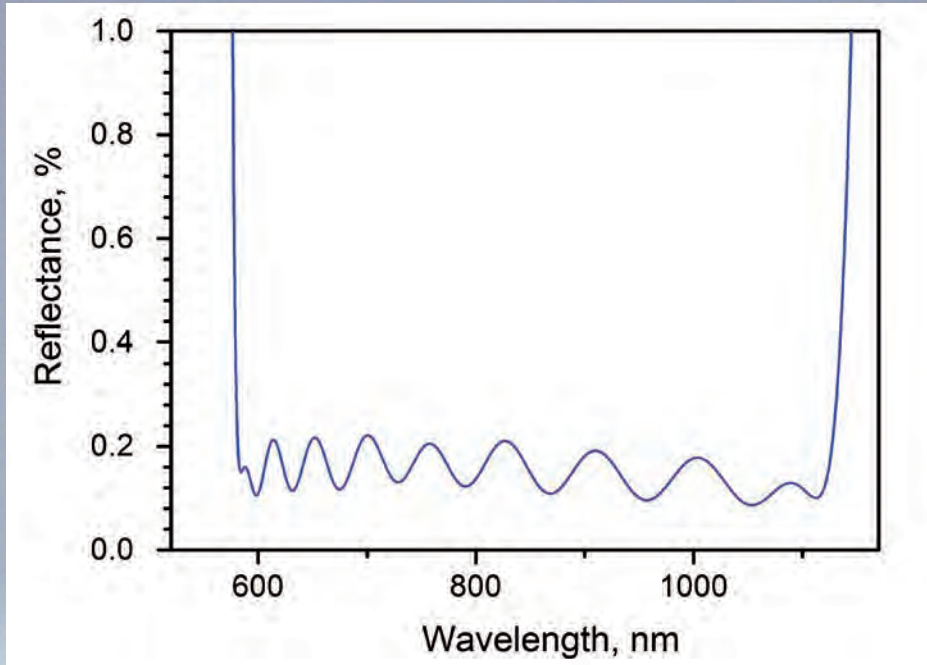


Details	
Description of the design	Broad-band IR anti-reflection coating
Type	AR coating
Subtype	Broad-band AR coating
First working range	
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	IR
Spectral working range low end	770 nm

Spectral working range high end	810 nm
Central wavelength	790 nm
Minimum transmission	99 %
Second working range	
Second spectral working range low end	1420.0 nm
Second spectral working range high end	1610.0 nm
Minimum transmittance	99 %



BROAD-BAND ANTI-REFLECTION COATING AR 550-1130

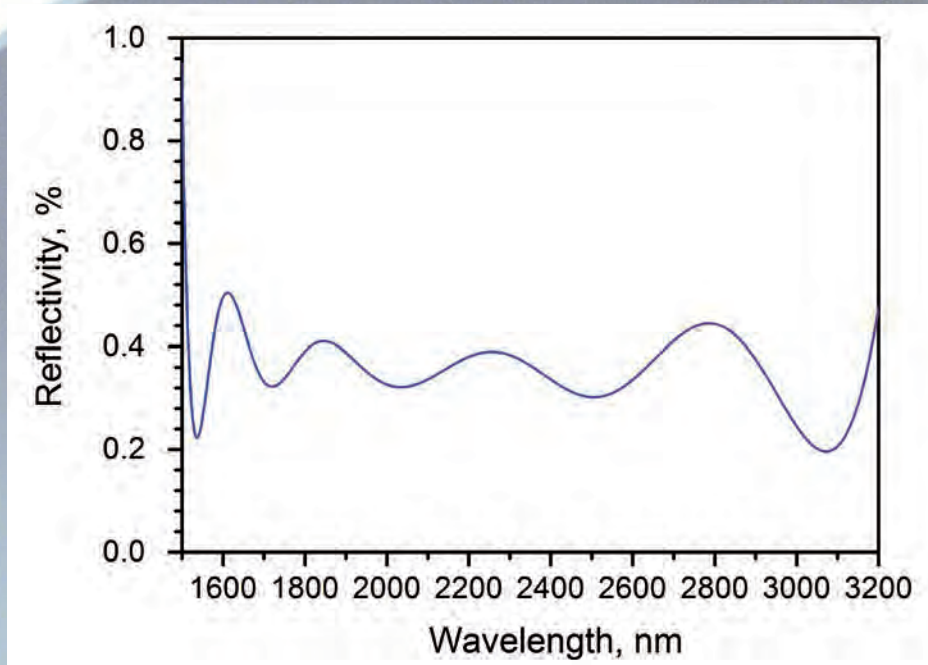


Details	
Description of the design	Broad-band anti-reflection coating
Type	AR coating
Subtype	Broad-band AR coating
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	580 nm
Spectral working range high end	1125 nm
Central wavelength	852 nm
Minimum transmission	99.7 %



BROAD-BAND ANTI-REFLECTION COATING ARIR 19

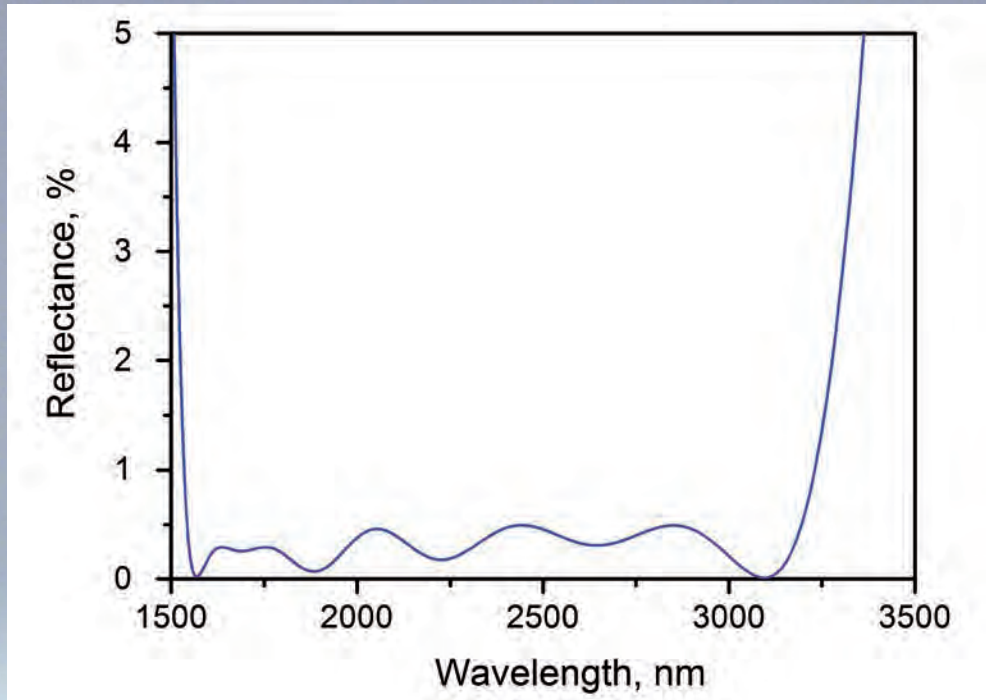


Details	
Description of the design	Broad-band anti-reflection coating
Type	AR coating
Subtype	Broad-band AR coating
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1500 nm
Spectral working range high end	3200 nm
Central wavelength	2350 nm
Minimum transmission	99.5 %



BROAD-BAND ANTI-REFLECTION COATING ARIR 16

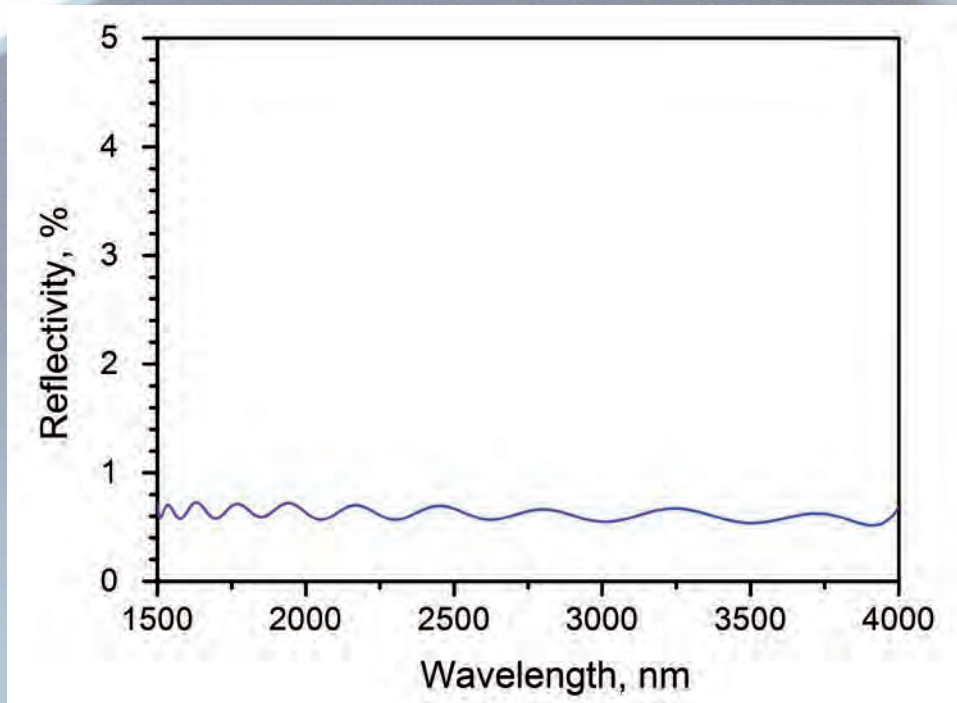


Details	
Description of the design	Broad-band anti-reflection coating
Type	AR coating
Subtype	Broad-band AR coating
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1550 nm
Spectral working range high end	3200 nm
Central wavelength	2375 nm
Minimum transmission	99.5 %



BROAD-BAND ANTI-REFLECTION COATING ARIR 17



Details	
Description of the design	Broad-band anti-reflection coating
Type	AR coating
Subtype	Broad-band AR coating
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	1500 nm
Spectral working range high end	4000 nm
Central wavelength	2750 nm
Minimum transmission	99.2 %



Positive-dispersion mirrors

Positive-dispersion mirrors are series of mirrors which provide positive GDD with the same sign of GDD as most material in UV-VIS-NIR ranges. We split positive dispersion mirrors in independent category because of their importance. Positively-chirped mirrors can be used for pulse compression in chirped-pulse amplifier systems, e. g. in a hybrid prism / mirror compressor setup. In these applications mirrors with positive GDD are needed. PD mirrors are custom-designed according to your specification regarding dispersion and reflectivity characteristics.

Please browse UFI's design database for following examples:

(<http://www.ultrafast-innovations.com/index.php/database>)

PD5, PD41, PD1301

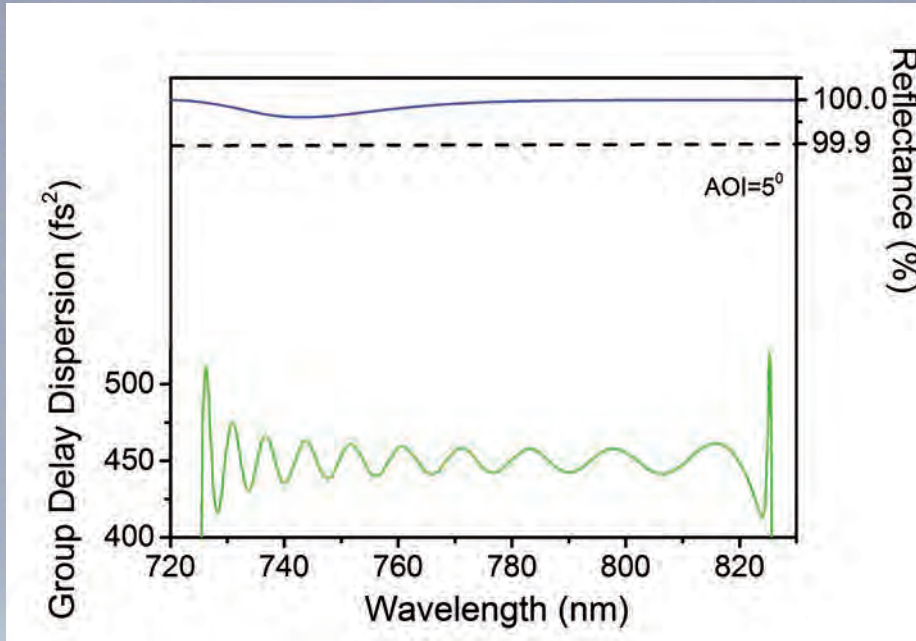
Applications

Pulse compression in
chirped-pulse amplifier systems

See also literature for further information and application:

- A. L. Cavalieri et al. New J. Phys. 9 242 (2007)
- D. Herrmann et al. Opt. Lett. 34 2459 (2009)

HIGH DISPERSIVE MIRROR HD1401_RC2



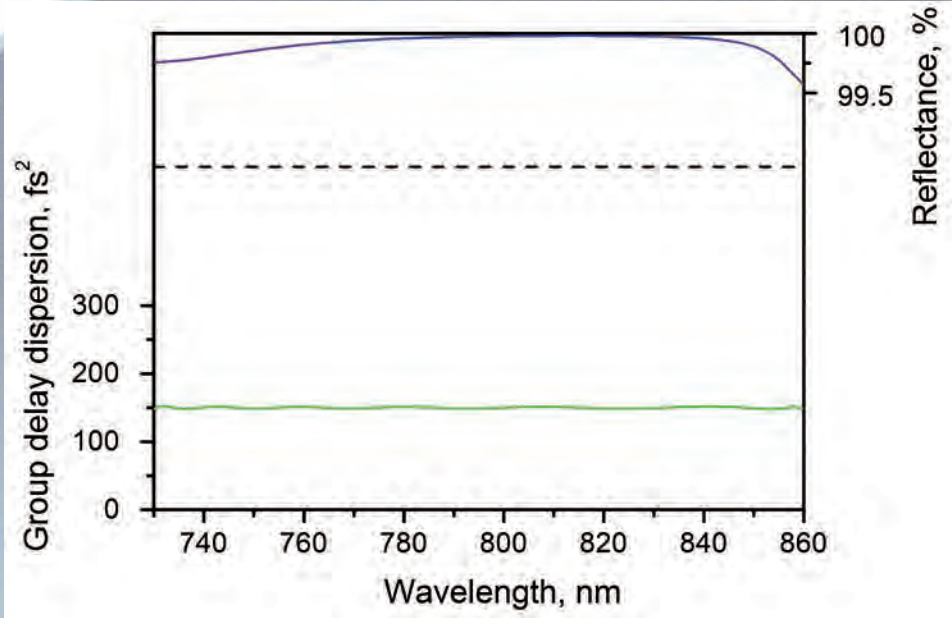
Details	
Description of the design	High-dispersive mirror
Type	Mirror
Subtype	High (negative) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	725 nm
Spectral working range high end	825 nm
Central wavelength	775 nm
Nominal GDD	450 fs ² *
Nominal GDD maximum deviation	300 fs ²
Minimum Reflectance	> 99.9 %

* not constant over defined working range



MIRROR WITH HIGH-POSITIVE DISPERSION PD 5



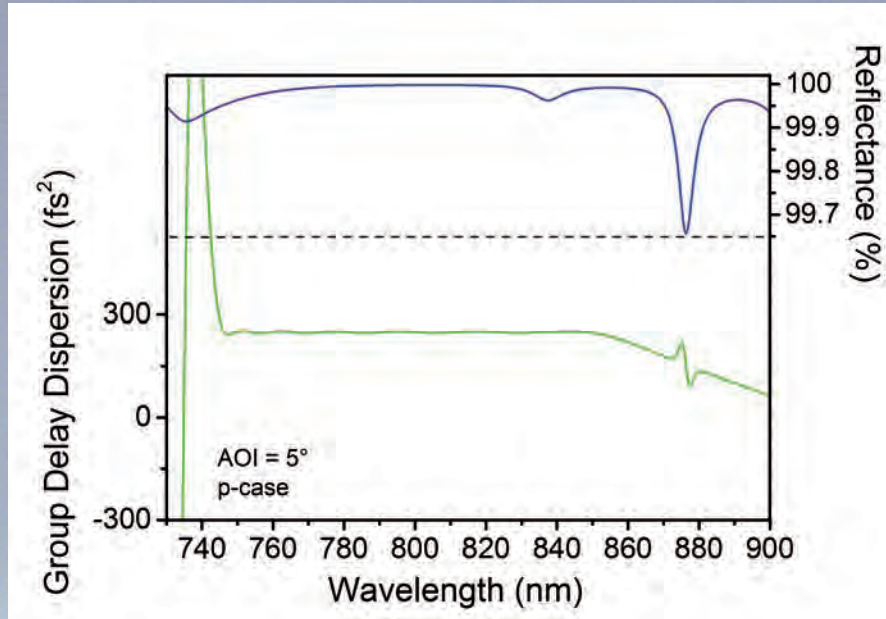
Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High(positive) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	730 nm
Spectral working range high end	860 nm
Central wavelength	795 nm
Nominal GDD	150 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	99.8 %

* not constant over defined working range



BROAD-BAND MIRROR WITH HIGH POSITIVE DISPERSION PD 1602



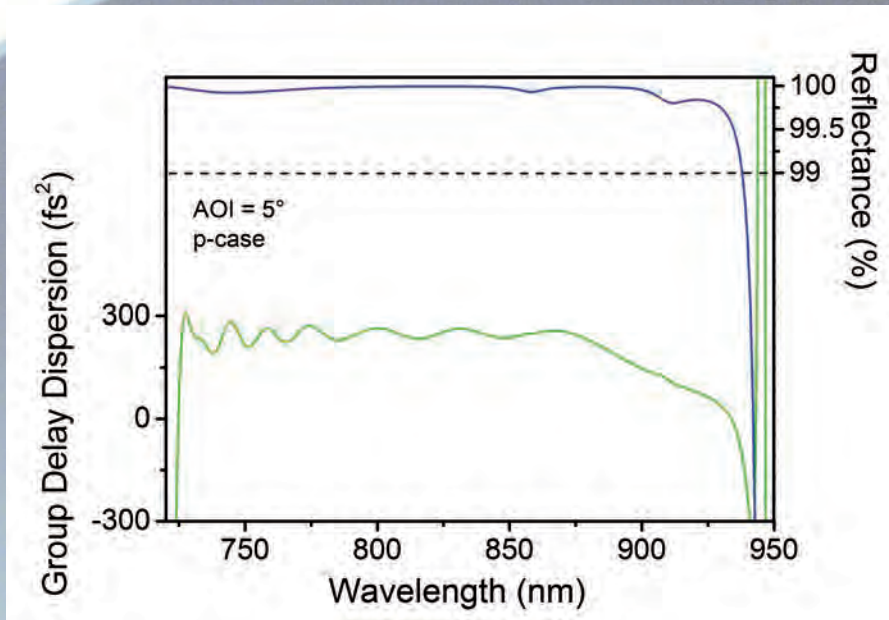
Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High (positive)-dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	750 nm
Spectral working range high end	880 nm
Central wavelength	800 nm
Nominal GDD	250 fs ² *
Minimum reflectance	99.92 %

* not constant over defined working range



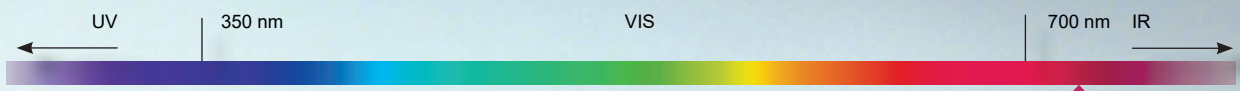
BROAD-BAND MIRROR WITH HIGH POSITIVE DISPERSION PD 1521



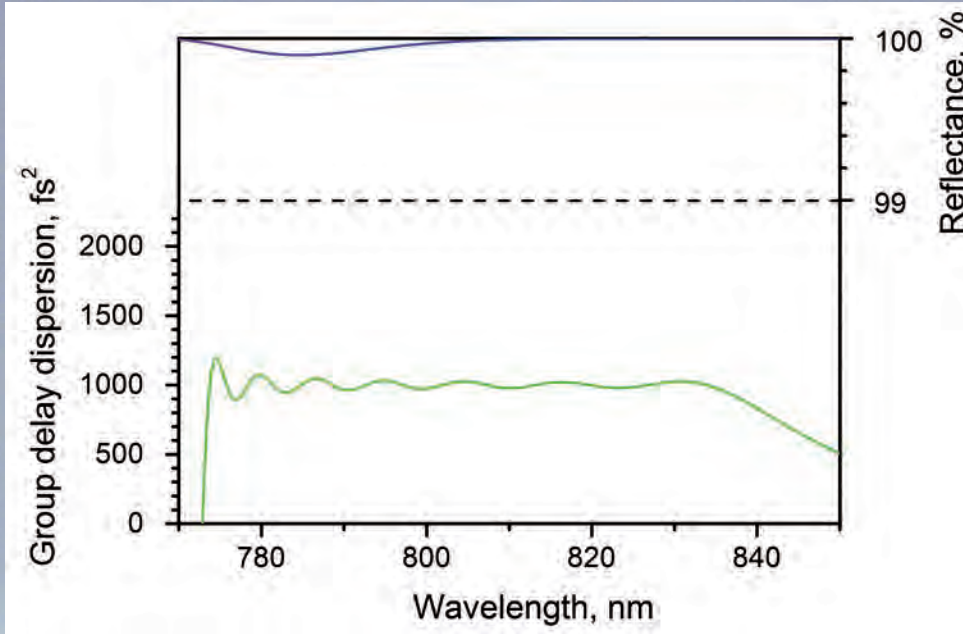
Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High (positive)-dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	730 nm
Spectral working range high end	880 nm
Central wavelength	805 nm
Nominal GDD	250 fs ² *
Minimum reflectance	99.8 %

* not constant over defined working range



MIRROR WITH HIGH-POSITIVE DISPERSION PD 51



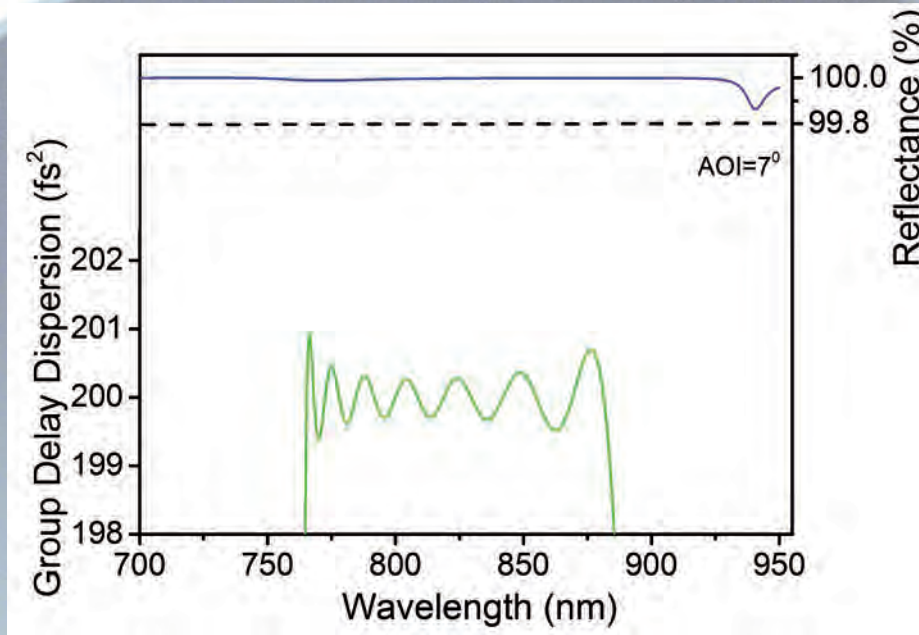
Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High(positive) - dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	IR
Spectral working range low end	775 nm
Spectral working range high end	840 nm
Central wavelength	807 nm
Nominal GDD	1000 fs ² *
Nominal GDD maximum deviation	50 fs ²
Minimum Reflectance	99.9 %

* not constant over defined working range



MIRROR WITH HIGH-POSITIVE DISPERSION PD 1404_RC1

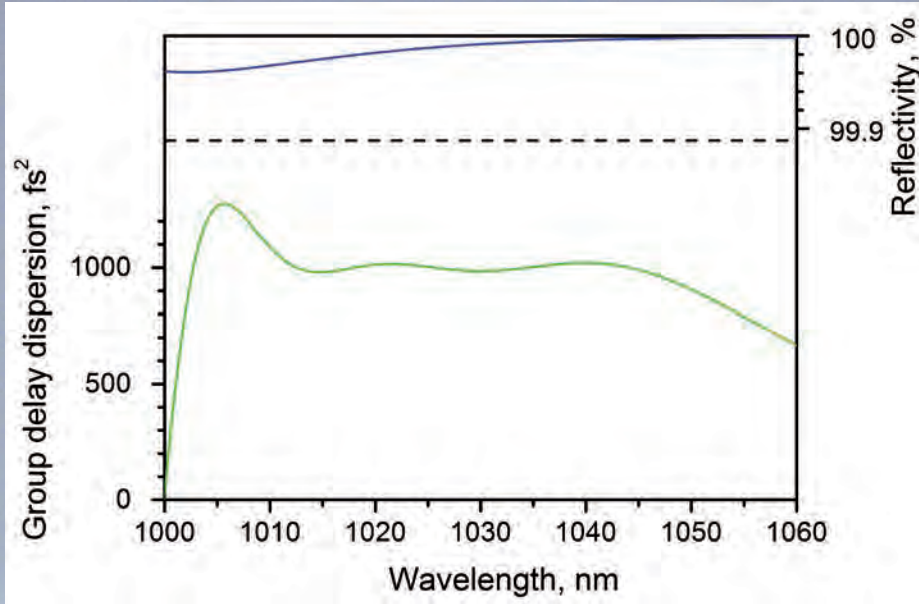


Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High(positive) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	P

Spectral category	VIS-IR
Spectral working range low end	765 nm
Spectral working range high end	880 nm
Central wavelength	822 nm
Nominal GDD	200 fs ²
Minimum Reflectance	99.9 %



MIRROR WITH HIGH-POSITIVE DISPERSION PD 41



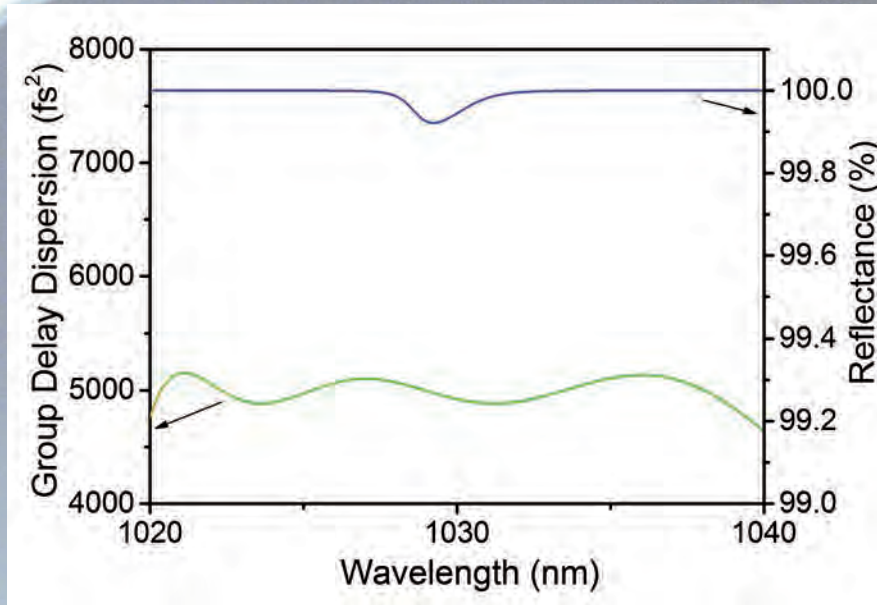
Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High(positive) - dispersion mirror
Angle of Incidence in degrees	6
Polarization regime (primary spectral range)	p
Spectral category	IR

Spectral working range low end	1015 nm
Spectral working range high end	1045 nm
Central wavelength	1027 nm
Nominal GDD	1000 fs ² *
Nominal GDD maximum deviation	200 fs ²
Minimum Reflectance	99.9 %

* not constant over defined working range



MIRROR WITH HIGH-POSITIVE DISPERSION PD 1401_RC1

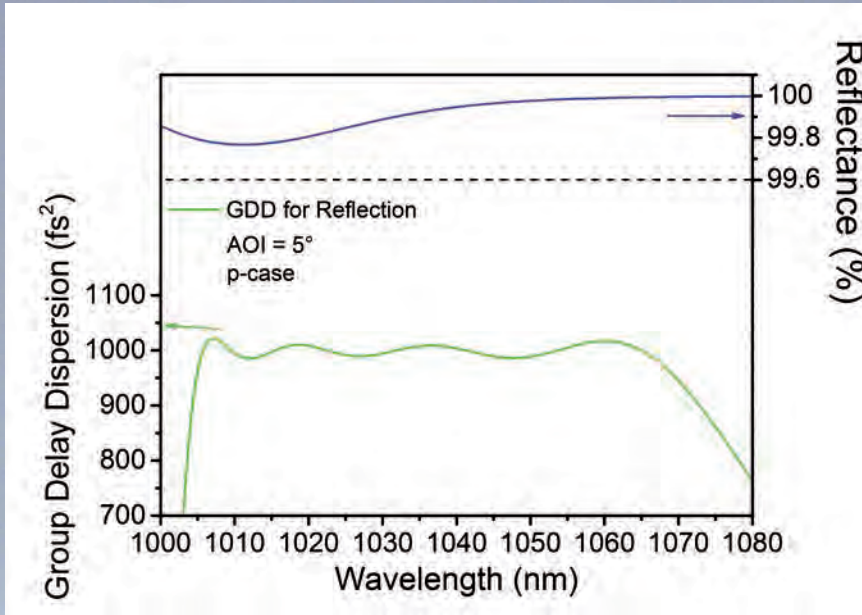


Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High(positive) - dispersion mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	1020 nm
Spectral working range high end	1040 nm
Central wavelength	1030 nm
Nominal GDD	5000 fs ²
Minimum Reflectance	99.9 %



BROAD-BAND MIRROR WITH HIGH POSITIVE DISPERSION PD 1565

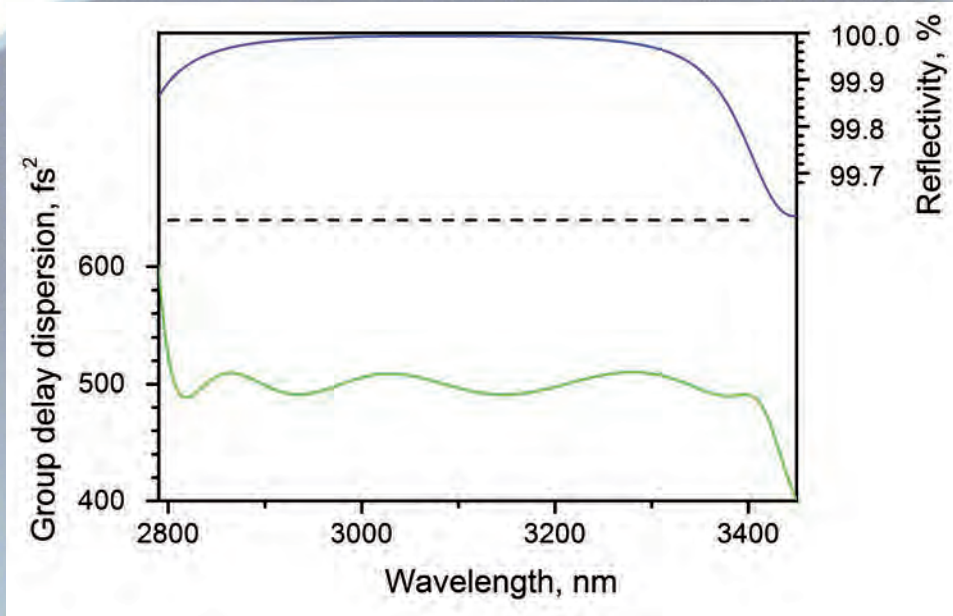


Details	
Description of the design	Mirror with high positive dispersion
Type	Mirror
Subtype	High (positive)-dispersion mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	1010 nm
Spectral working range high end	1060 nm
Central wavelength	1035 nm
Nominal GDD	1000 fs ²
Minimum reflectance	99.8 %



BROAD-BAND MIRROR WITH POSITIVE DISPERSION IR 26



Details	
Description of the design	Broad-band mirror with positive dispersion
Type	Mirror
Subtype	DM (dispersive mirror)
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	p
Spectral category	IR

Spectral working range low end	2800 nm
Spectral working range high end	3400 nm
Central wavelength	3100 nm
Nominal GDD	500 fs ² *
Nominal GDD maximum deviation	100 fs ²
Minimum Reflectance	99 %

* not constant over defined working range



Third-order dispersion mirrors

Generation and control of pulse durations below approximately 30 femtoseconds entails the need for compensating not only the average group delay dispersion but also for third order dispersion. Third order dispersion can be introduced without adding any additional GDD using TOD mirrors. In most cases grating compressor compensates nicely GDD, but introduces a significant third order dispersion. Not compensated third order dispersion has to be compensated. Ultrafast Innovations offers state-of-the-art way to compensate third order dispersion with TOD mirrors.

Our customer uses the multi Terawatt few-cycle light wave synthesizer (LWS) based on optical parametric amplification driven by a flashlamp-pumped 80-ps Nd:YAG laser. LWS-20 produces 5-fs, 100-mJ, 20-TW pulses. This innovative laser includes special TOD dispersive mirrors. These elements allow one to control precisely not only GDD but also third order dispersion in system. Our mirrors are specifically designed for obtaining the shortest pulse duration with highest pulse quality.

Pulse side lobes and other detrimental structures can be detected and eliminated in our advanced pulse analysis.

Please browse UFI's design database for following examples:

(<http://www.ultrafast-innovations.com/index.php/database>)

TOD1 (TOD1301), TOD9

Applications

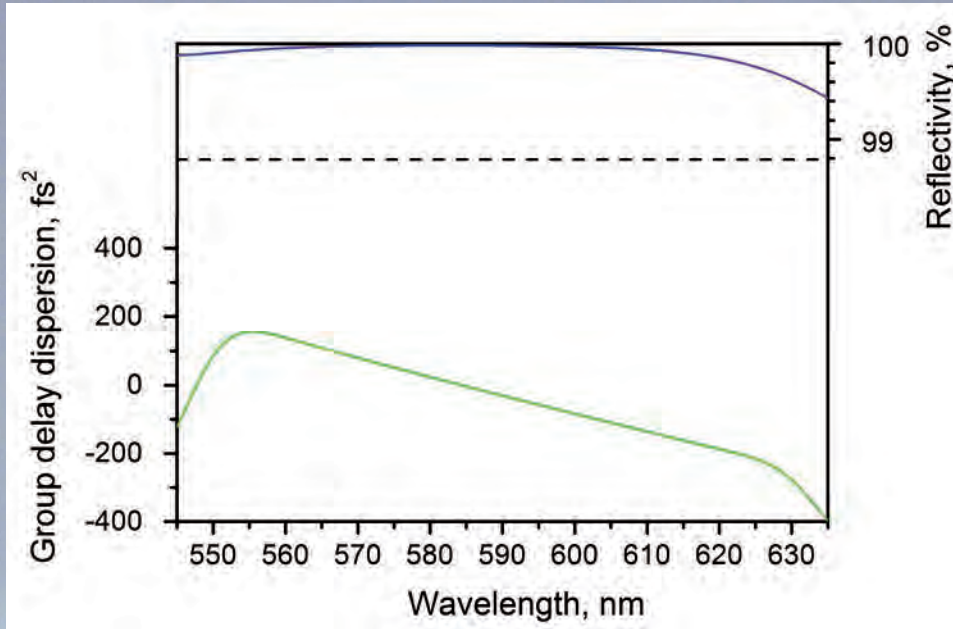
Compensation of higher-order dispersion in chirped-pulse amplifier systems or optical parametric chirped-pulse amplifiers.

See also literature

for further information and application:

- F. Tavella et al. Opt. Lett. 32 2227 (2007)

MIRROR WITH NEGATIVE THIRD-ORDER DISPERSION TOD 72



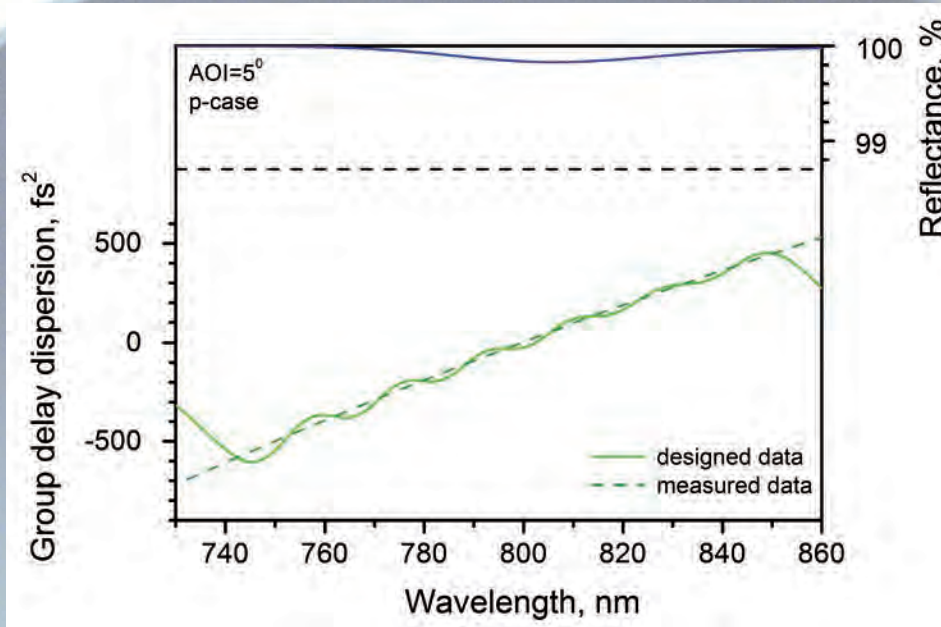
Details	
Description of the design	Mirror with negative third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	VIS
Spectral working range low end	555 nm
Spectral working range high end	625 nm
Central wavelength	590 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	99.5 %

* not constant over defined working range



MIRROR WITH THIRD-ORDER DISPERSION TOD 51



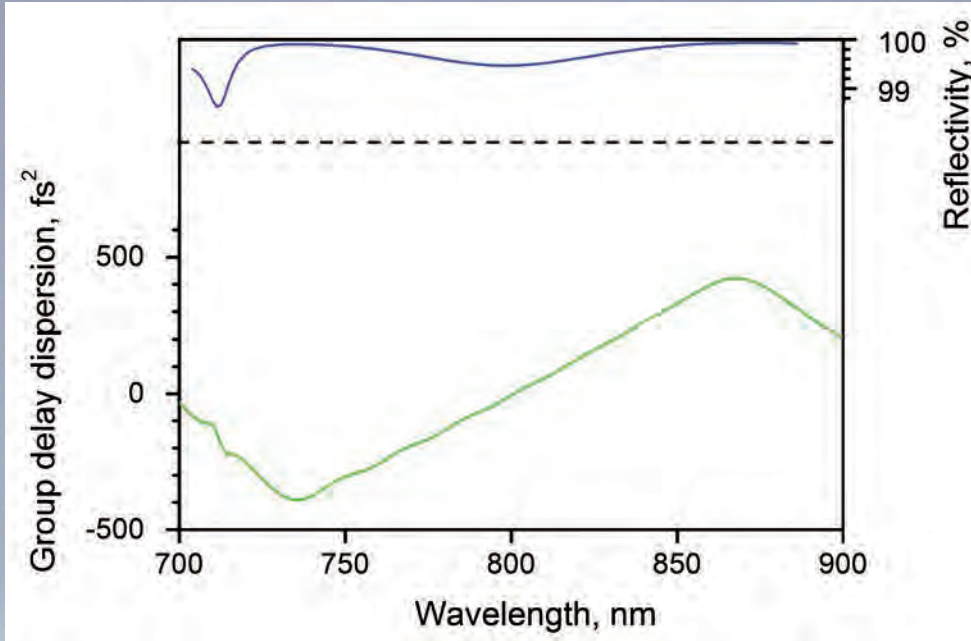
Details	
Description of the design	Mirror with third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	750 nm
Spectral working range high end	850 nm
Central wavelength	800 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	99.8 %

* not constant over defined working range



MIRROR WITH THIRD-ORDER DISPERSION TOD 9

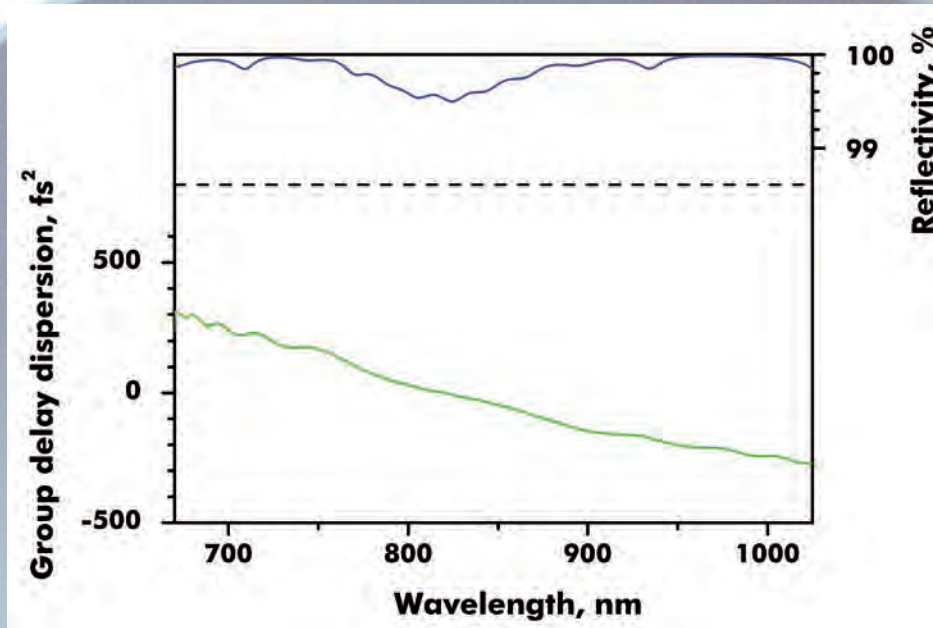


Details	
Description of the design	Mirror with third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	7
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	740 nm
Spectral working range high end	860 nm
Central wavelength	800 nm
Minimum Reflectance	99.5 %



MIRROR WITH THIRD-ORDER DISPERSION TOD 1



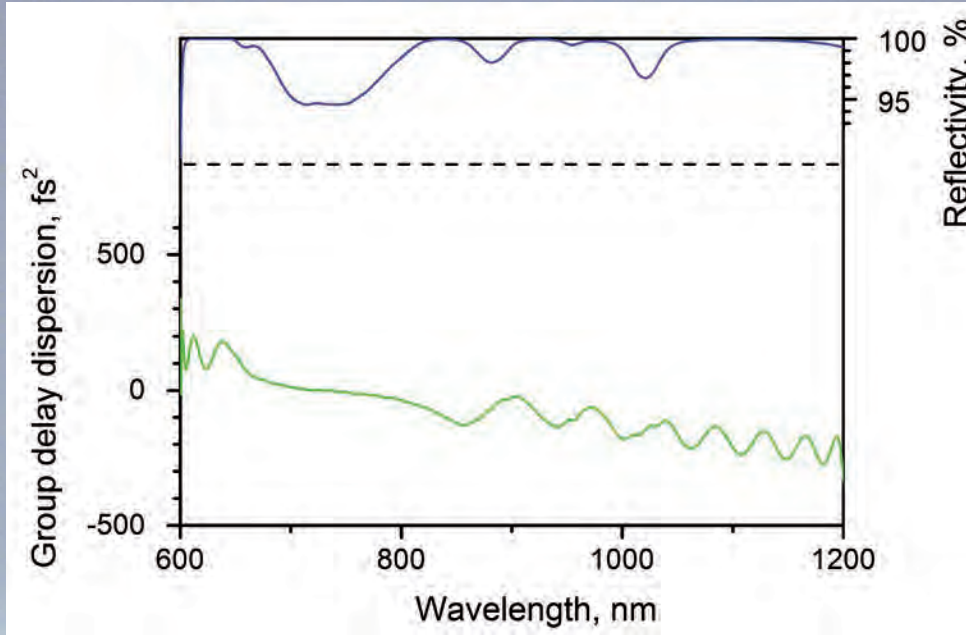
Details	
Description of the design	Mirror with third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	10
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	700 nm
Spectral working range high end	1000 nm
Central wavelength	850 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	99.5 %

* not constant over defined working range



MIRROR WITH NEGATIVE THIRD-ORDER DISPERSION TOD 71



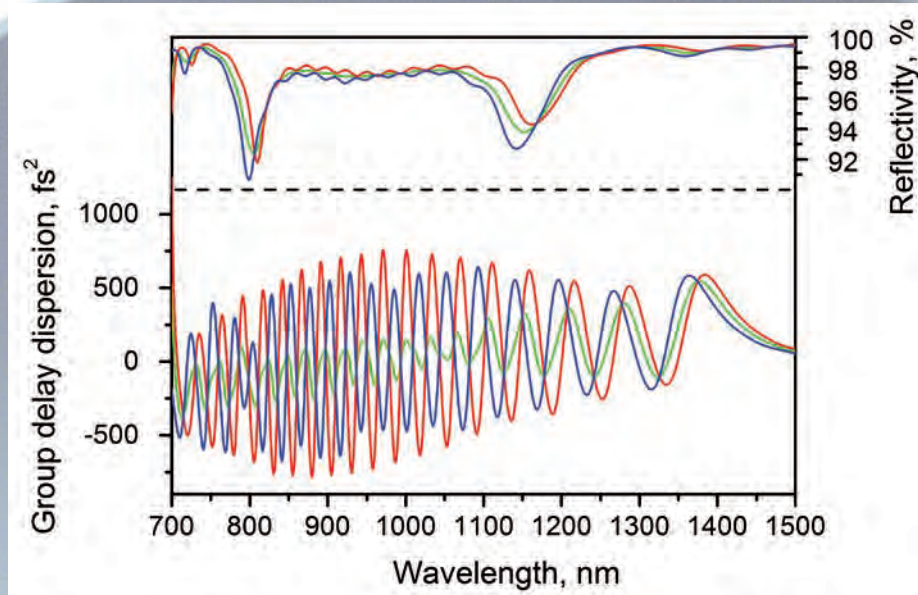
Details	
Description of the design	Mirror with negative third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	VIS-IR
Spectral working range low end	600 nm
Spectral working range high end	1200 nm
Central wavelength	900 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	95 %

* not constant over defined working range



DOUBLE-ANGLE MIRROR WITH THIRD-ORDER DISPERSION TOD 1301



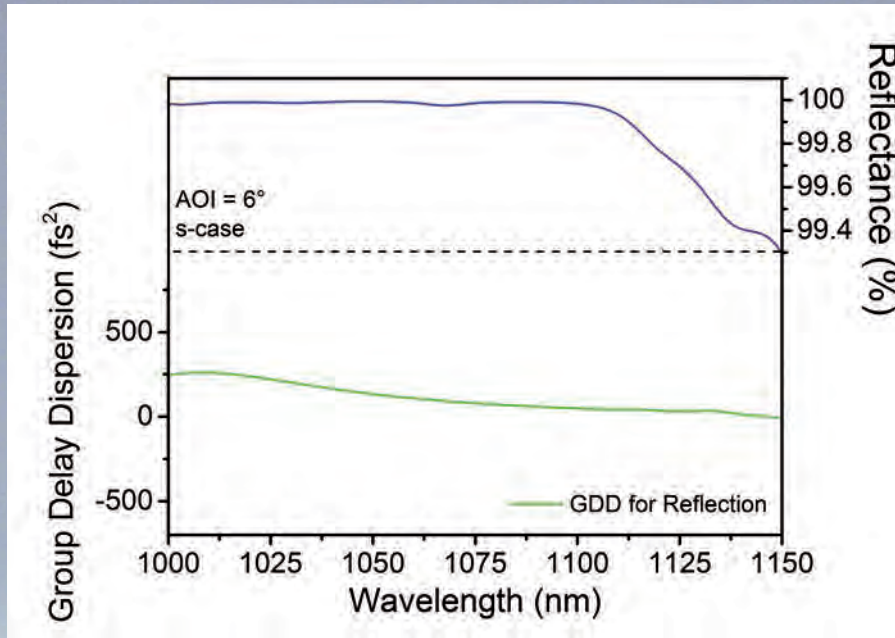
Details	
Description of the design	Double-angle mirror with third-order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	5
Second angle of incidence	18
Polarization regime (primary spectral range)	P

Spectral category	IR
Spectral working range low end	700 nm
Spectral working range high end	1400 nm
Central wavelength	1050 nm
Nominal GDD	0 fs ² *
Minimum Reflectance	92 %

* not constant over defined working range



MIRROR WITH THIRD-ORDER DISPERSION TOD 1501



Details	
Description of the design	Mirror with third order dispersion (TOD)
Type	Mirror
Subtype	TOD mirror
Angle of Incidence in degrees	6
Polarization regime (primary spectral range)	s

Spectral category	VIS-IR
Spectral working range low end	1010 nm
Spectral working range high end	1110 nm
Central wavelength	1060 nm
Nominal GDD	0 fs^2 *
Minimum Reflectance	99.9 %

* not constant over defined working range



XUV mirrors

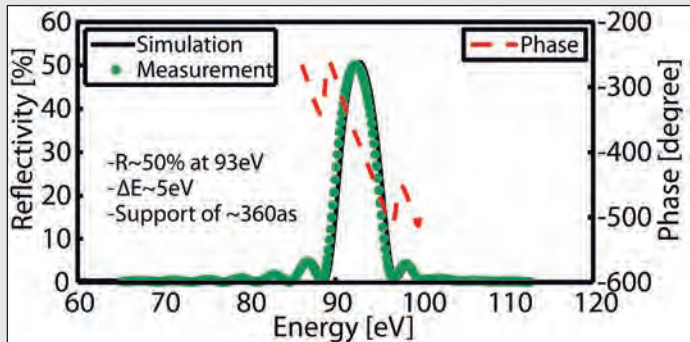
XUV mirrors specifically adapted to the experimental parameters are a key component for e. g. attosecond pulse generation and other experiments.

Our design know-how and application experience enables us to provide support for the planning of your set-up.

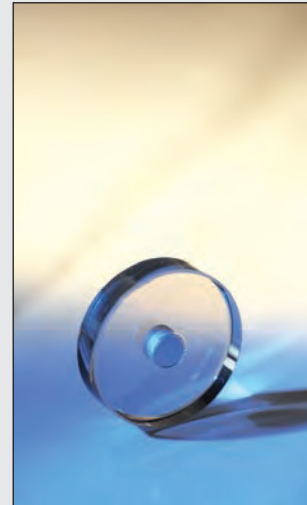
Realizing multilayer coatings for the XUV and soft-X-ray spectral range requires arrangements of tens to hundreds of nanometer-thick layers with atomically smooth interfaces and sub-0.1 nm thickness control. This imposes very high demands on the multilayer deposition process which our in-house coating facilities can fulfill.

The currently accessible range for the central energy spans 23 to 200 eV. As an example, the measured reflectivity of an XUV mirror at central energy 92 eV is shown here.

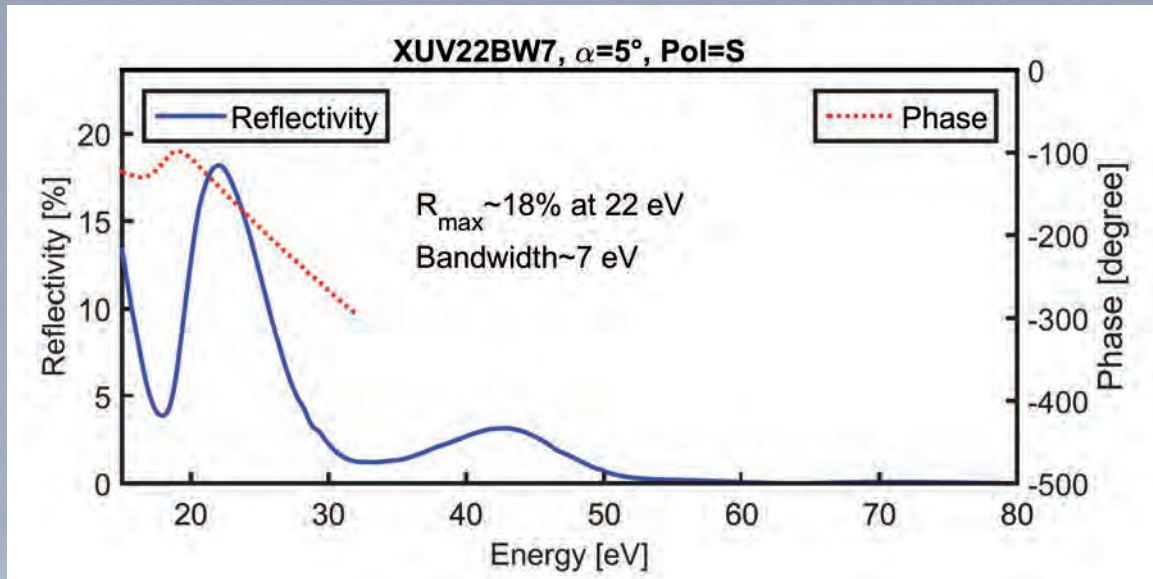
Further information on XUV multilayer optics can be found in UFI's design database.



Simulation and XUV reflectivity measurement, together with the simulated phase evolution, for the XUV93eVBW5eV mirror design, supporting ~360 as pulses. b) Image of a coated XUV double mirror with a core diameter of 5mm for e.g. IR/XUV time delay experiments being used for attosecond streaking.



XUV MIRROR XUV 22BW7

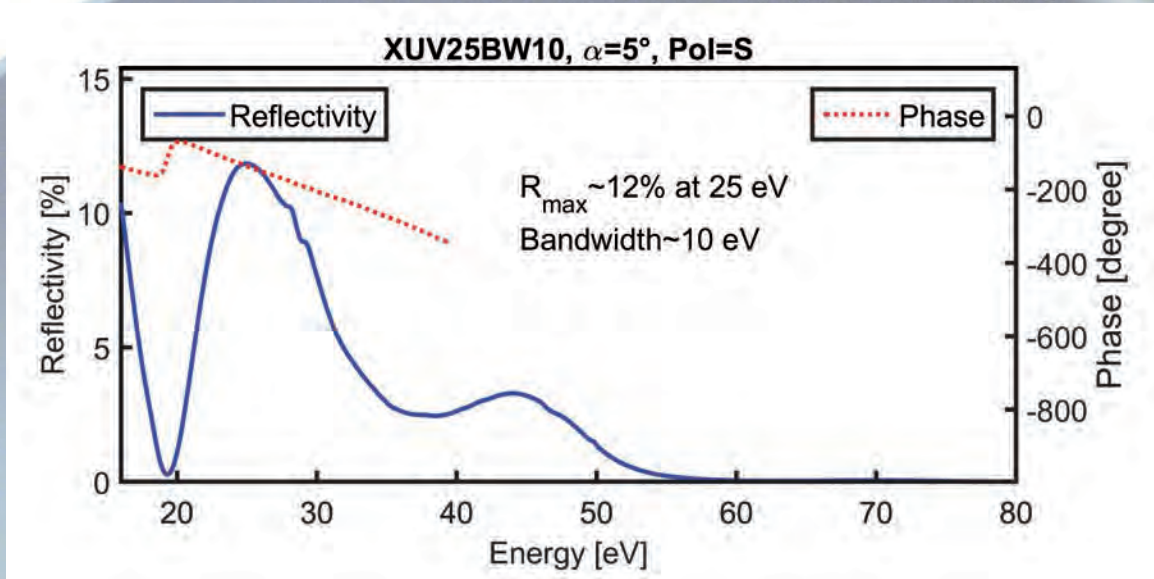


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	38.7 nm (17eV)
Spectral working range high end	72.9 nm (32eV)
Central wavelength	56.4 nm (22eV)
Nominal GDD	0.023 fs ²
Maximum reflectance	18 %

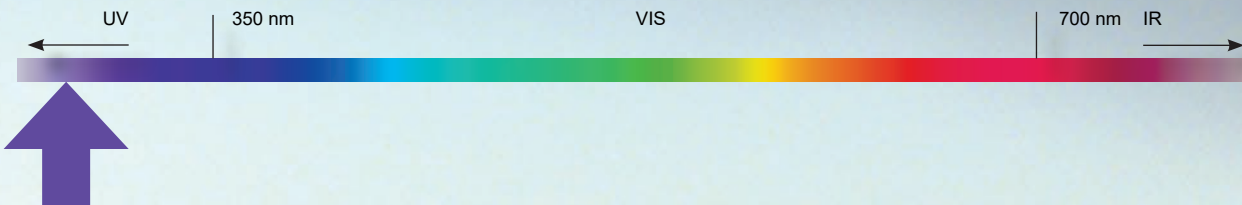


XUV MIRROR XUV 25BW10

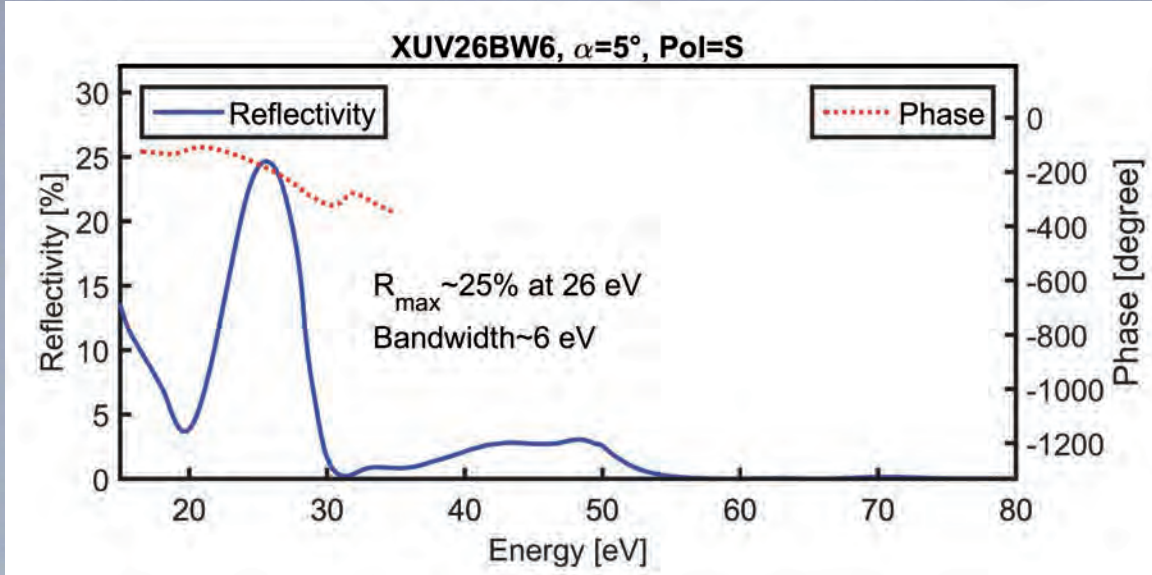


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	22.5 nm (19eV)
Spectral working range high end	63.3 nm (55eV)
Central wavelength	49.6 nm (25eV)
Nominal GDD	0.035 fs ²
Maximum reflectance	12 %



XUV MIRROR XUV 26BW6

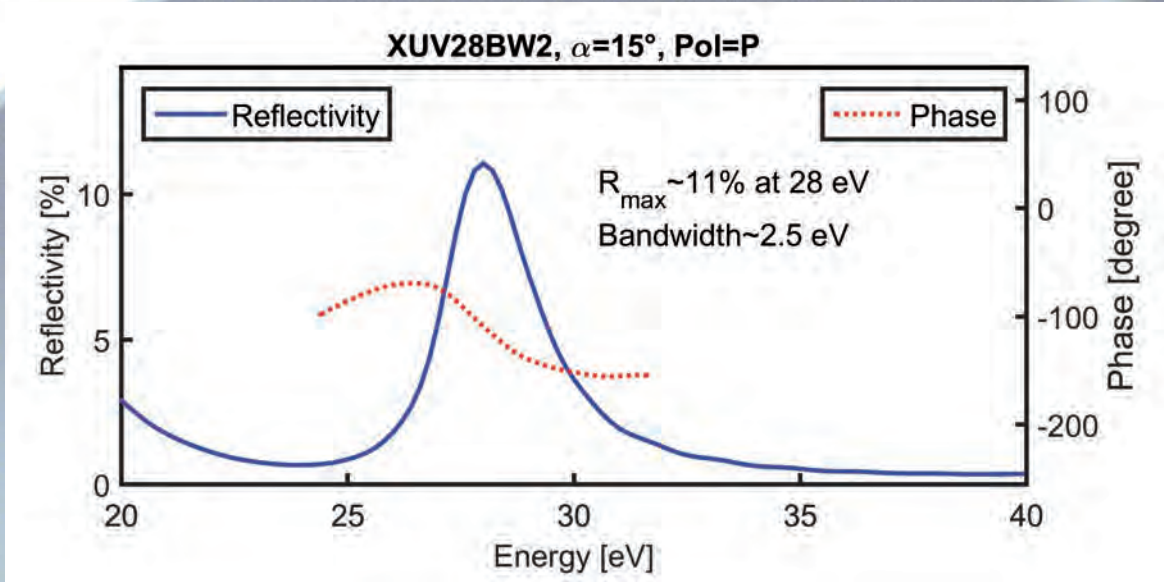


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	40 nm (20eV)
Spectral working range high end	62 nm (31eV)
Central wavelength	47.7 nm (26eV)
Nominal GDD	0.007 fs ²
Maximum reflectance	25 %

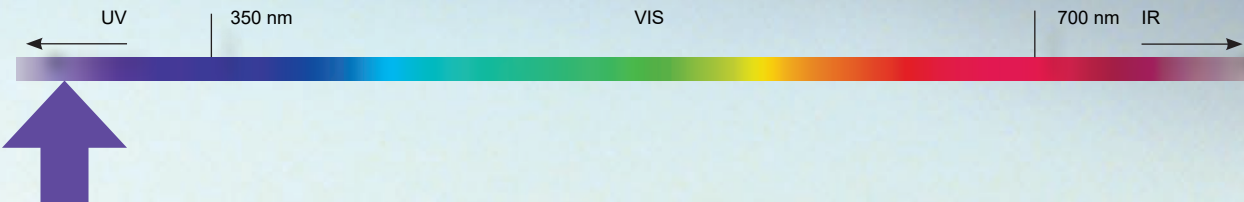


XUV MIRROR XUV 28BW2

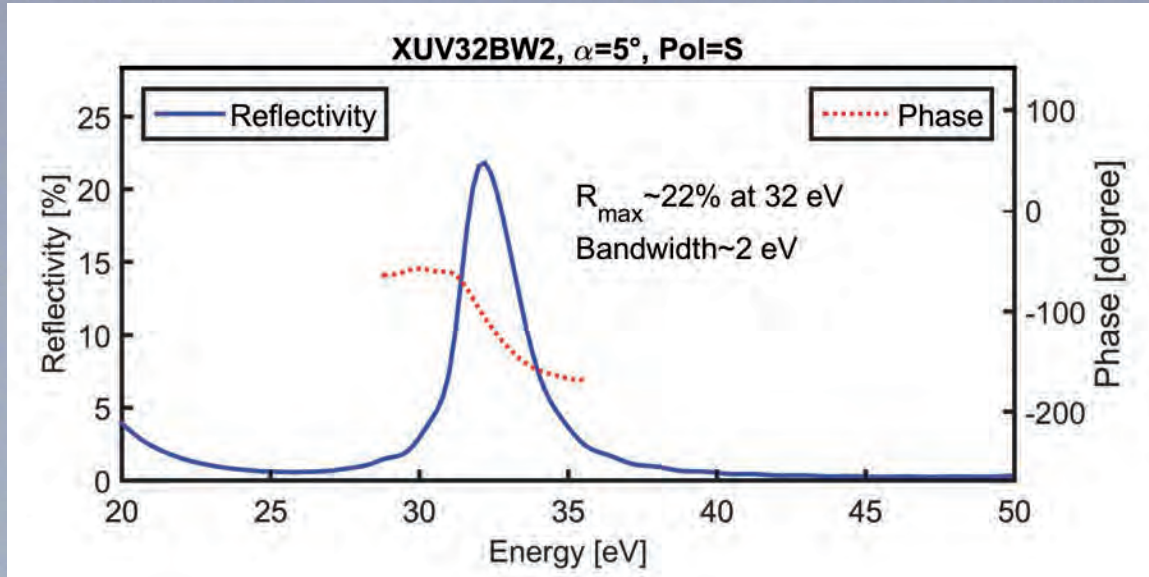


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	15
Polarization regime (primary spectral range)	p

Spectral category	XUV
Spectral working range low end	35.4 nm (24ev)
Spectral working range high end	51.7 nm (35ev)
Central wavelength	44.3 nm (28ev)
Nominal GDD	-0.01 fs ²
Maximum reflectance	11 %



XUV MIRROR XUV 32BW2

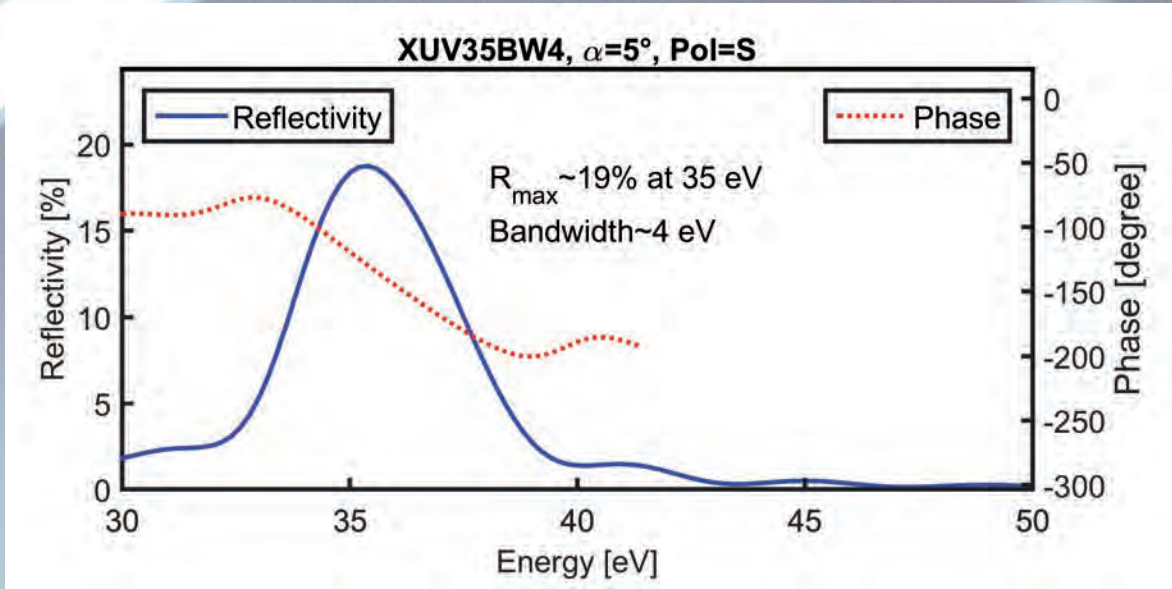


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	31 nm (27ev)
Spectral working range high end	45.9 nm (40ev)
Central wavelength	38.7 nm (32ev)
Nominal GDD	0.04 fs ²
Maximum reflectance	22 %

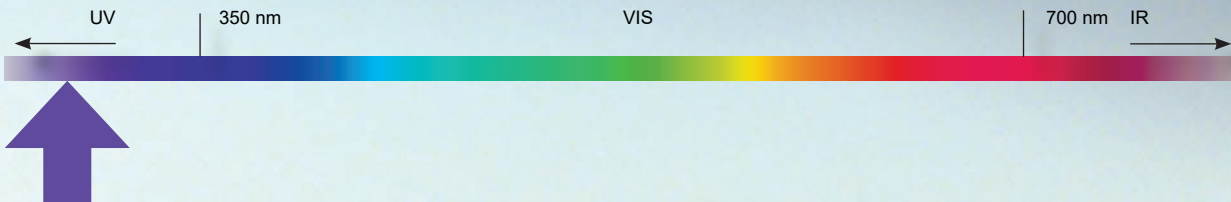


XUV MIRROR XUV 35BW4

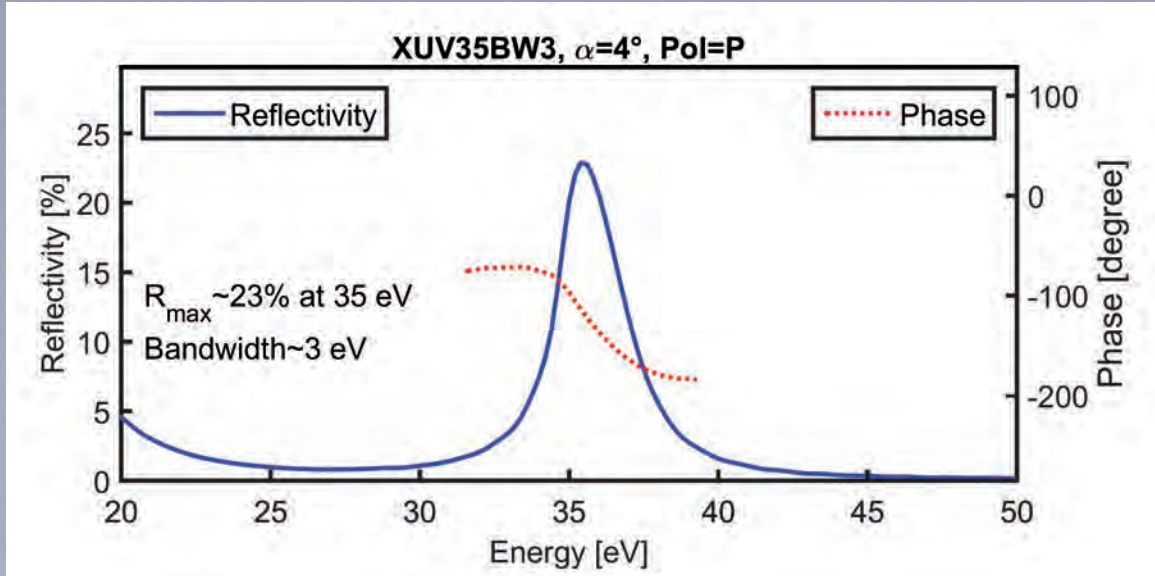


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	31 nm (30ev)
Spectral working range high end	41.3 nm (40ev)
Central wavelength	35.4 nm (35ev)
Nominal GDD	0.006 fs ²
Maximum reflectance	19 %



XUV MIRROR XUV 35BW3

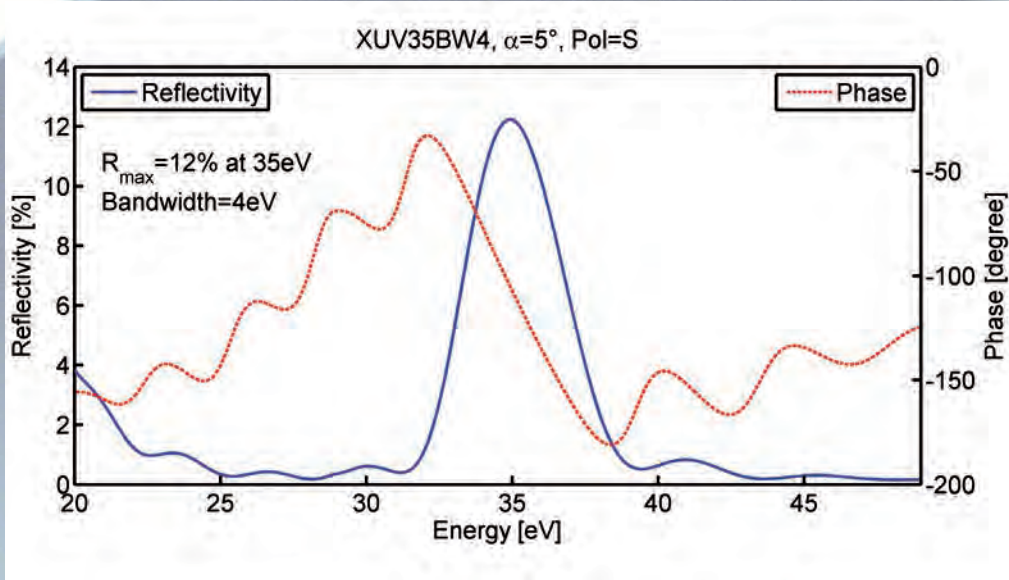


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	4
Polarization regime (primary spectral range)	p

Spectral category	XUV
Spectral working range low end	28.8 nm (30eV)
Spectral working range high end	41.3 nm (43eV)
Central wavelength	35.4 nm (35eV)
Nominal GDD	-0.028 fs ²
Maximum reflectance	23 %

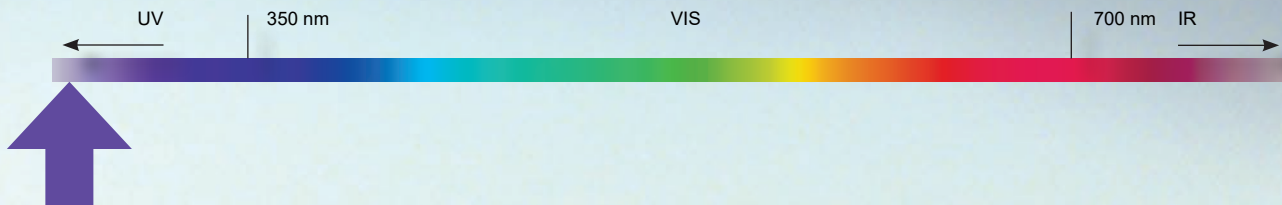


XUV MIRROR XUV 35BW4

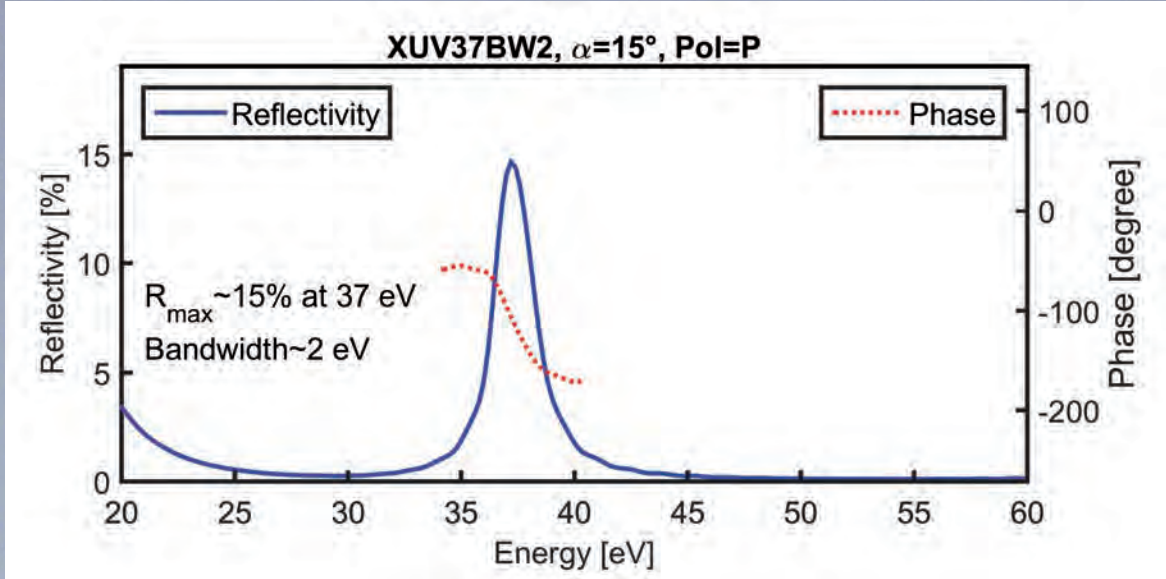


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	31 nm (31ev)
Spectral working range high end	40 nm (39ev)
Central wavelength	35 nm (35ev)
Nominal GDD	0 fs ²
Maximum reflectance	12 %



XUV MIRROR XUV 37BW2

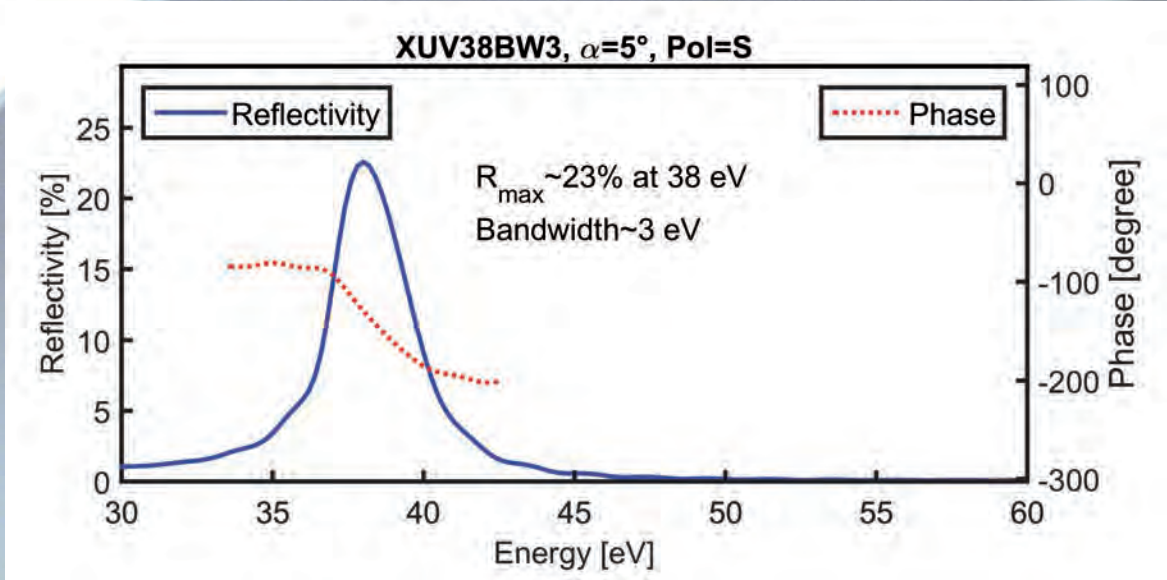


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	15
Polarization regime (primary spectral range)	p

Spectral category	XUV
Spectral working range low end	27.6 nm (30ev)
Spectral working range high end	41.3 nm (45ev)
Central wavelength	33.5 nm (37ev)
Nominal GDD	-0.002 fs ²
Maximum reflectance	15 %

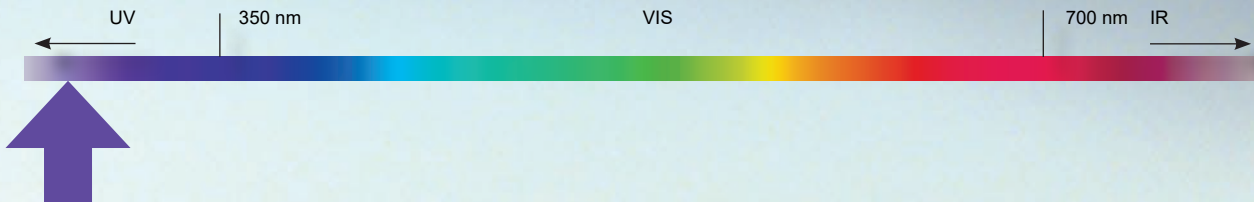


XUV MIRROR XUV 38BW3

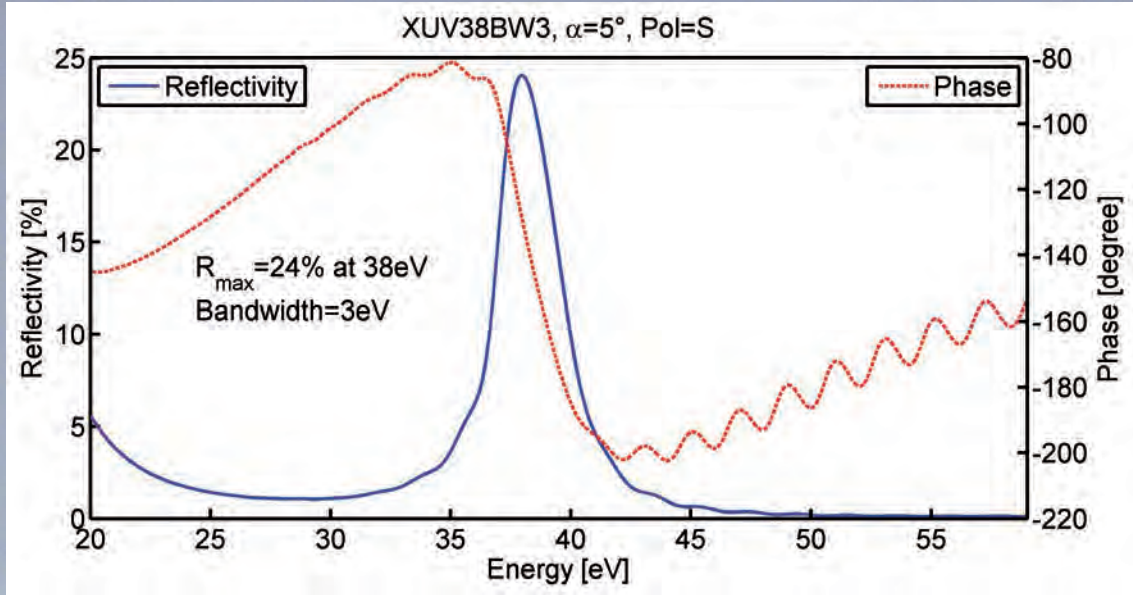


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	27.6 nm (30ev)
Spectral working range high end	41.3 nm (45ev)
Central wavelength	32.6 nm (38ev)
Nominal GDD	-0.025 fs ²
Maximum reflectance	23 %



XUV MIRROR XUV 38BW3

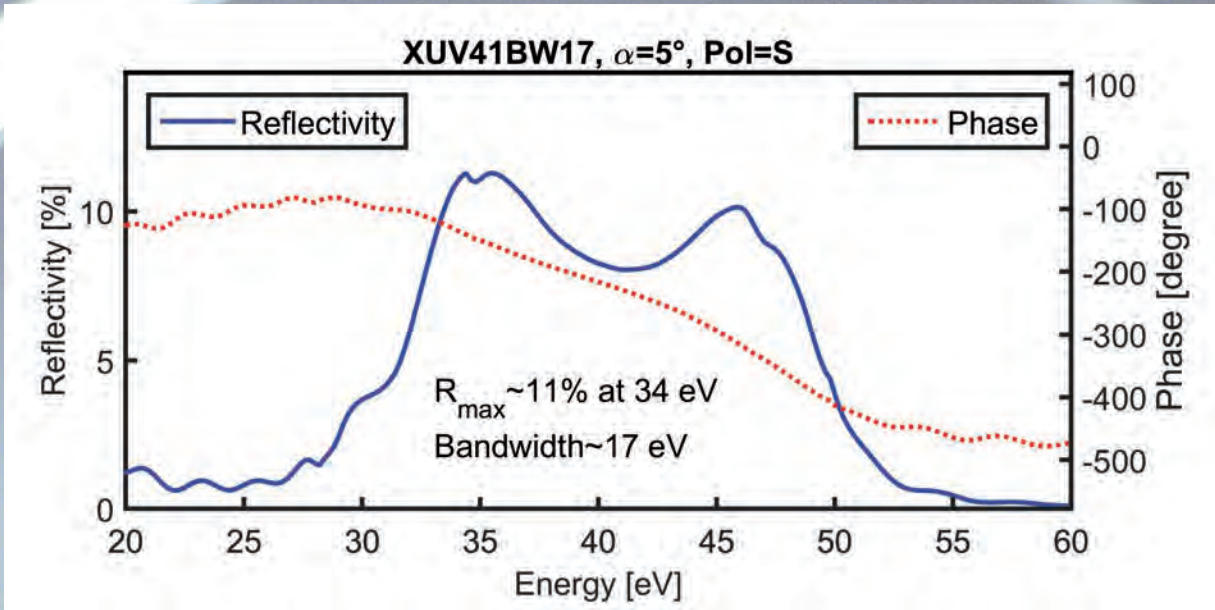


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	27 nm (30ev)
Spectral working range high end	41 nm (45ev)
Central wavelength	32 nm (38ev)
Nominal GDD	0 fs ²
Maximum reflectance	24 %



XUV MIRROR XUV 41BW17

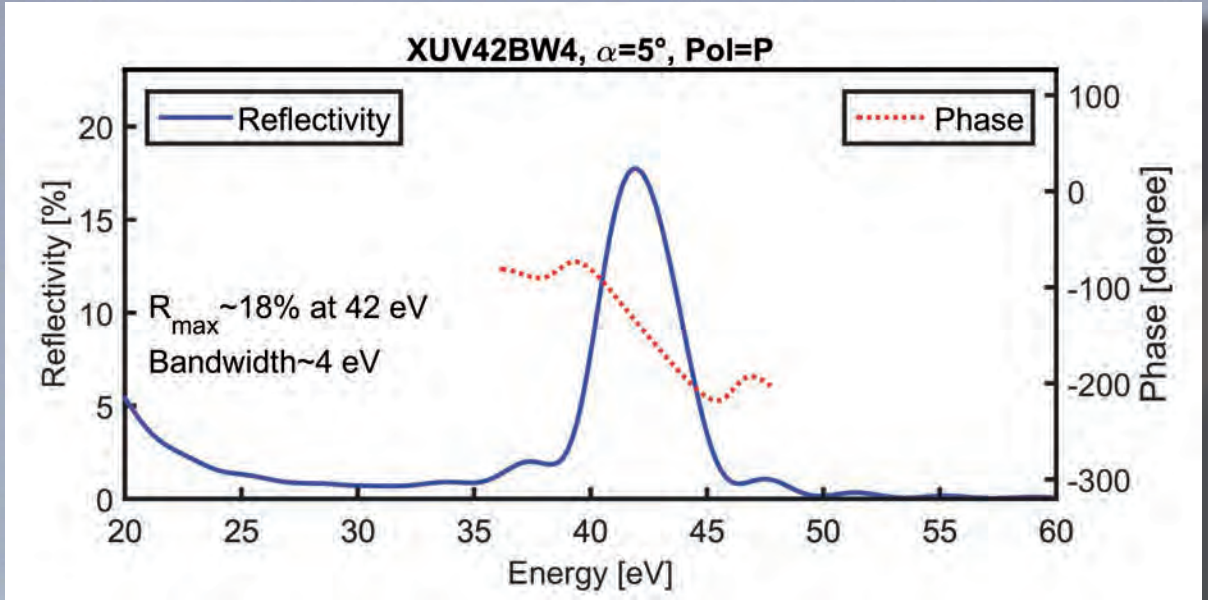


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	22.5 nm (25ev)
Spectral working range high end	49.6 nm (55ev)
Central wavelength	30.2 nm (41ev)
Nominal GDD	0.008 fs ²
Maximum reflectance	11 %



XUV MIRROR XUV 42BW4

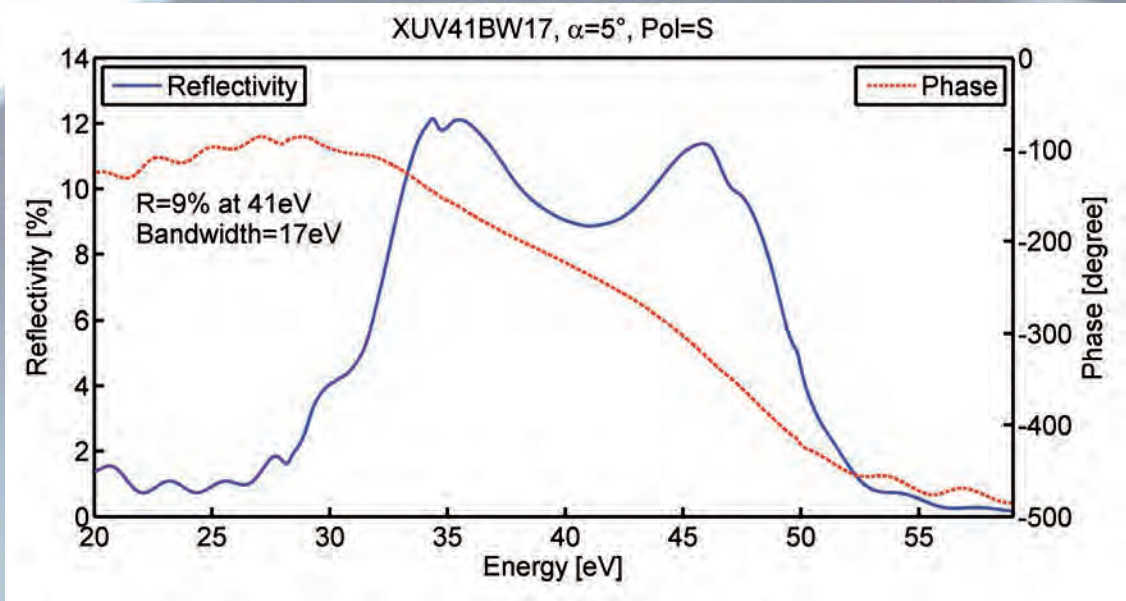


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	22.5 nm (25ev)
Spectral working range high end	49.6 nm (55ev)
Central wavelength	30.2 nm (41ev)
Nominal GDD	0.008 fs ²
Maximum reflectance	11 %

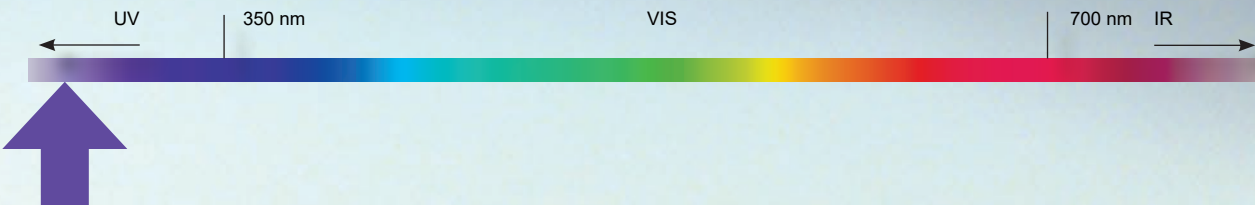


XUV MIRROR XUV 41BW17

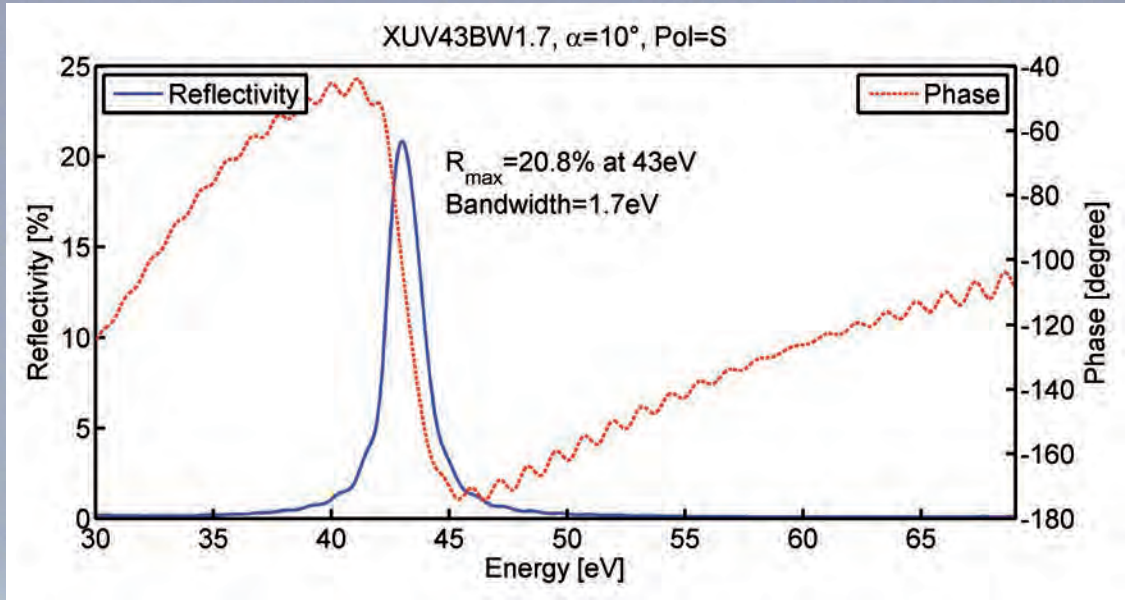


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	22 nm (25ev)
Spectral working range high end	49 nm (55ev)
Central wavelength	30 nm (41ev)
Nominal GDD	0 fs ²
Maximum reflectance	9 %

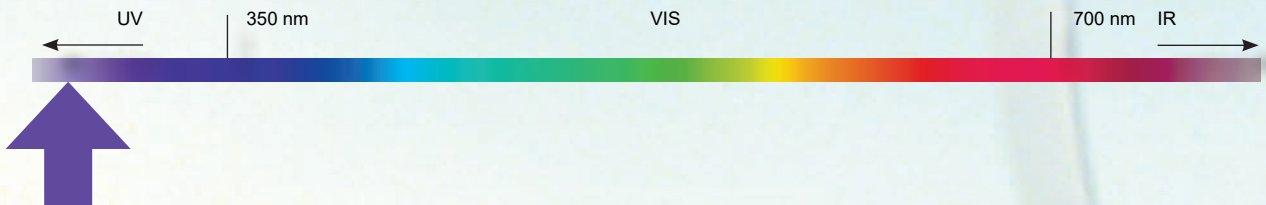


XUV MIRROR XUV 43BW2

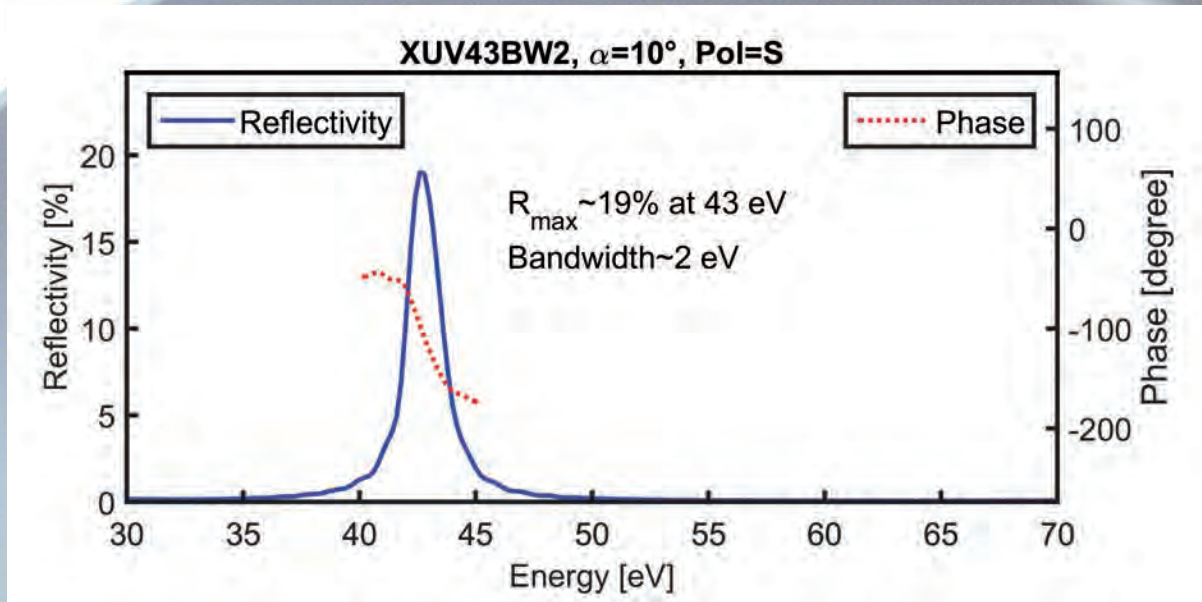


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	10
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	25 nm (39ev)
Spectral working range high end	31 nm (48ev)
Central wavelength	29 nm (42ev)
Nominal GDD	0 fs ²
Maximum reflectance	21 %

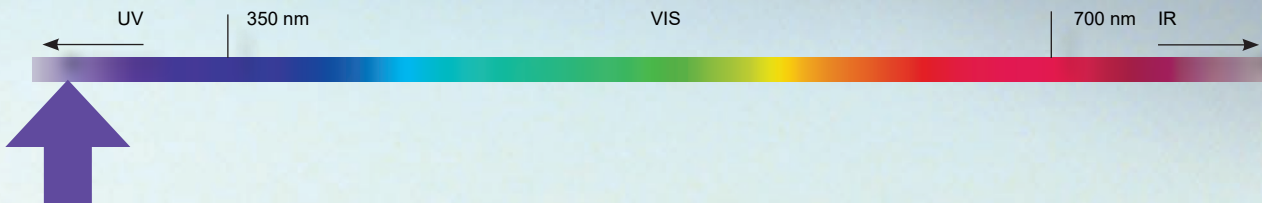


XUV MIRROR XUV 43BW2

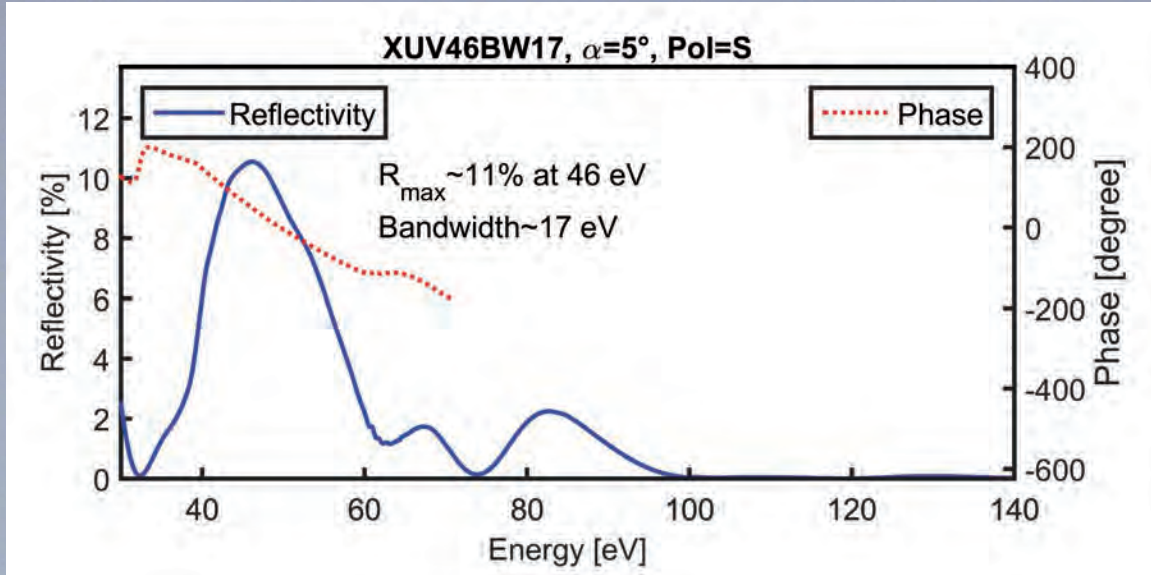


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	10
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	25.8 nm (38ev)
Spectral working range high end	32.6 nm (48ev)
Central wavelength	28.8 nm (43ev)
Nominal GDD	0.005 fs ²
Maximum reflectance	19 %



XUV MIRROR XUV 46BW17

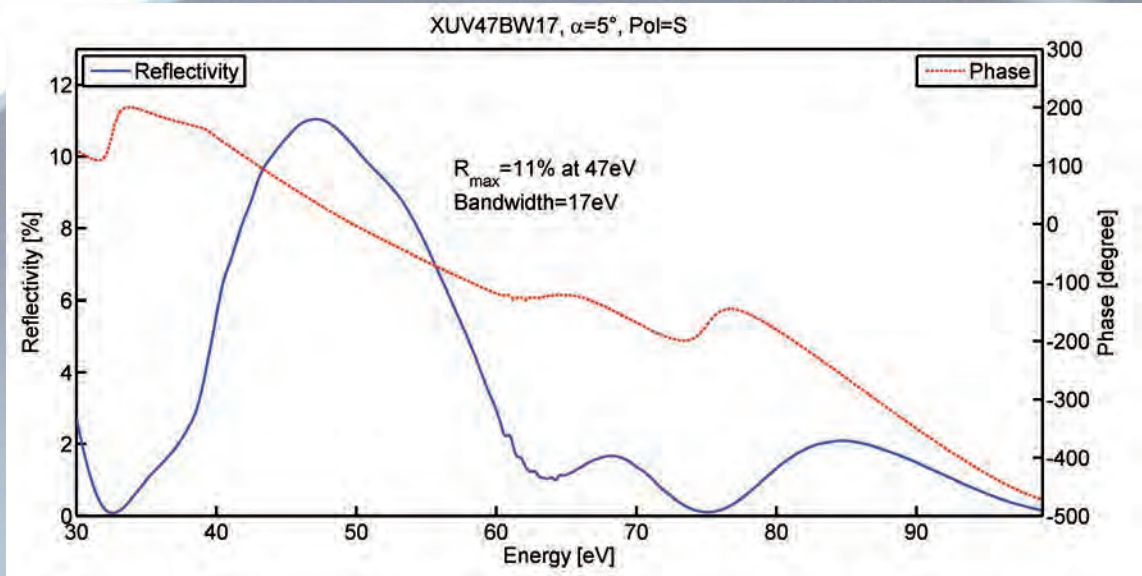


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	17.2 nm (32eV)
Spectral working range high end	38.7 nm (72eV)
Central wavelength	27 nm (46eV)
Nominal GDD	0.003 fs ²
Maximum reflectance	11 %

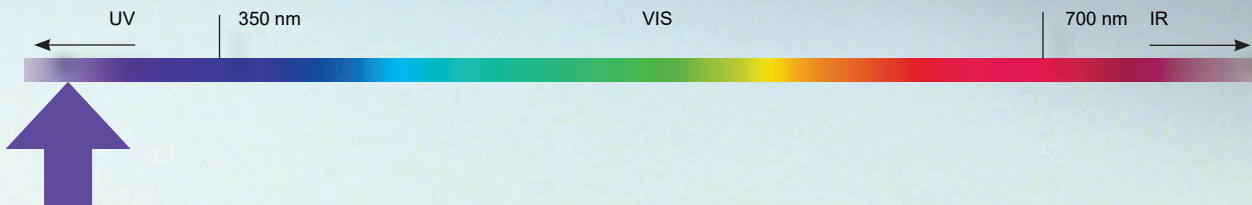


XUV MIRROR XUV 47BW17

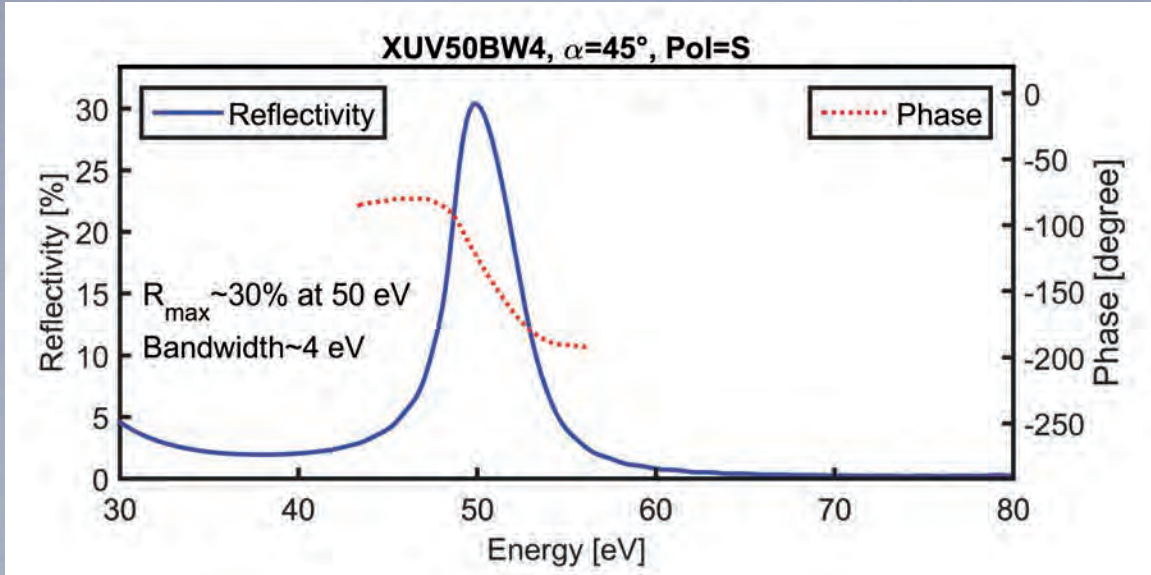


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	19 nm (32ev)
Spectral working range high end	38 nm (64ev)
Central wavelength	26 nm (47ev)
Nominal GDD	0 fs ²
Maximum reflectance	11 %



XUV MIRROR XUV 50BW4

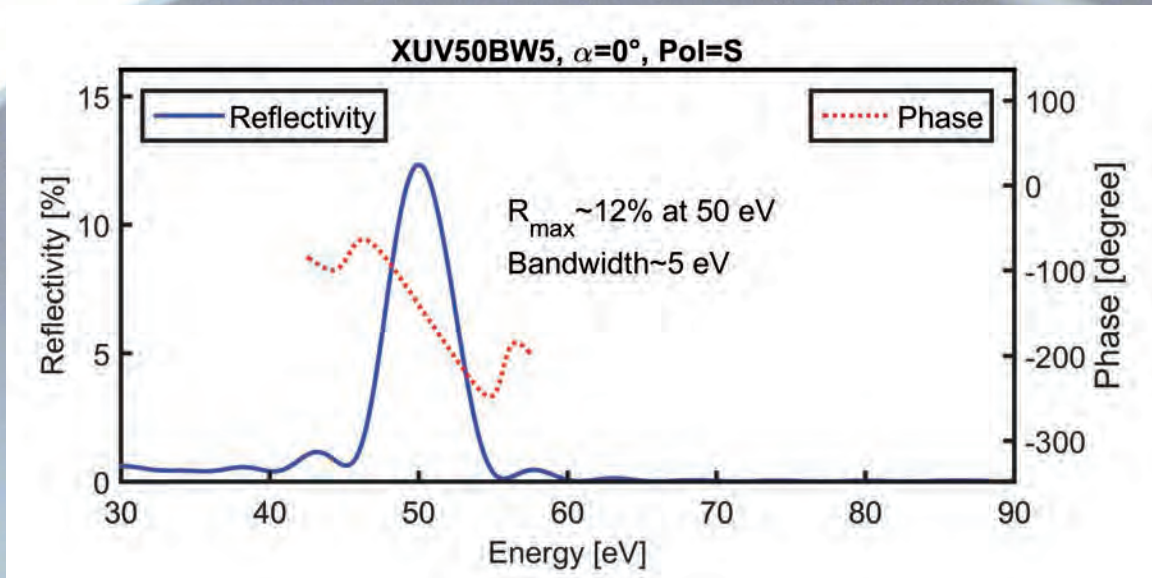


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	20.7 nm (40eV)
Spectral working range high end	31 nm (60eV)
Central wavelength	24.8 nm (50eV)
Nominal GDD	0.019 fs ²
Maximum reflectance	30 %

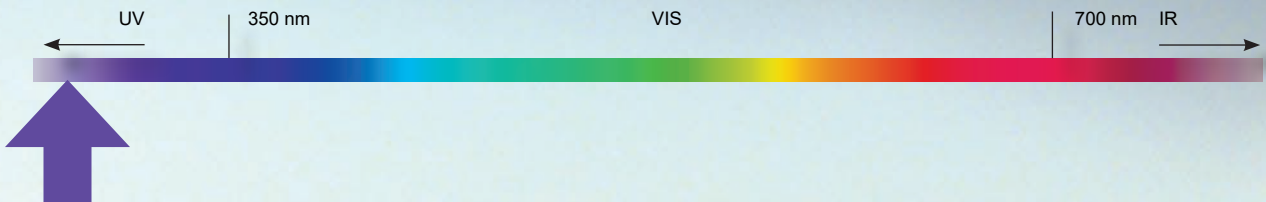


XUV MIRROR XUV 50BW5

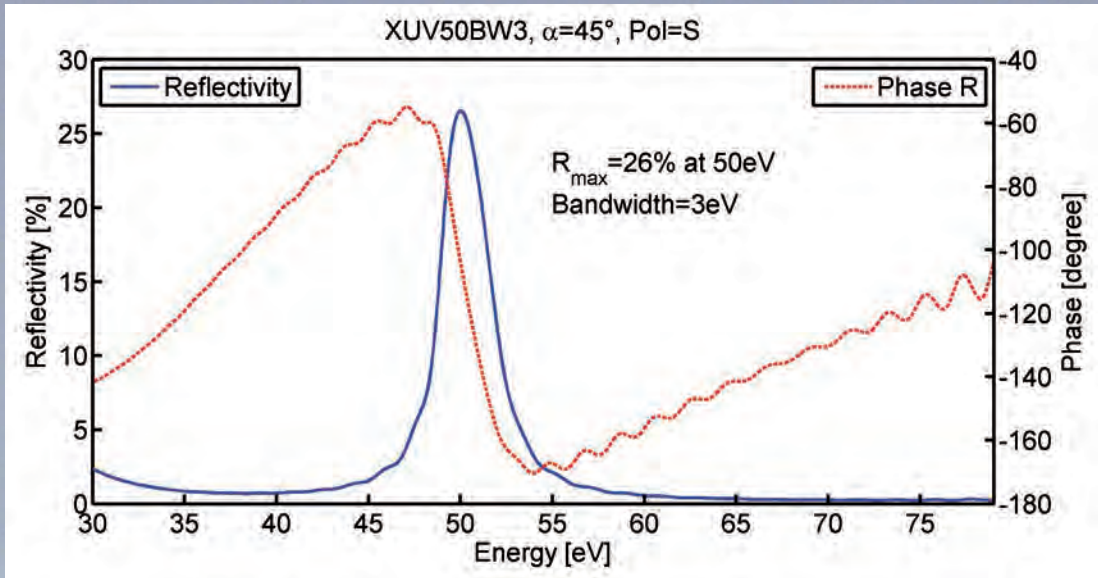


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	22.5 nm (40ev)
Spectral working range high end	31 nm (55ev)
Central wavelength	24.8 nm (50ev)
Nominal GDD	0.005 fs ²
Maximum reflectance	12 %



XUV MIRROR XUV 50BW3

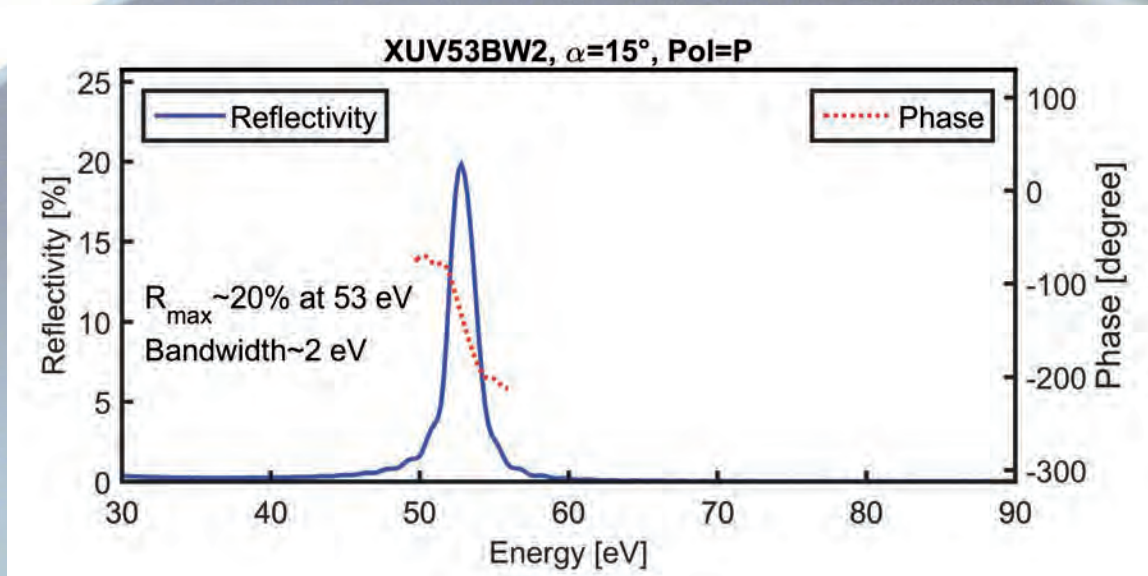


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	20 nm (40ev)
Spectral working range high end	31 nm (60ev)
Central wavelength	24 nm (50ev)
Nominal GDD	0 fs ²
Maximum reflectance	26 %

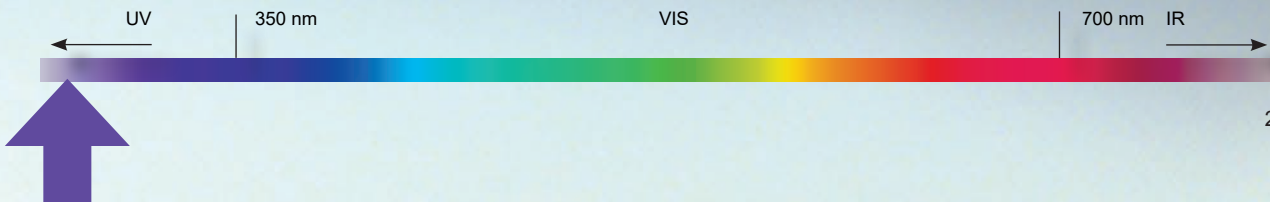


XUV MIRROR XUV 53BW2

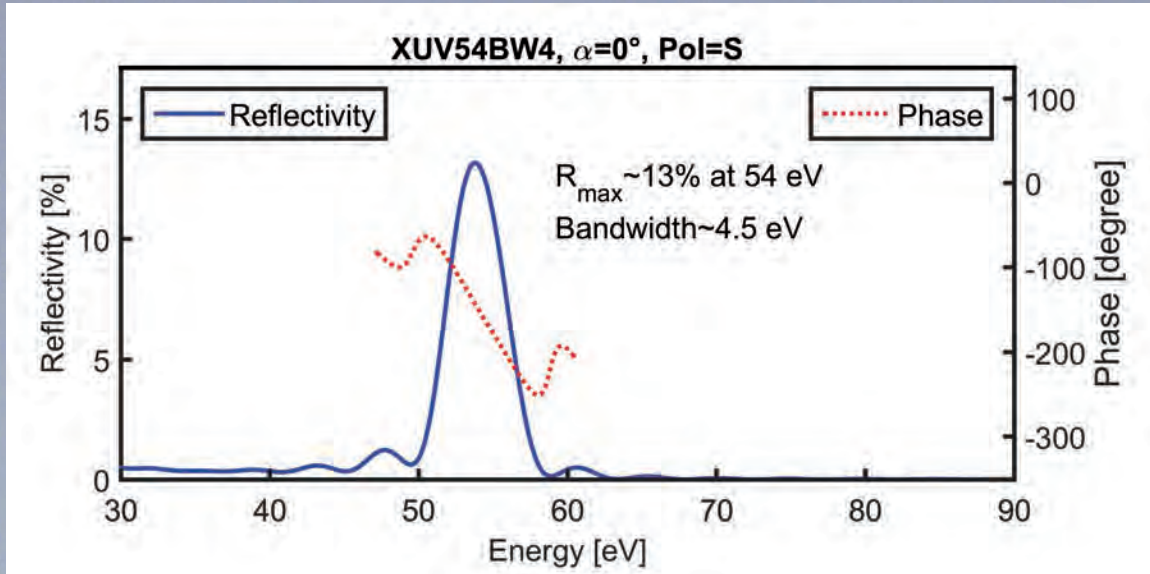


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	15
Polarization regime (primary spectral range)	p

Spectral category	XUV
Spectral working range low end	21.8 nm (45ev)
Spectral working range high end	27.6 nm (57ev)
Central wavelength	23.4 nm (53ev)
Nominal GDD	-0.06 fs ²
Maximum reflectance	20 %



XUV MIRROR XUV 54BW4

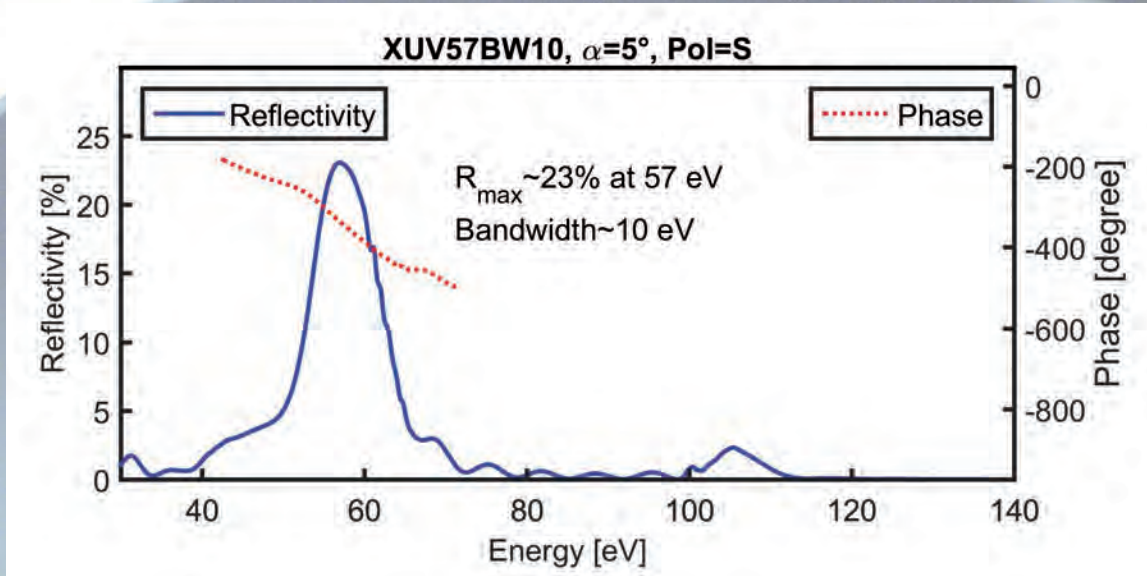


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	21 nm (49eV)
Spectral working range high end	25.3 nm (59eV)
Central wavelength	23 nm (54eV)
Nominal GDD	0.005 fs ²
Maximum reflectance	13 %

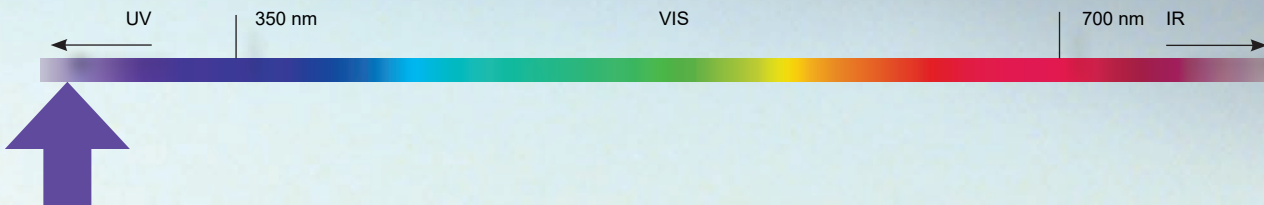


XUV MIRROR XUV 57BW10

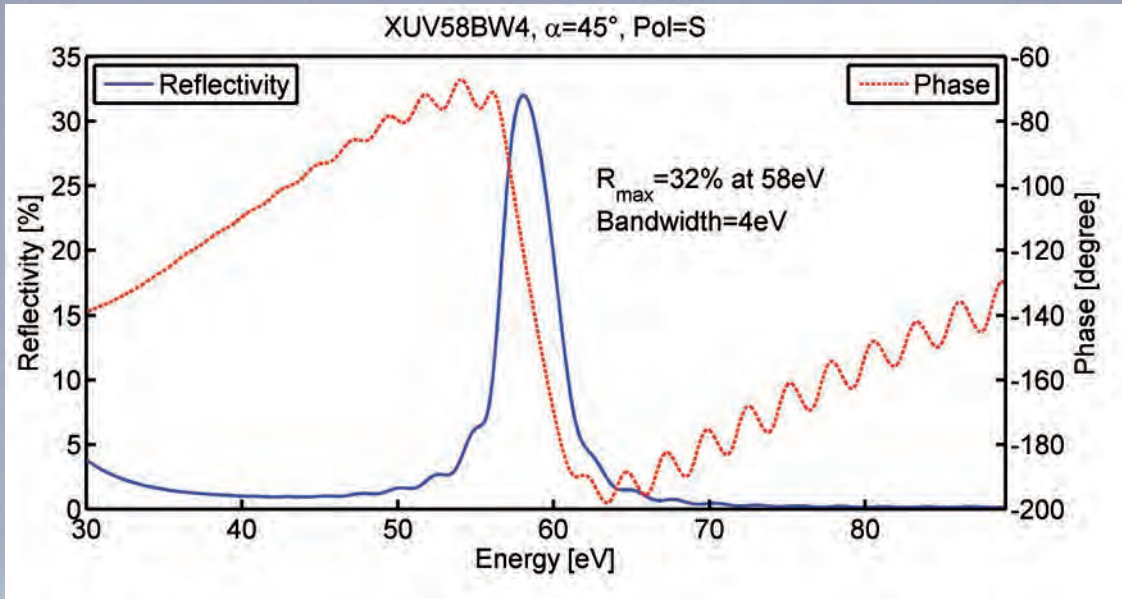


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	17.2 nm (40ev)
Spectral working range high end	31 nm (72ev)
Central wavelength	21.8 nm (57ev)
Nominal GDD	0.004 fs ²
Maximum reflectance	23 %



XUV MIRROR XUV 58BW4

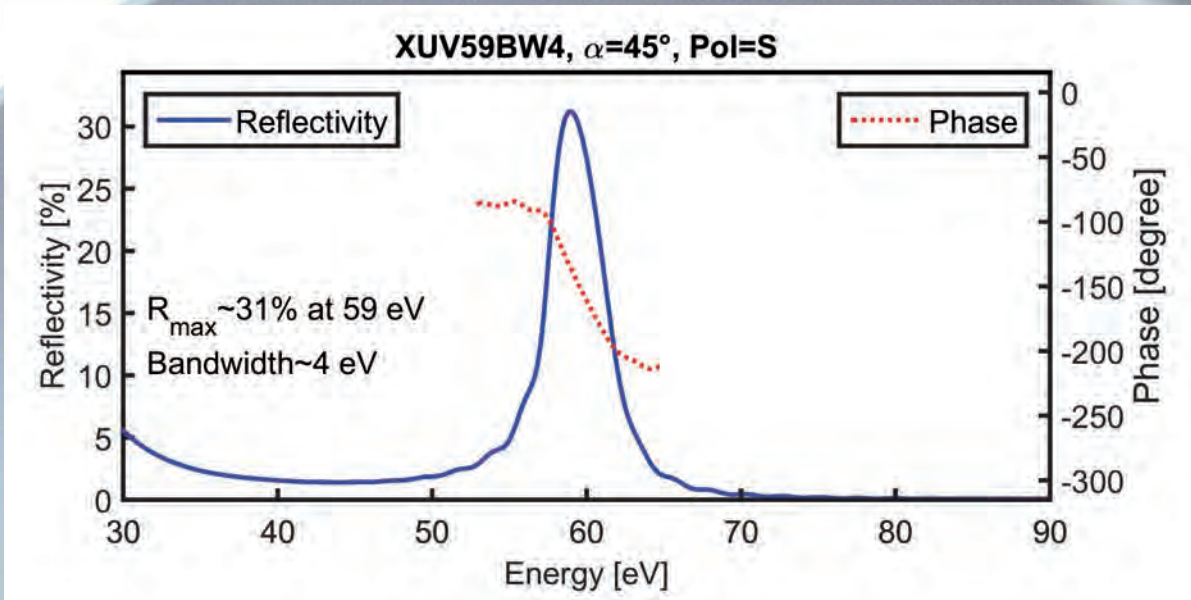


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	18 nm (50ev)
Spectral working range high end	24 nm (66ev)
Central wavelength	21 nm (58ev)
Nominal GDD	0 fs ²
Maximum reflectance	32 %

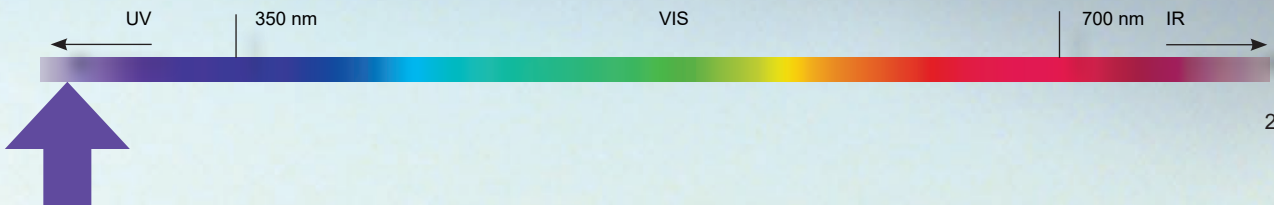


XUV MIRROR XUV 59BW4

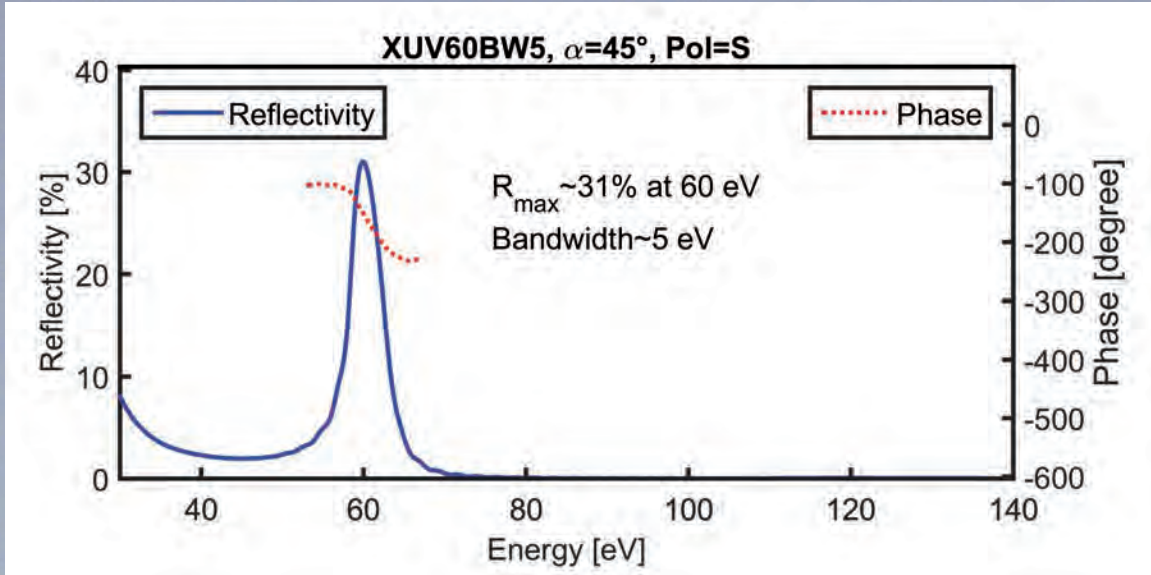


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	17.7 nm (50eV)
Spectral working range high end	24.8 nm (70eV)
Central wavelength	21 nm (59eV)
Nominal GDD	0.023 fs ²
Maximum reflectance	31 %



XUV MIRROR XUV 60BW5

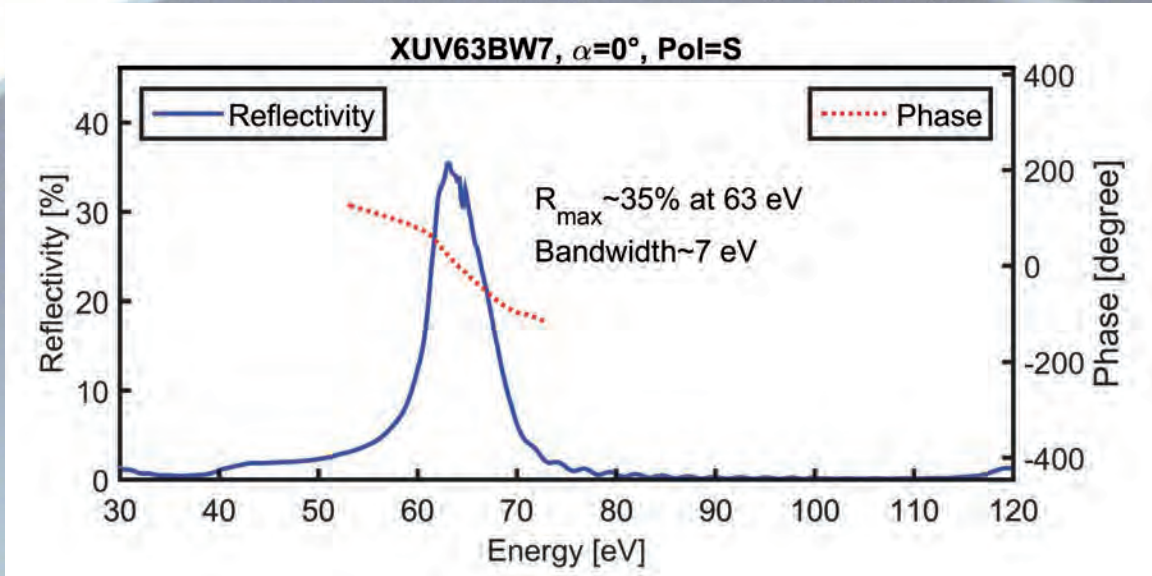


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	18.2 nm (48eV)
Spectral working range high end	25.8 nm (68eV)
Central wavelength	20.7 nm (60eV)
Nominal GDD	-0.019 fs ²
Maximum reflectance	31 %

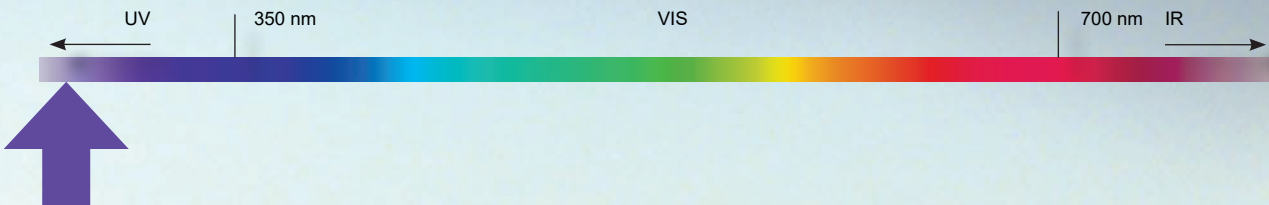


XUV MIRROR XUV 63BW7

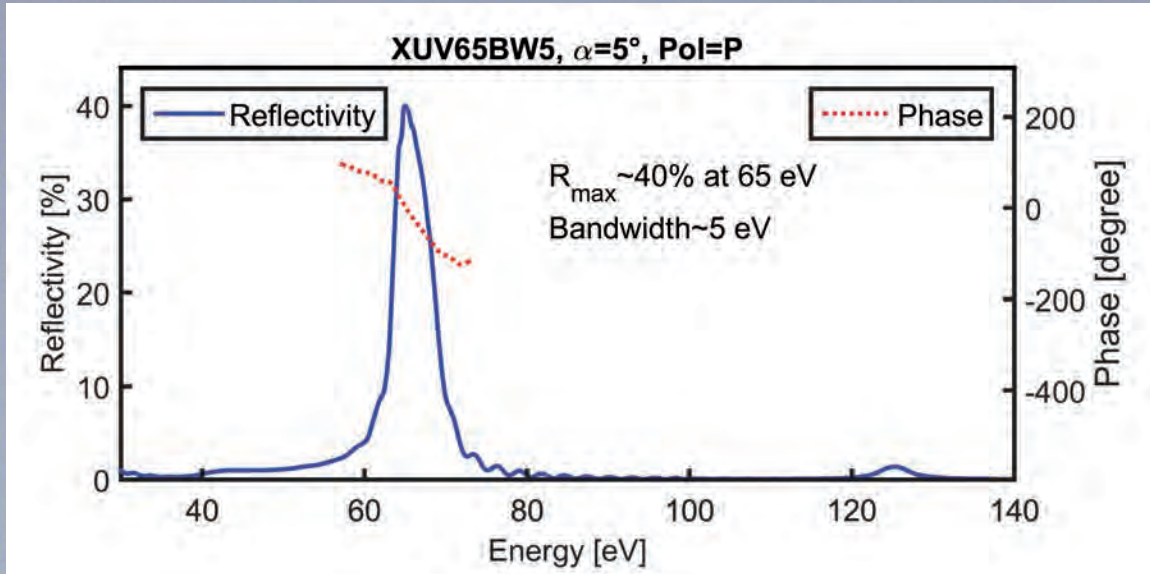


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	16.5 nm (40ev)
Spectral working range high end	31 nm (75ev)
Central wavelength	19.7 nm (63ev)
Nominal GDD	0.008 fs ²
Maximum reflectance	35 %



XUV MIRROR XUV 65BW5

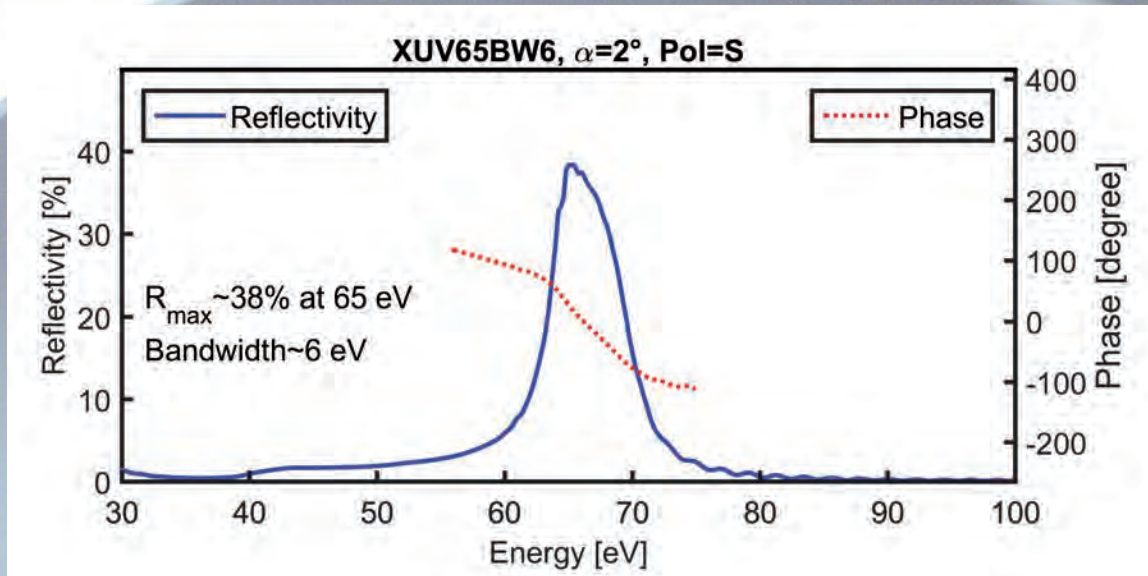


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	p

Spectral category	XUV
Spectral working range low end	16.5 nm (55ev)
Spectral working range high end	22.5 nm (75ev)
Central wavelength	19.1 nm (65ev)
Nominal GDD	0.03 fs ²
Maximum reflectance	40 %

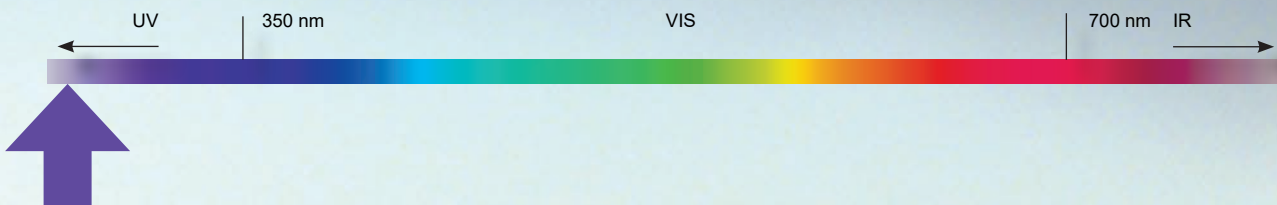


XUV MIRROR XUV 65BW6

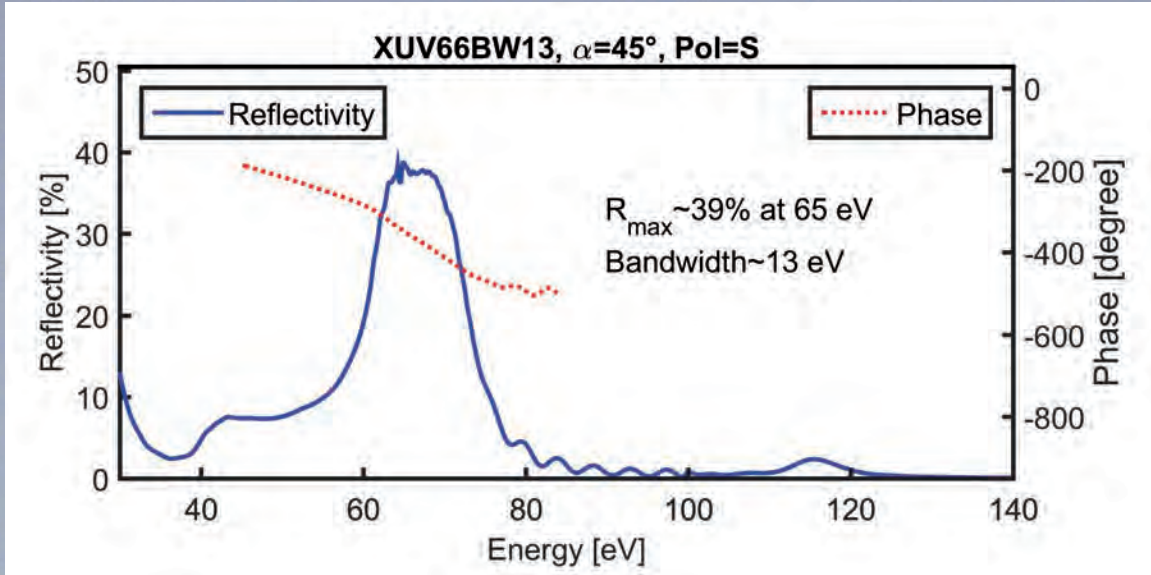


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	2
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	15.9 nm (40ev)
Spectral working range high end	31 nm (78ev)
Central wavelength	19.1 nm (65ev)
Nominal GDD	0.015 fs ²
Maximum reflectance	38 %



XUV MIRROR XUV 66BW13

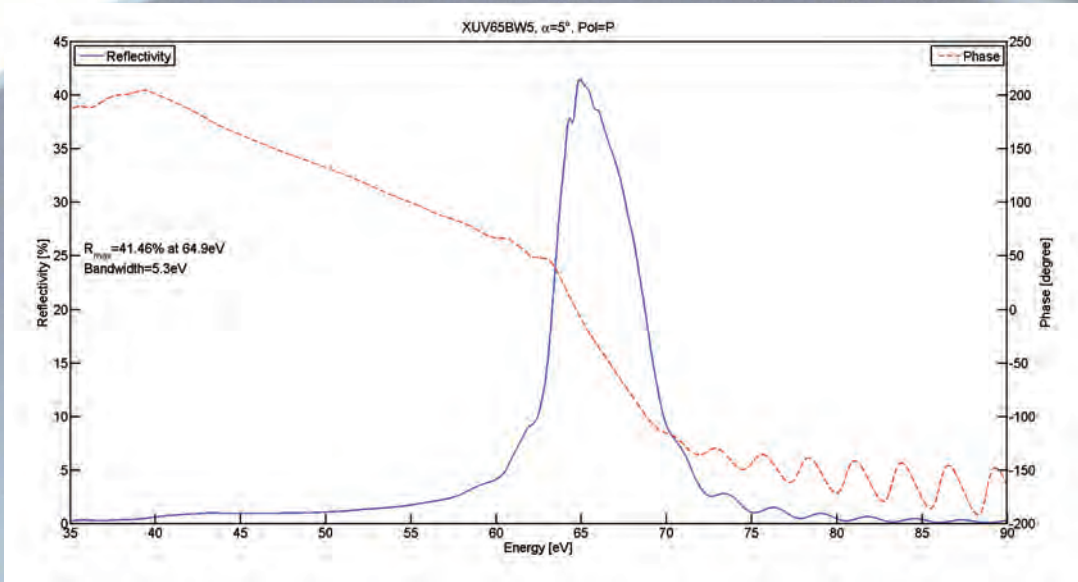


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	14.6 nm (38ev)
Spectral working range high end	32.6 nm (85ev)
Central wavelength	19.1 nm (65ev)
Nominal GDD	0.003 fs ²
Maximum reflectance	39 %

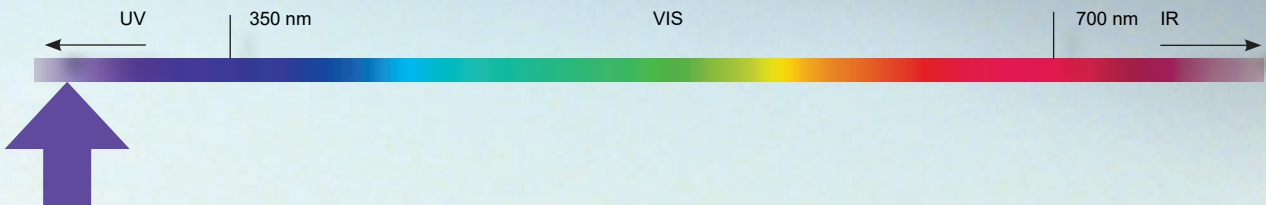


XUV MIRROR XUV 65BW5

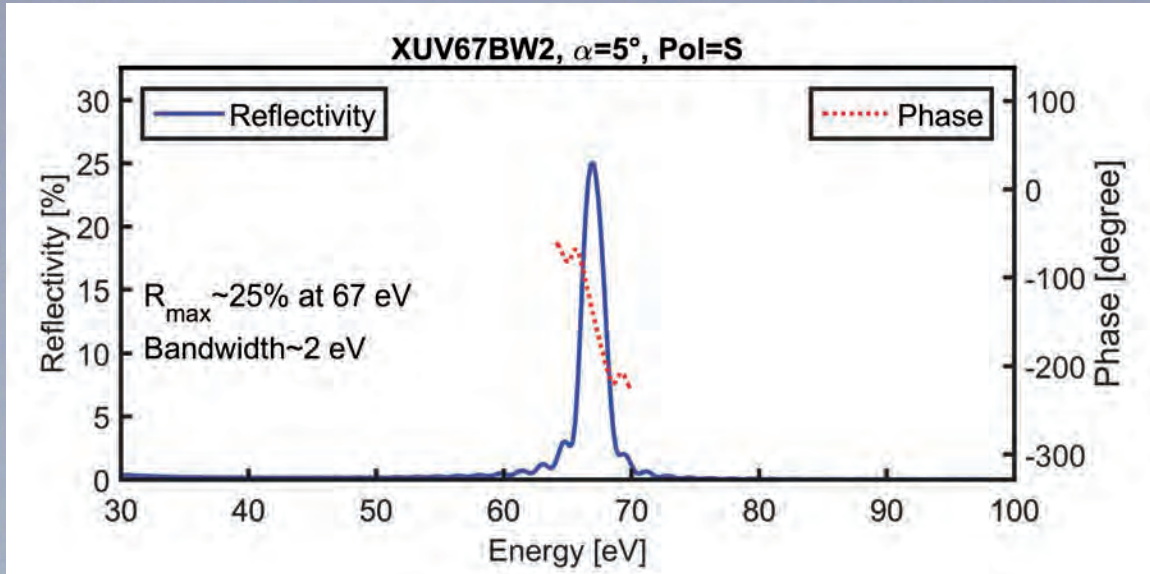


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	XUV
Spectral working range low end	16 nm (55ev)
Spectral working range high end	22 nm (75ev)
Central wavelength	19 nm (65ev)
Nominal GDD	0 fs ²
Maximum reflectance	41 %



XUV MIRROR XUV 67BW2

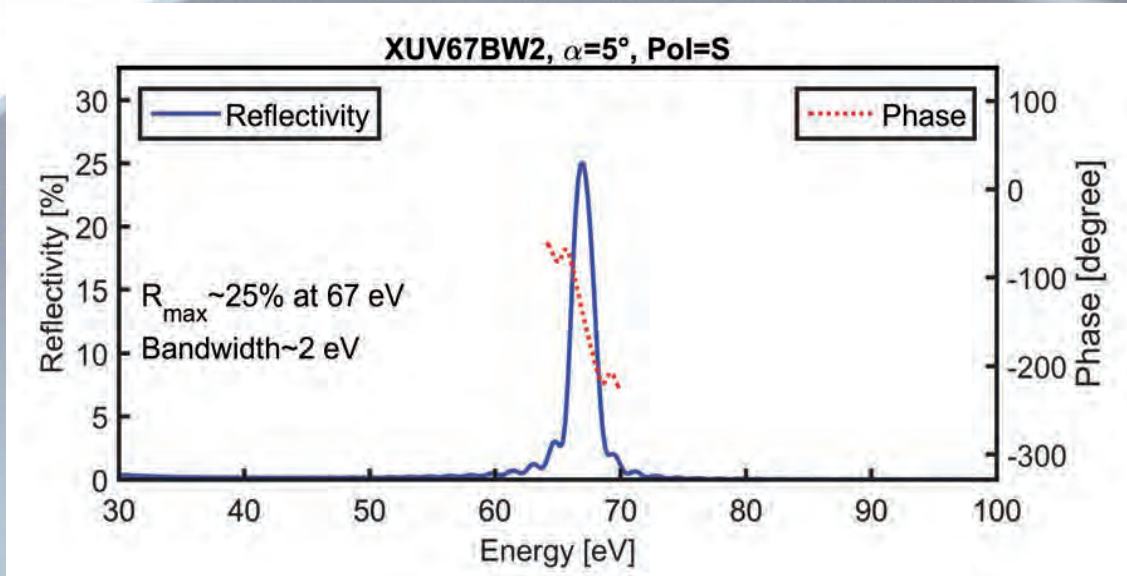


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	17.7 nm (62eV)
Spectral working range high end	20 nm (70eV)
Central wavelength	18.5 nm (67eV)
Nominal GDD	-0.03 fs ²
Maximum reflectance	25 %

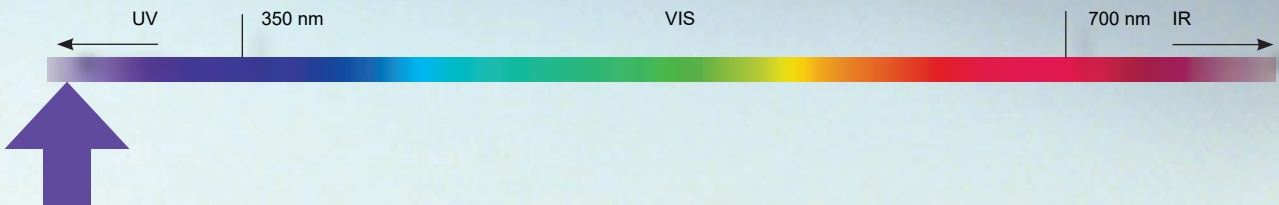


XUV MIRROR XUV 67BW2

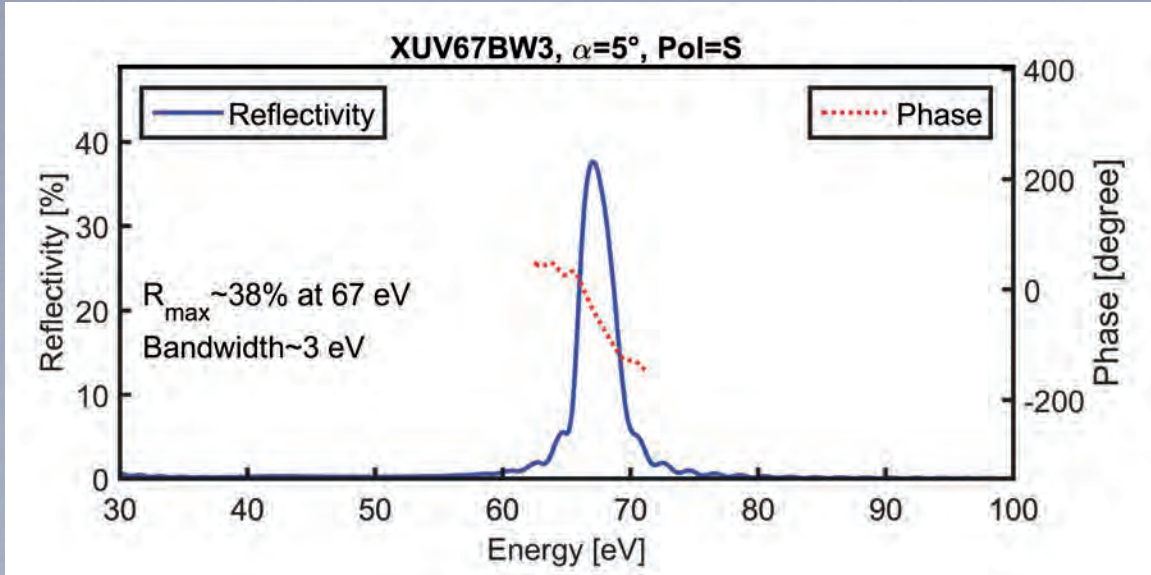


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	17.7 nm (62ev)
Spectral working range high end	20 nm (70ev)
Central wavelength	18.5 nm (67ev)
Nominal GDD	-0.03 fs ²
Maximum reflectance	25 %



XUV MIRROR XUV 67BW3

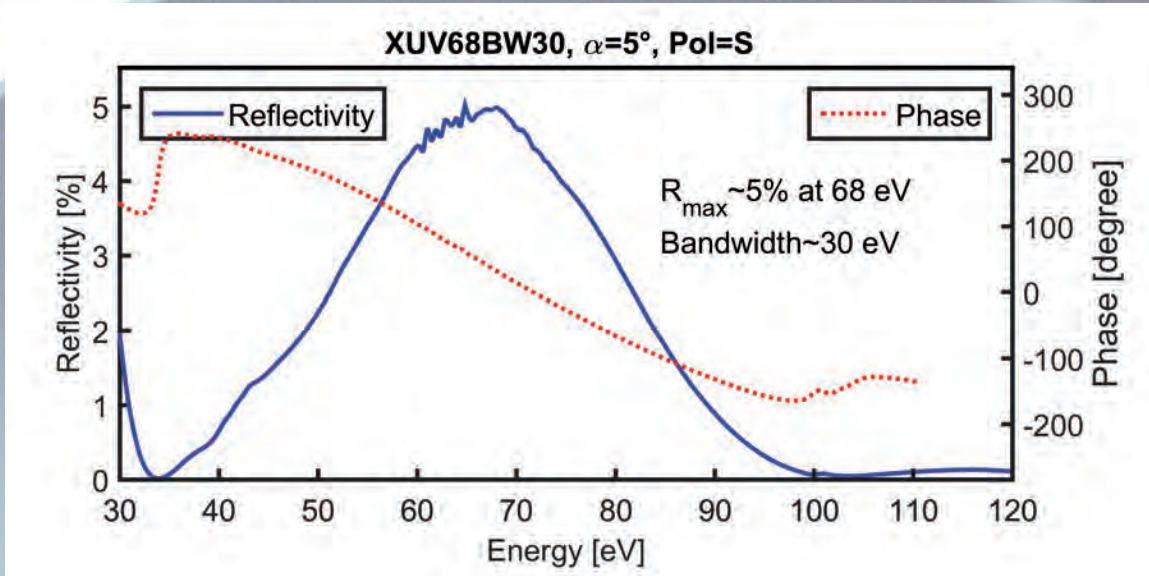


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	17 nm (60ev)
Spectral working range high end	20.7 nm (73ev)
Central wavelength	18.5 nm (67ev)
Nominal GDD	0.02 fs ²
Maximum reflectance	38 %

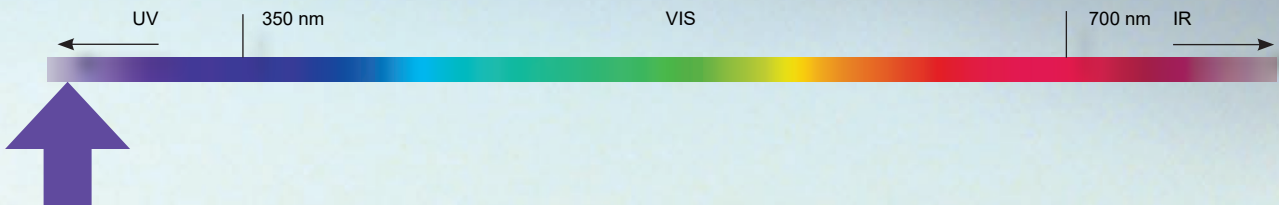


XUV MIRROR XUV 68BW30

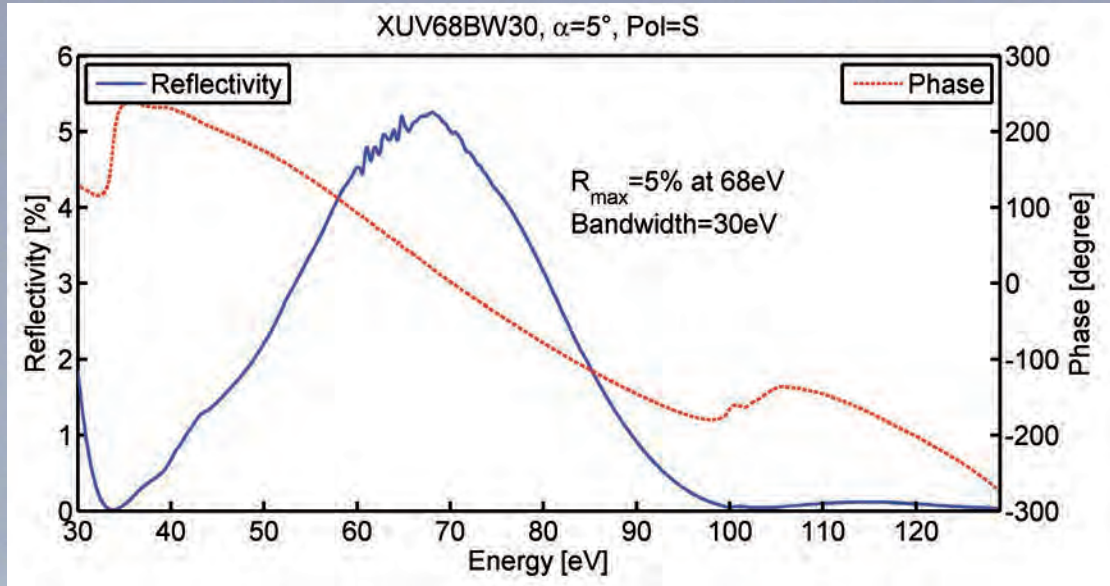


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.4 nm (33ev)
Spectral working range high end	37.6 nm (100ev)
Central wavelength	18.2 nm (68ev)
Nominal GDD	0.001 fs ²
Maximum reflectance	5 %



XUV MIRROR XUV 68BW30

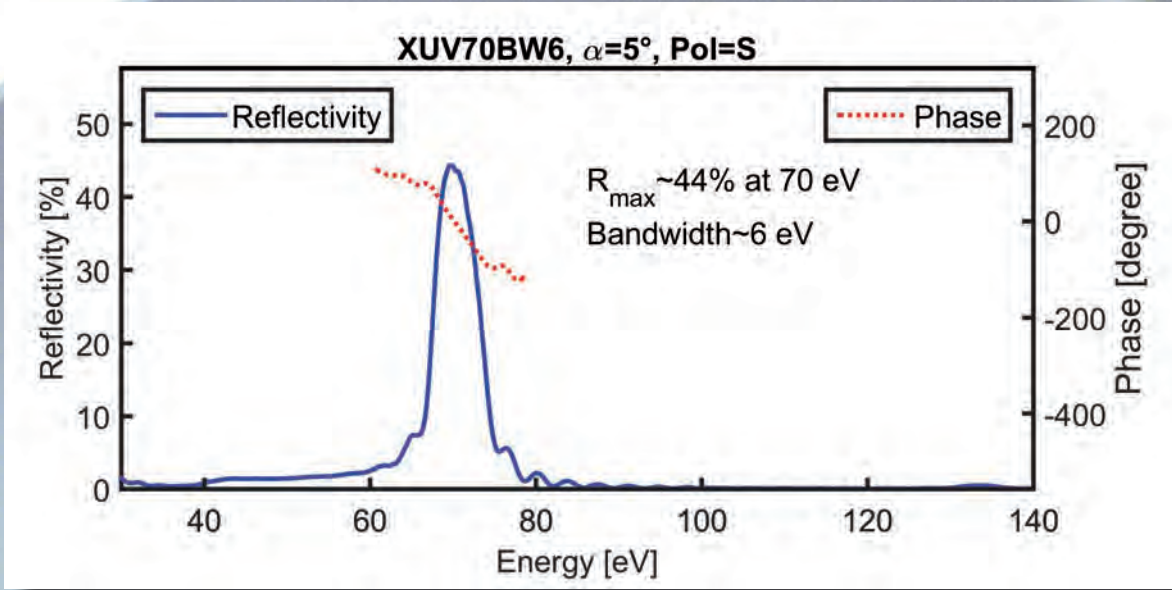


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12 nm (33ev)
Spectral working range high end	37 nm (100ev)
Central wavelength	18 nm (68ev)
Nominal GDD	0 fs ²
Maximum reflectance	5 %

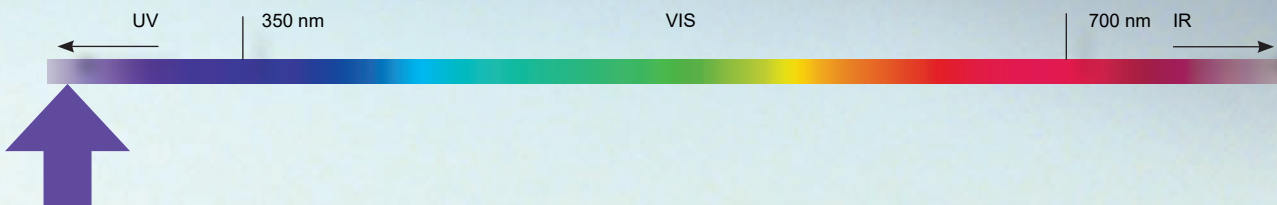


XUV MIRROR XUV 70BW6

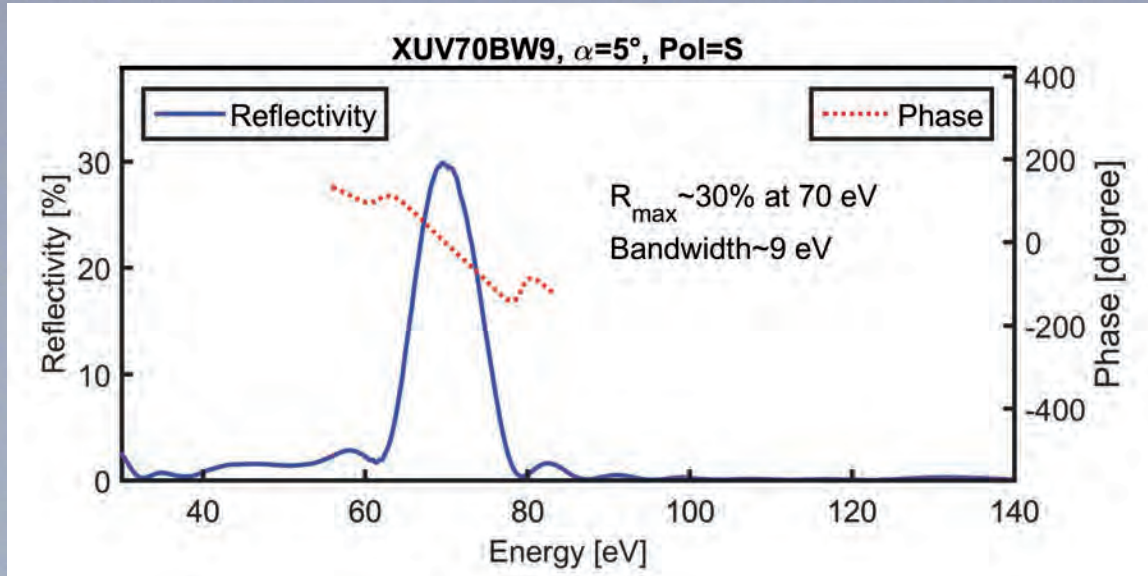


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	15.5 nm (60eV)
Spectral working range high end	20.7 nm (80eV)
Central wavelength	17.7 nm (70eV)
Nominal GDD	0.01 fs ²
Maximum reflectance	44 %



XUV MIRROR XUV 70BW9

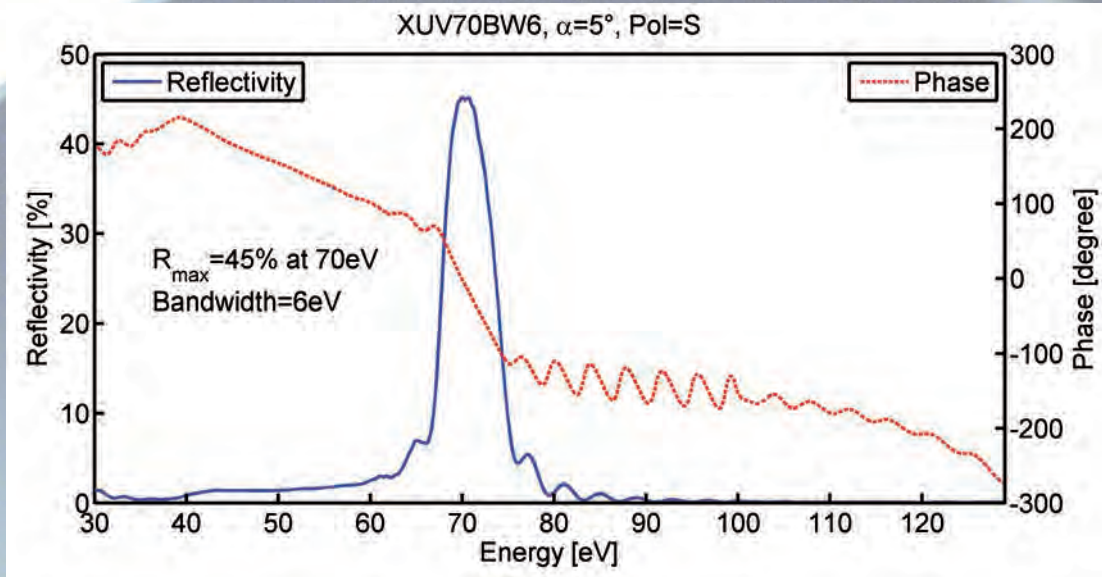


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	15.7 nm (61eV)
Spectral working range high end	20.3 nm (79eV)
Central wavelength	17.7 nm (70eV)
Nominal GDD	-0.001 fs ²
Maximum reflectance	30 %

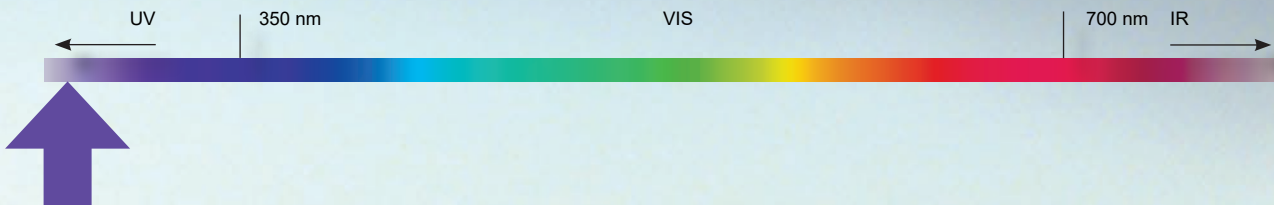


XUV MIRROR XUV 70BW6

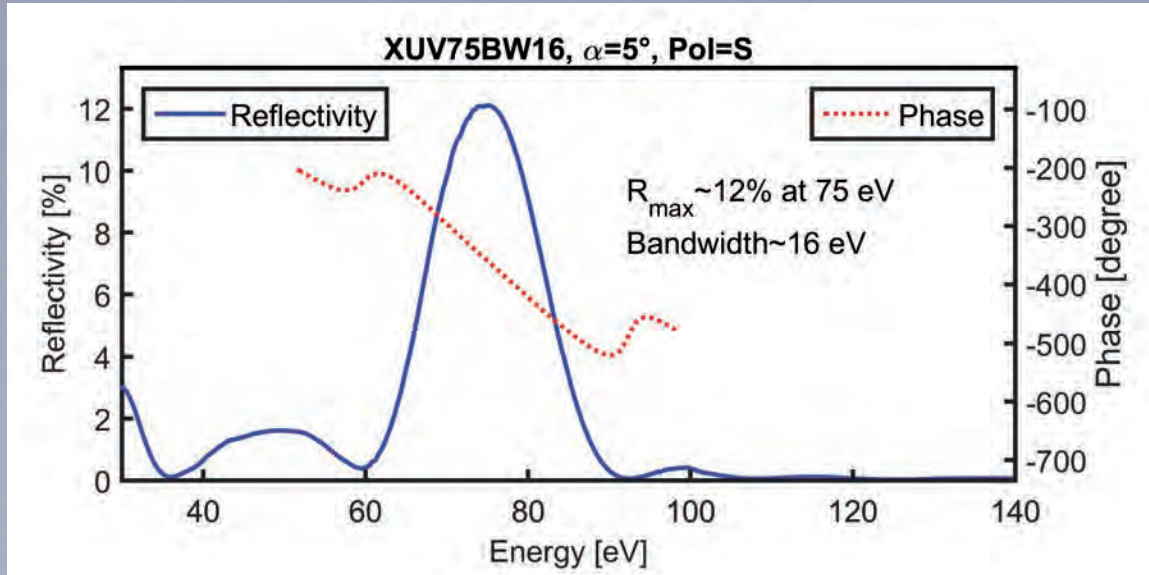


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	15 nm (60ev)
Spectral working range high end	20 nm (80ev)
Central wavelength	17 nm (70ev)
Nominal GDD	0 fs ²
Maximum reflectance	45 %



XUV MIRROR XUV 75BW16

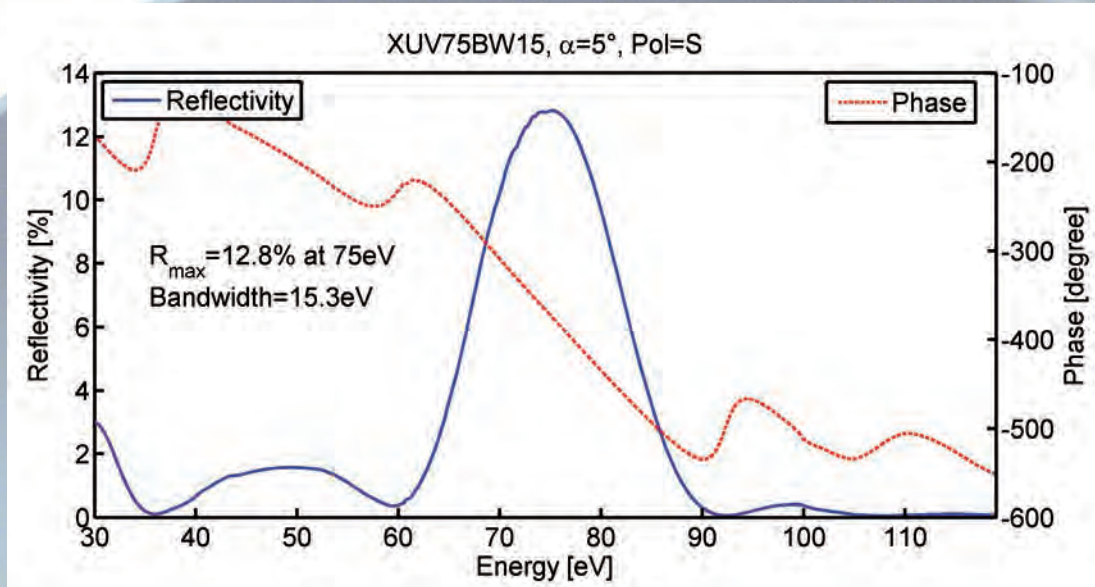


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13.8 nm (60eV)
Spectral working range high end	20.7 nm (90eV)
Central wavelength	16.5 nm (75eV)
Nominal GDD	-0.001 fs ²
Maximum reflectance	12 %

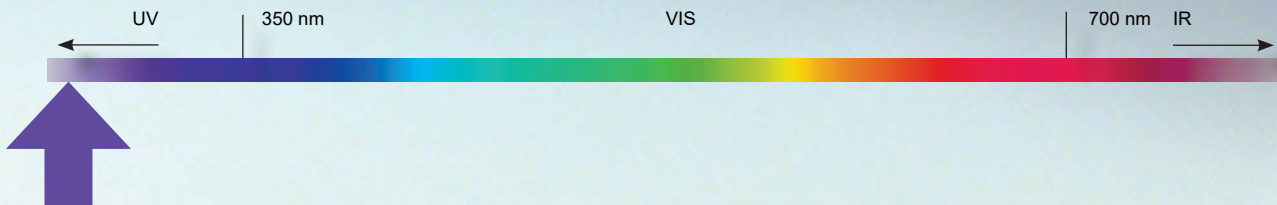


XUV MIRROR XUV 75BW15

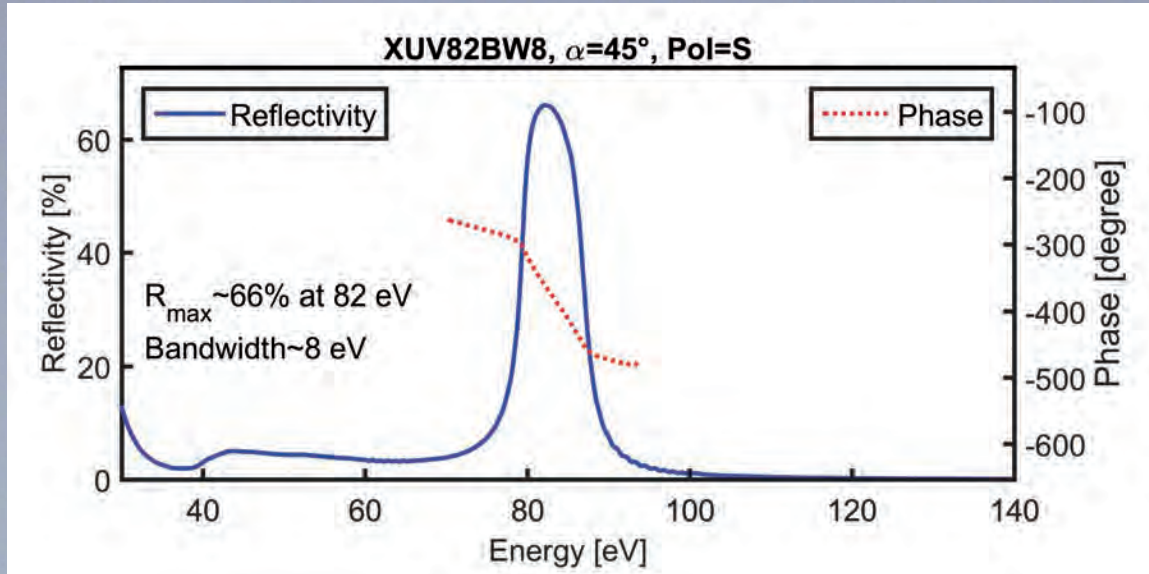


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13 nm (60ev)
Spectral working range high end	20 nm (90ev)
Central wavelength	16 nm (75ev)
Nominal GDD	0 fs ²
Maximum reflectance	13 %



XUV MIRROR XUV 82BW8

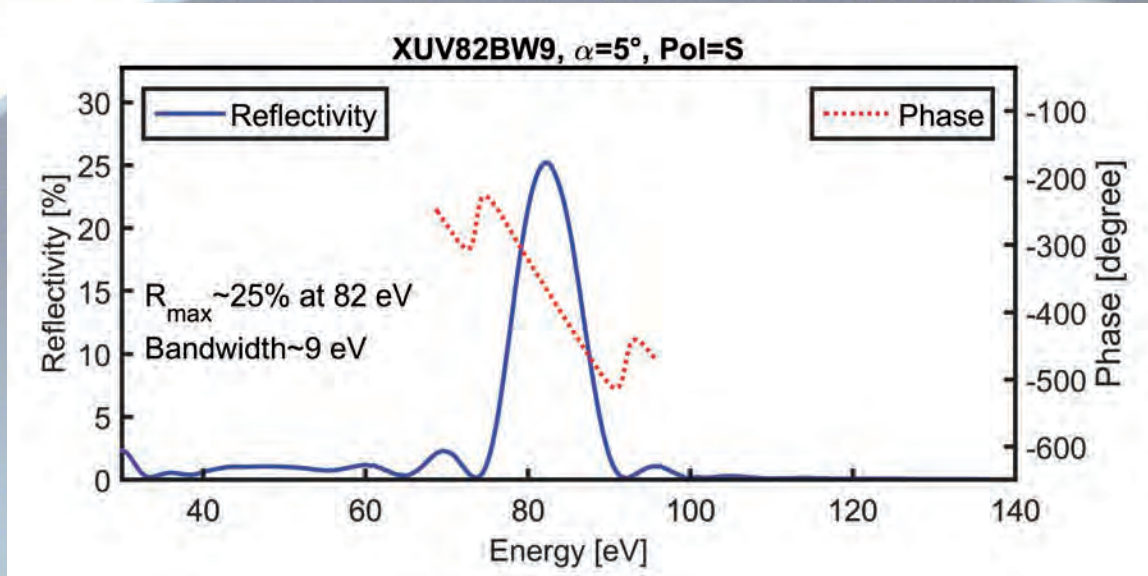


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.4 nm (70ev)
Spectral working range high end	17.7 nm (100ev)
Central wavelength	15.1 nm (82ev)
Nominal GDD	0.013 fs ²
Maximum reflectance	66 %

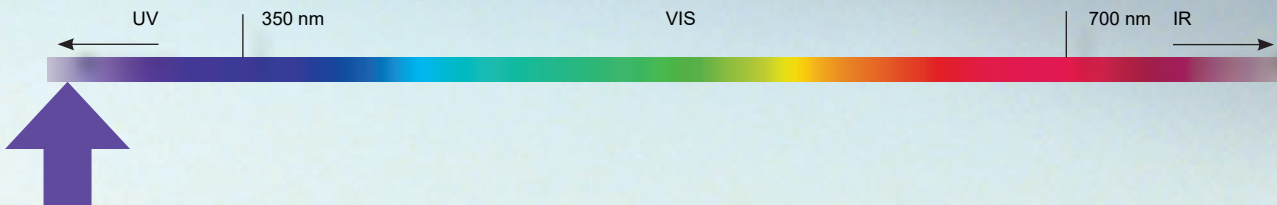


XUV MIRROR XUV 82BW9

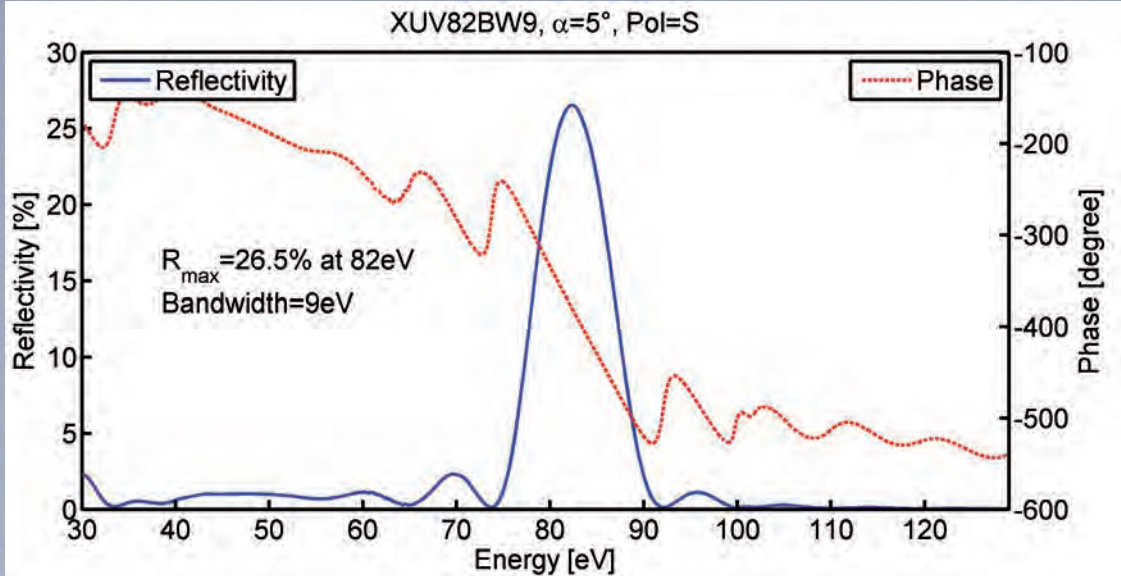


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13.6 nm (73eV)
Spectral working range high end	17 nm (91eV)
Central wavelength	15.1 nm (82eV)
Nominal GDD	-0.002 fs ²
Maximum reflectance	25 %



XUV MIRROR XUV 82BW9

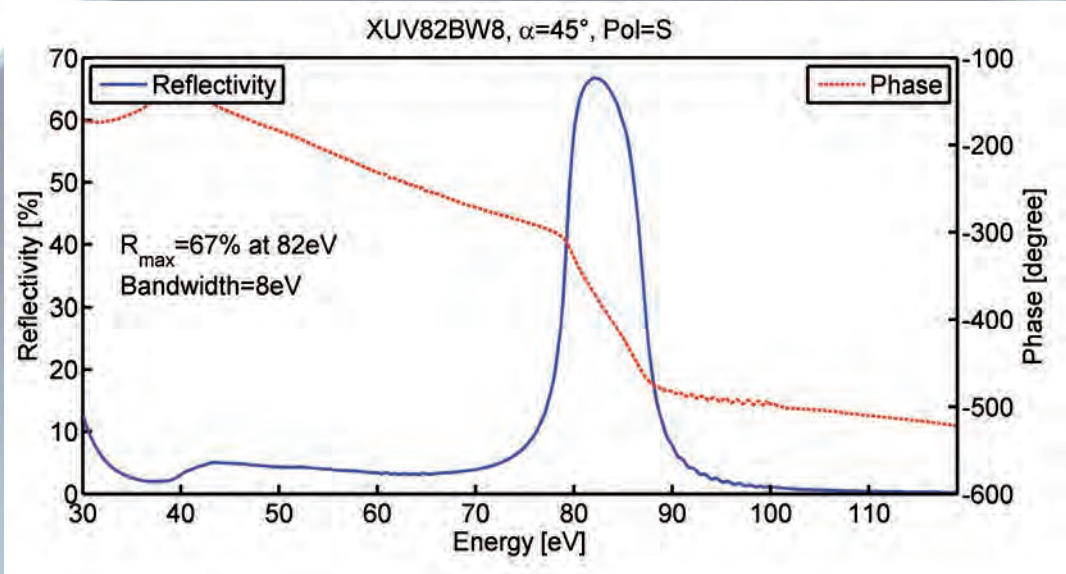


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13 nm (74eV)
Spectral working range high end	16 nm (91eV)
Central wavelength	15 nm (82eV)
Nominal GDD	0 fs ²
Maximum reflectance	27 %

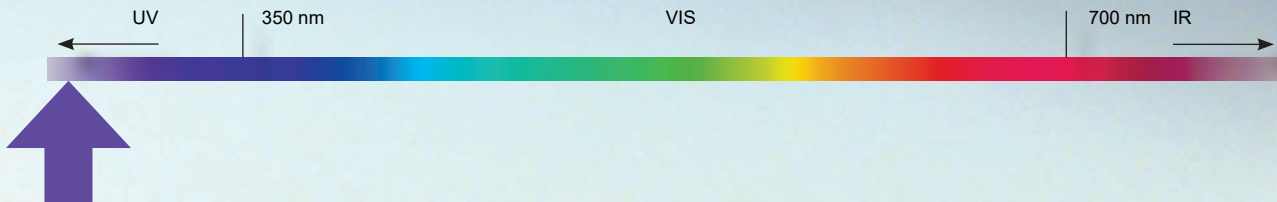


XUV MIRROR XUV 82BW8

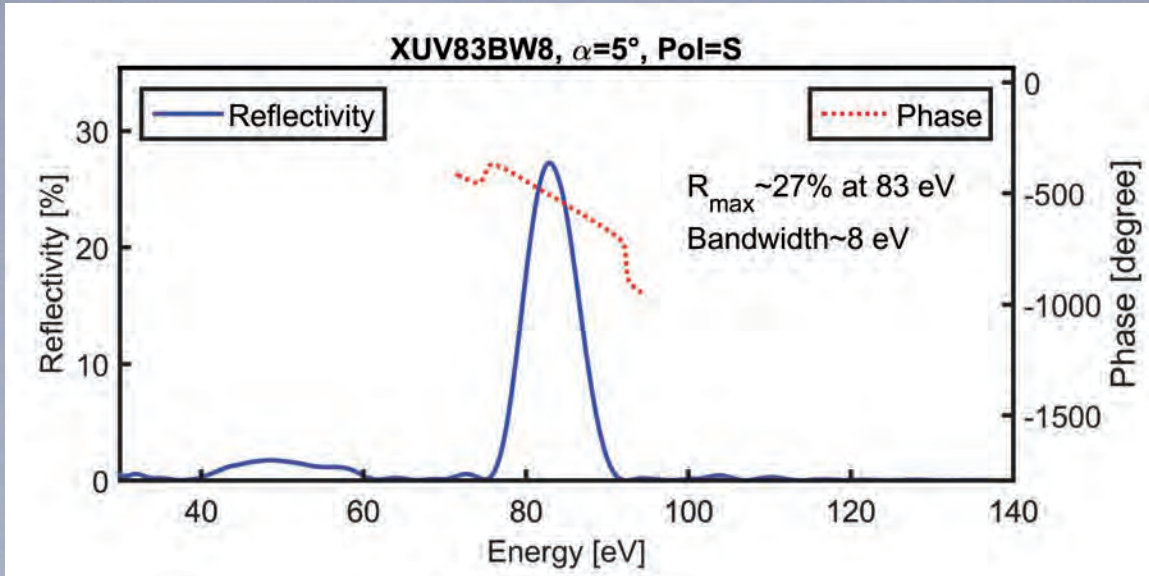


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12 nm (70ev)
Spectral working range high end	17 nm (100ev)
Central wavelength	15 nm (82ev)
Nominal GDD	0 fs ²
Maximum reflectance	67 %



XUV MIRROR XUV 83BW8

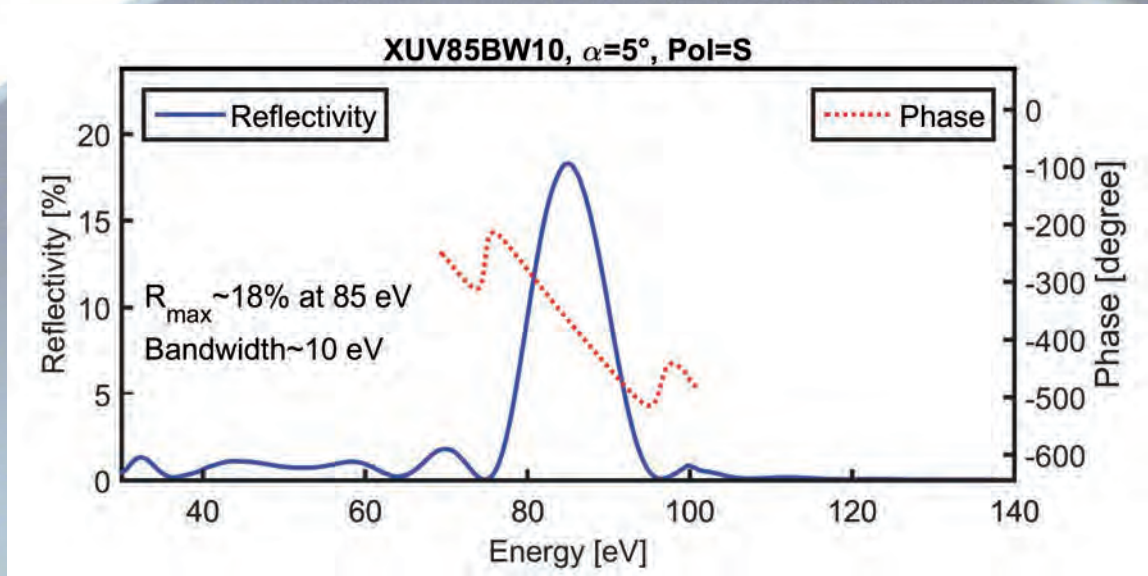


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13.5 nm (75eV)
Spectral working range high end	16.5 nm (92eV)
Central wavelength	14.9 nm (83eV)
Nominal GDD	-0.002 fs ²
Maximum reflectance	27 %

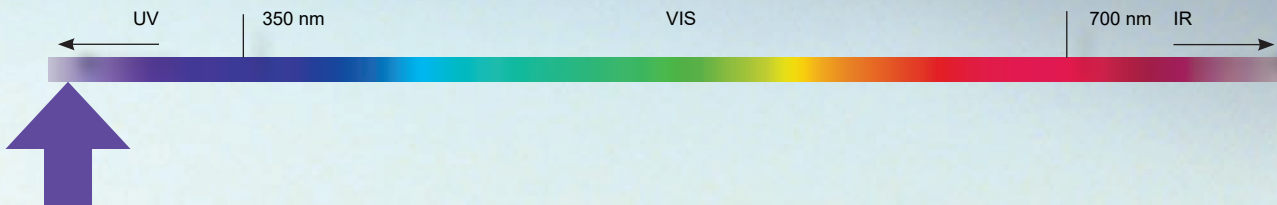


XUV MIRROR XUV 85BW10

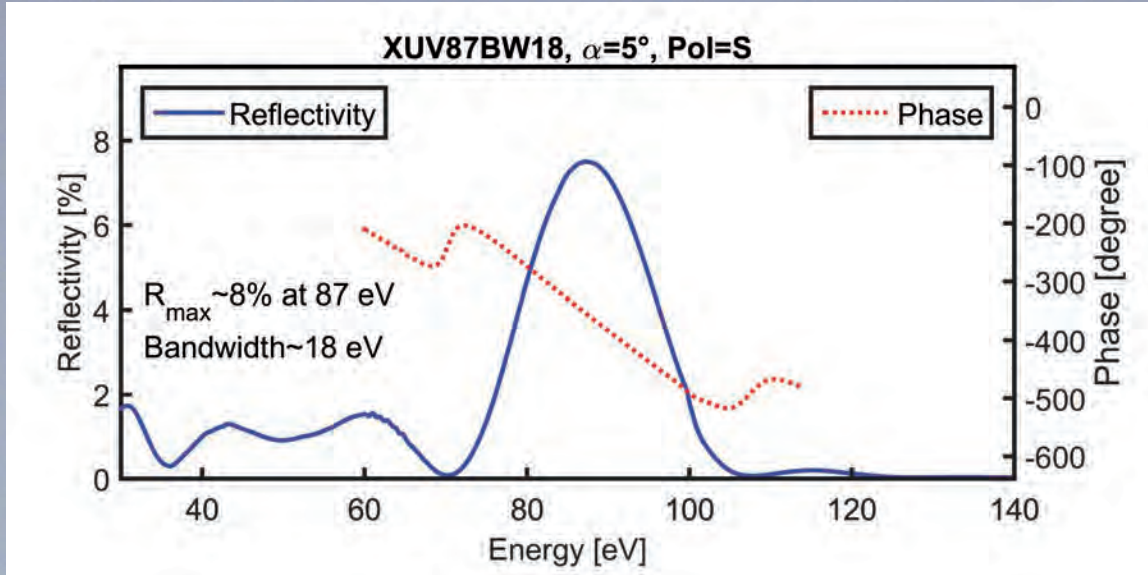


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13.1 nm (75eV)
Spectral working range high end	16.5 nm (95eV)
Central wavelength	14.6 nm (85eV)
Nominal GDD	-0.002 fs ²
Maximum reflectance	18 %



XUV MIRROR XUV 87BW18

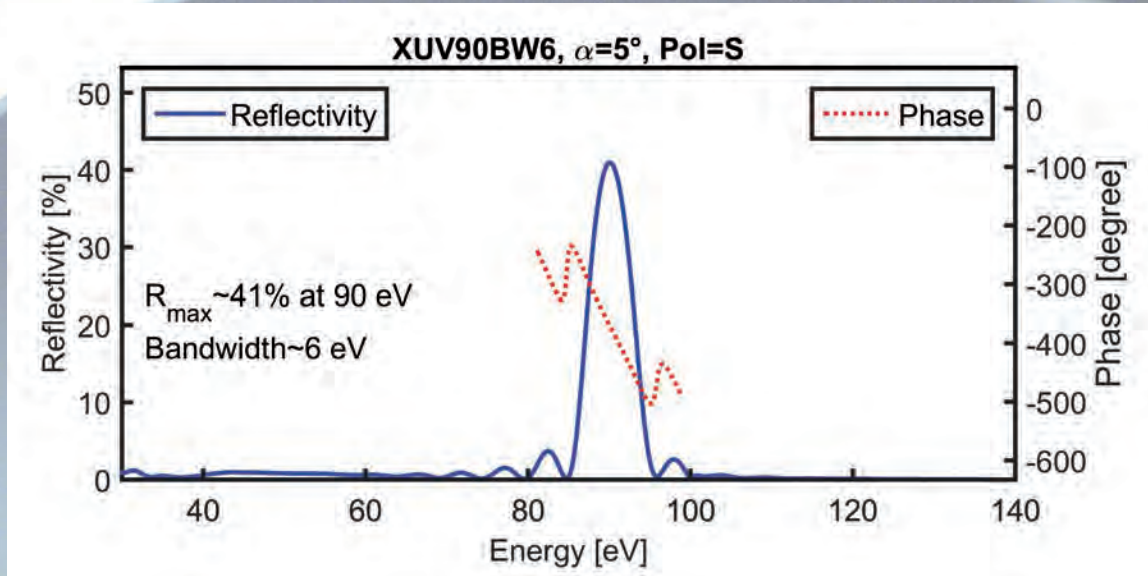


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11.7 nm (70eV)
Spectral working range high end	17.7 nm (106eV)
Central wavelength	14.3 nm (87eV)
Nominal GDD	-0.001 fs ²
Maximum reflectance	8 %

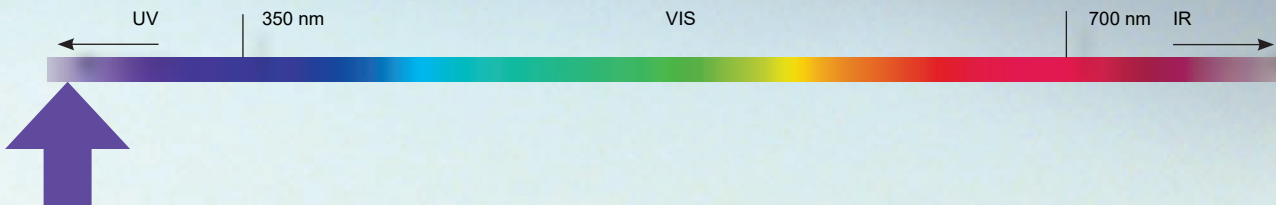


XUV MIRROR XUV 90BW6

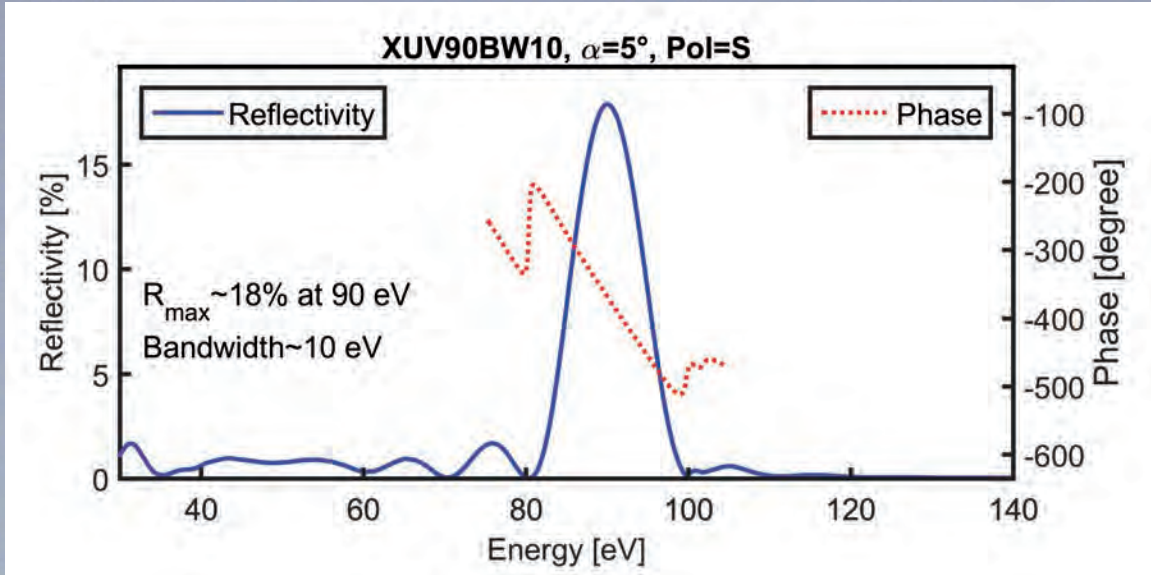


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	13.1 nm (85ev)
Spectral working range high end	14.6 nm (95ev)
Central wavelength	13.8 nm (90ev)
Nominal GDD	-0.004 fs ²
Maximum reflectance	41 %



XUV MIRROR XUV 90BW10

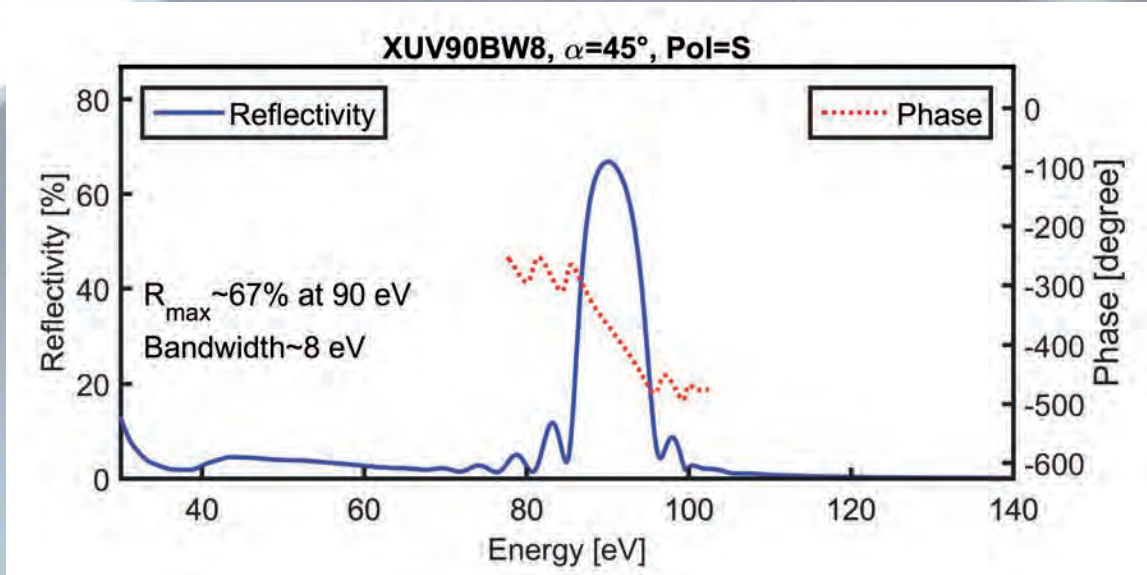


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.5 nm (81eV)
Spectral working range high end	15.3 nm (99eV)
Central wavelength	13.8 nm (90eV)
Nominal GDD	-0.002 fs ²
Maximum reflectance	18 %

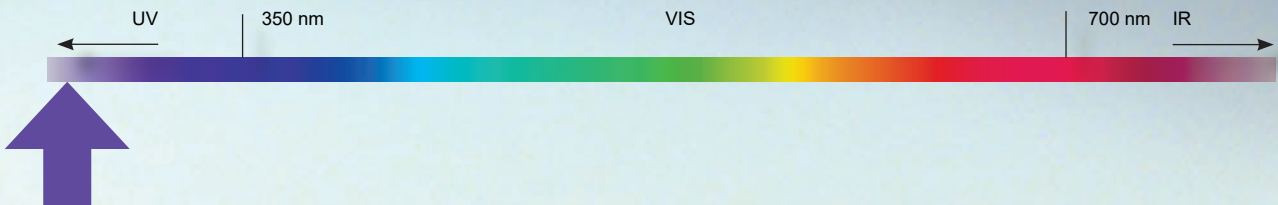


XUV MIRROR XUV 90BW8

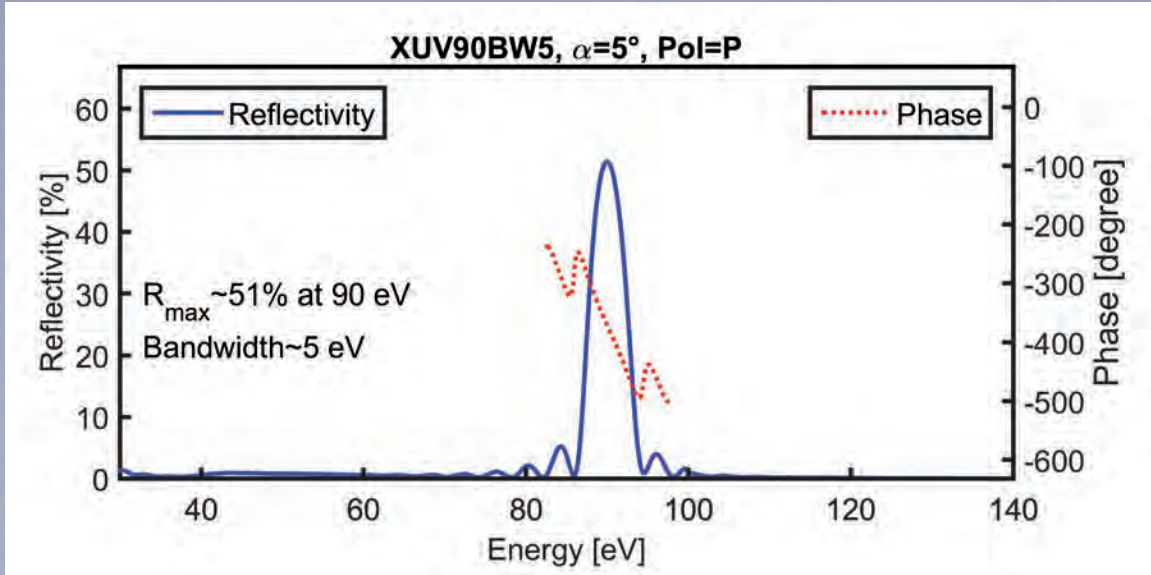


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.4 nm (80ev)
Spectral working range high end	15.5 nm (100ev)
Central wavelength	13.8 nm (90ev)
Nominal GDD	0.001 fs ²
Maximum reflectance	67 %



XUV MIRROR XUV 90BW5

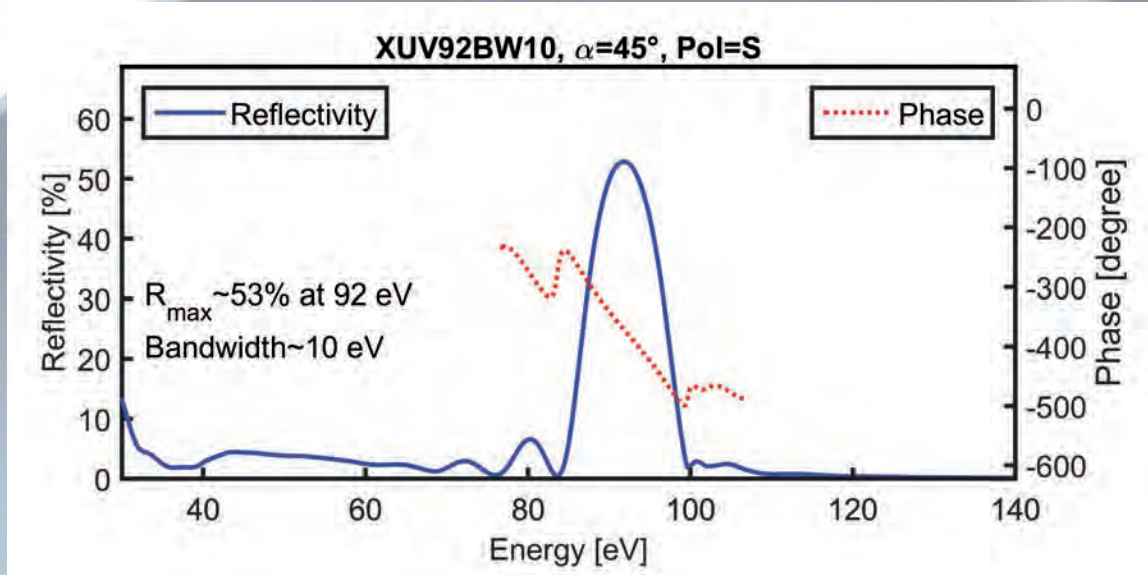


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	XUV
Spectral working range low end	13.1 nm (85ev)
Spectral working range high end	14.6 nm (95ev)
Central wavelength	13.8 nm (90ev)
Nominal GDD	-0.006 fs ²
Maximum reflectance	51 %

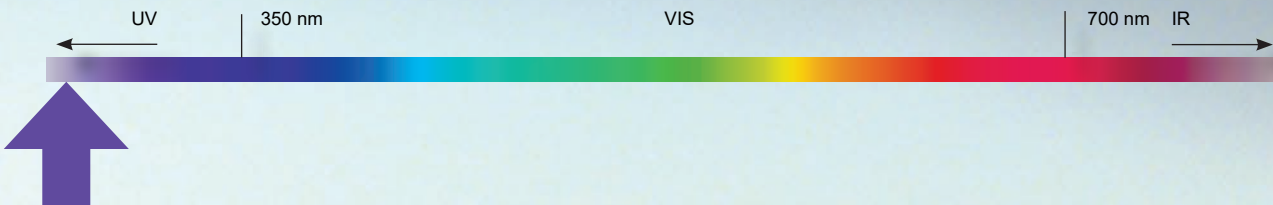


XUV MIRROR XUV 92BW10

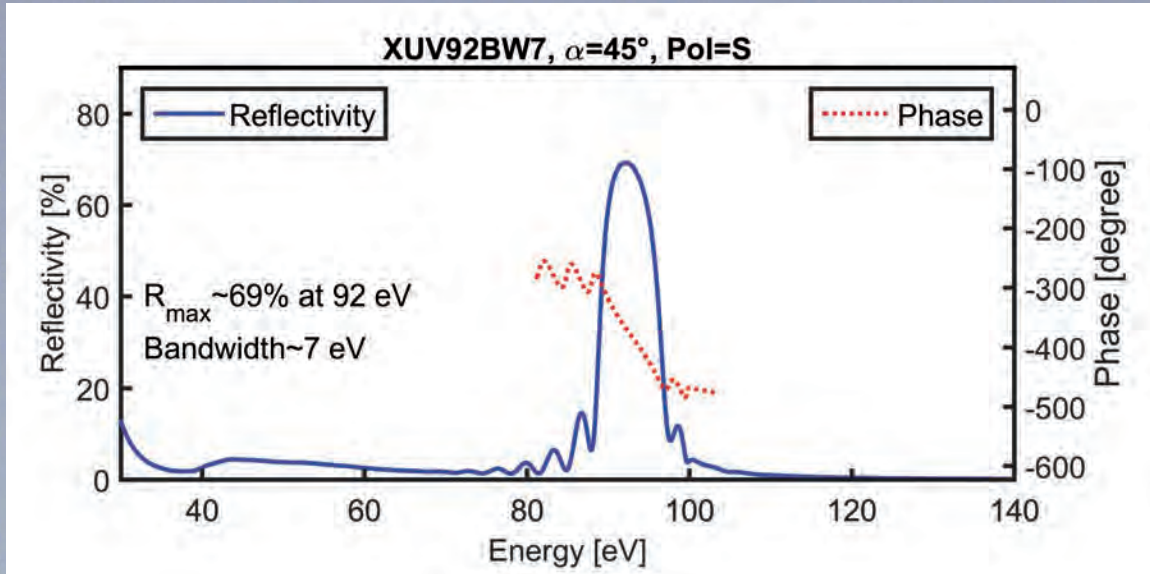


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.4 nm (84ev)
Spectral working range high end	14.8 nm (100ev)
Central wavelength	13.5 nm (92ev)
Nominal GDD	-0.002 fs ²
Maximum reflectance	53 %



XUV MIRROR XUV 92BW7

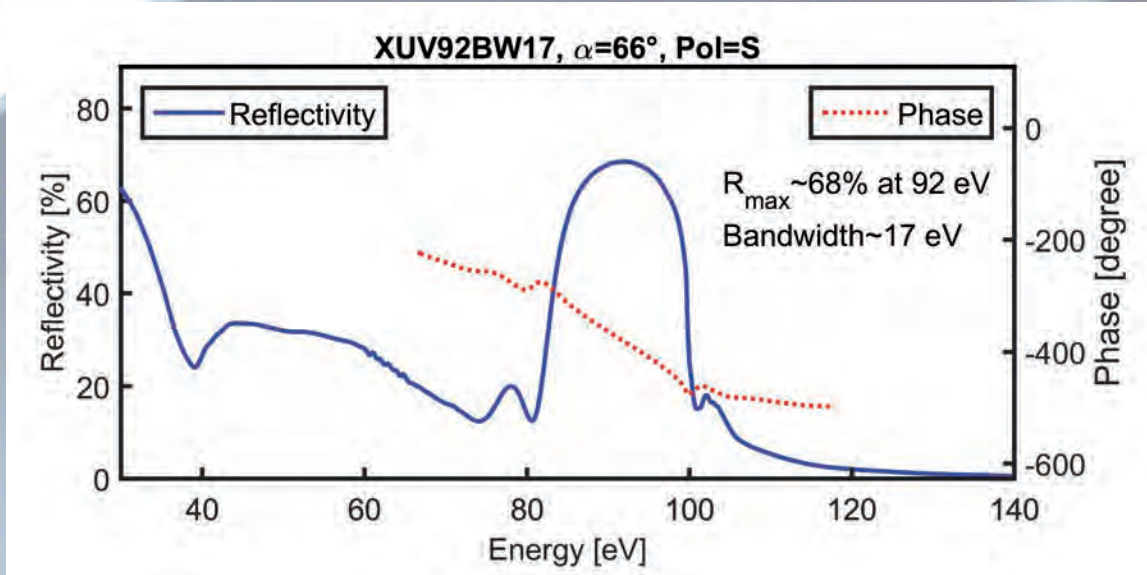


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.2 nm (80ev)
Spectral working range high end	15.5 nm (102ev)
Central wavelength	13.5 nm (92ev)
Nominal GDD	0.002 fs ²
Maximum reflectance	69 %

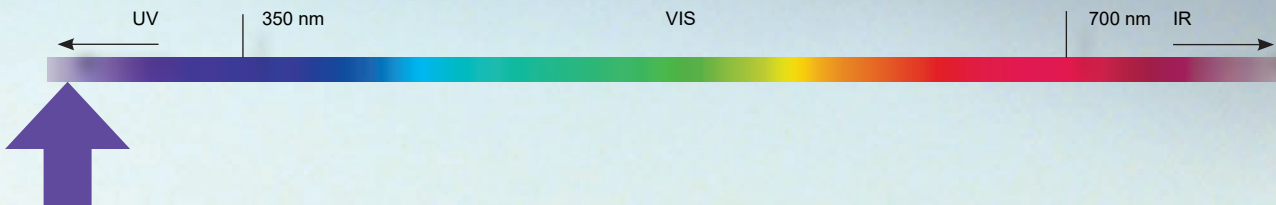


XUV MIRROR XUV 92BW17

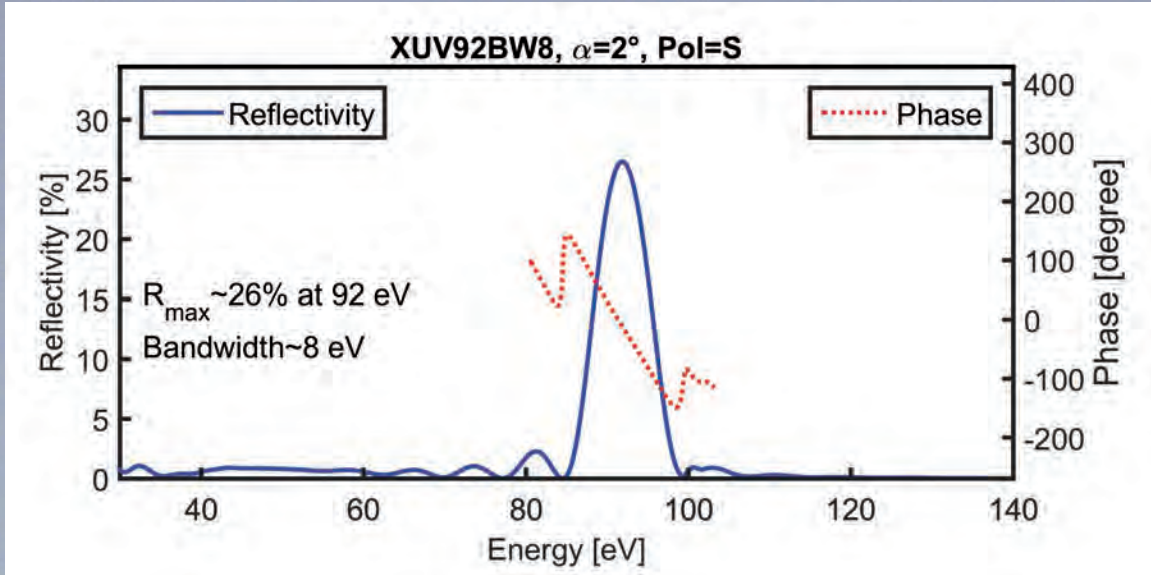


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	66
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	10.3 nm (30eV)
Spectral working range high end	41.3 nm (120eV)
Central wavelength	13.5 nm (92eV)
Nominal GDD	-0.01 fs ²
Maximum reflectance	68 %



XUV MIRROR XUV 92BW8

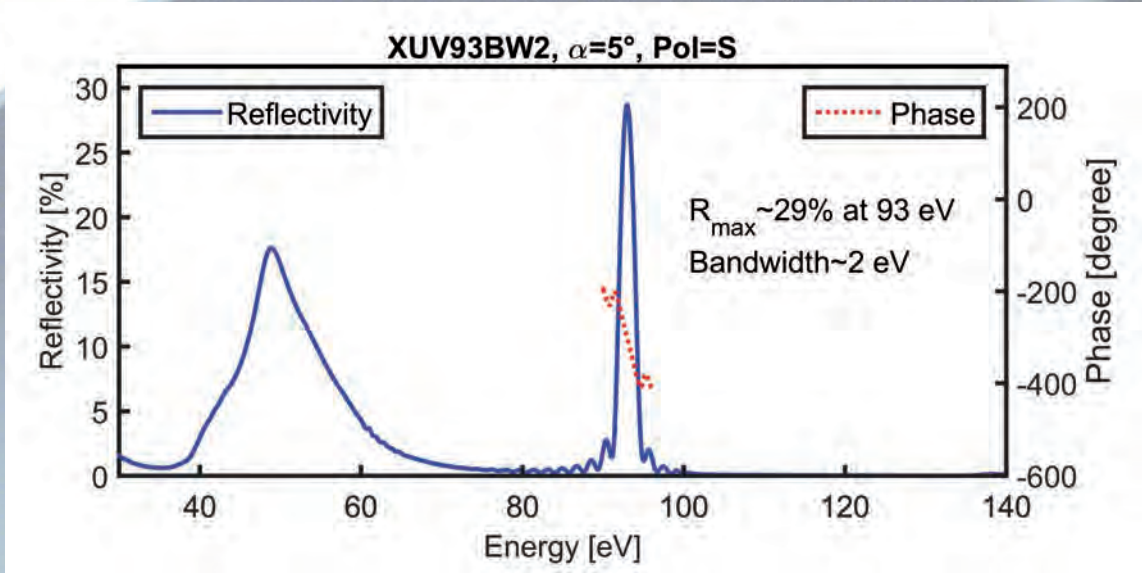


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	2
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.5 nm (85ev)
Spectral working range high end	14.6 nm (99ev)
Central wavelength	13.5 nm (92ev)
Nominal GDD	-0.002 fs ²
Maximum reflectance	26 %

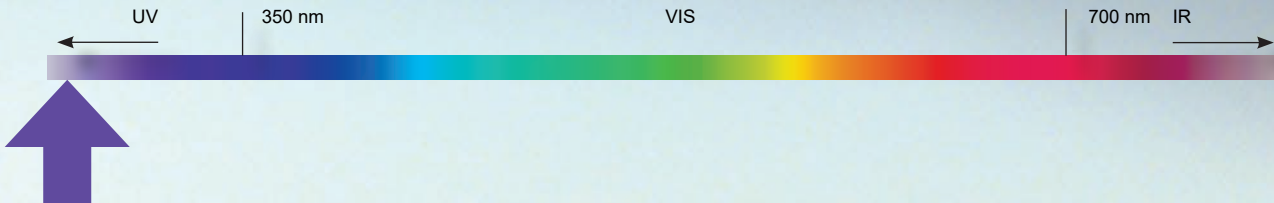


XUV MIRROR XUV 93BW2

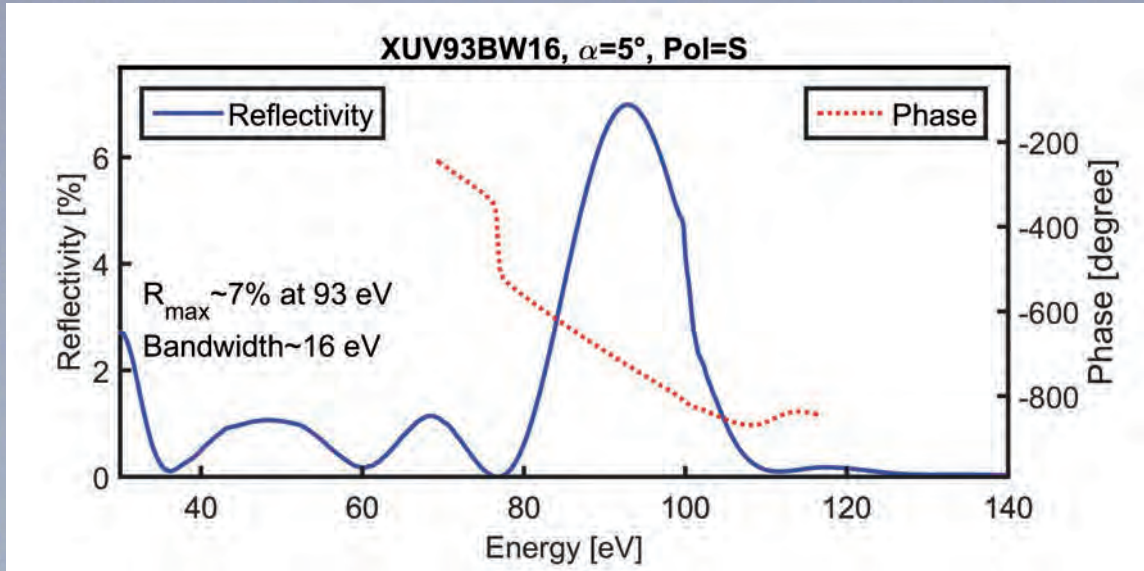


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.9 nm (90eV)
Spectral working range high end	13.8 nm (96eV)
Central wavelength	13.3 nm (93eV)
Nominal GDD	-0.005 fs ²
Maximum reflectance	29 %



XUV MIRROR XUV 93BW16

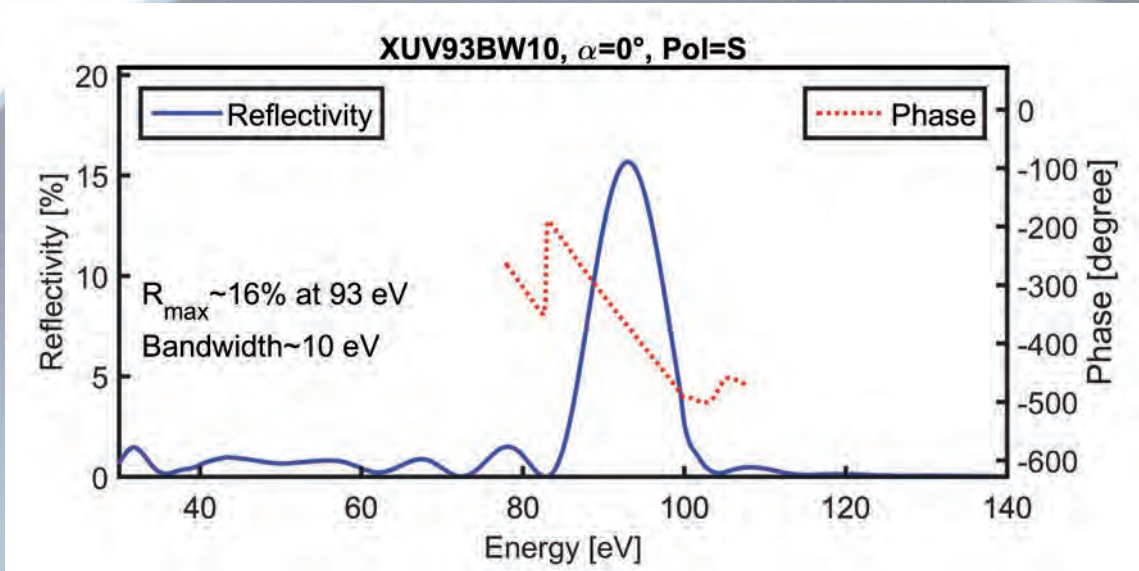


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11.3 nm (77eV)
Spectral working range high end	16.1 nm (110eV)
Central wavelength	13.3 nm (93eV)
Nominal GDD	-0.005 fs ²
Maximum reflectance	7 %

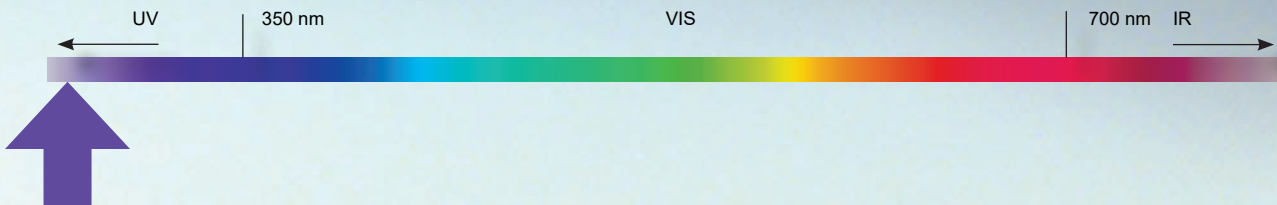


XUV MIRROR XUV 93BW10

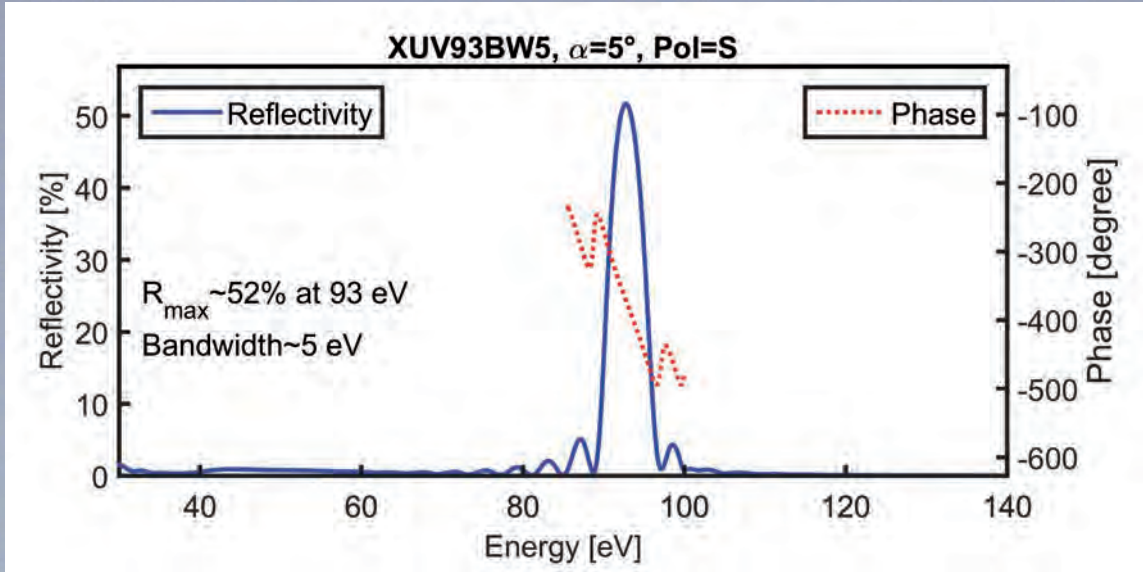


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.2 nm (82ev)
Spectral working range high end	15.1 nm (102ev)
Central wavelength	13.3 nm (93ev)
Nominal GDD	-0.001 fs ²
Maximum reflectance	16 %



XUV MIRROR XUV 93BW5

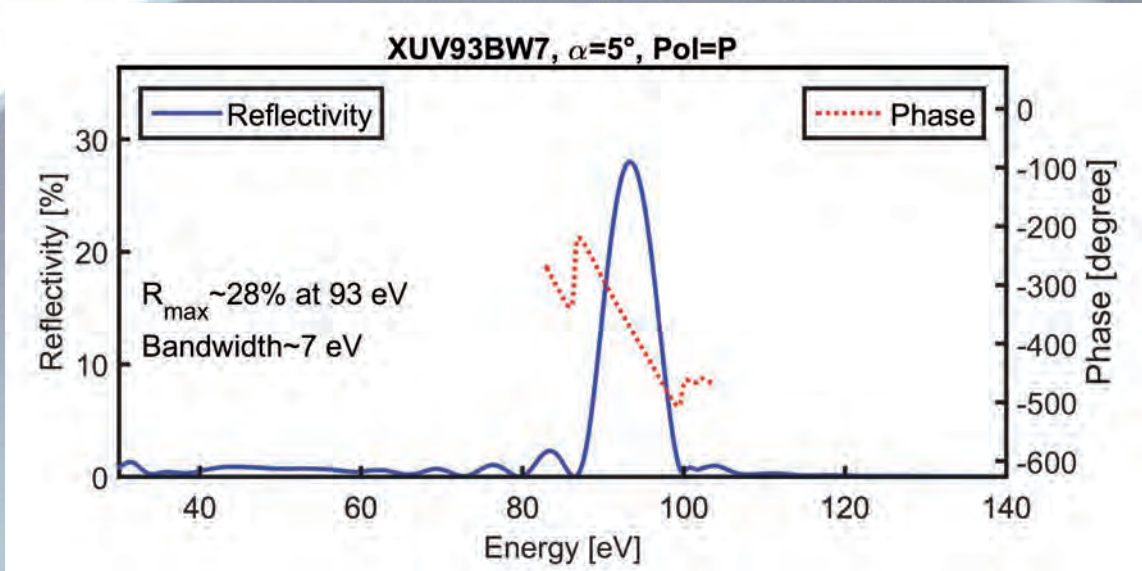


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.8 nm (89ev)
Spectral working range high end	13.9 nm (97ev)
Central wavelength	13.3 nm (93ev)
Nominal GDD	-0.006 fs ²
Maximum reflectance	52 %

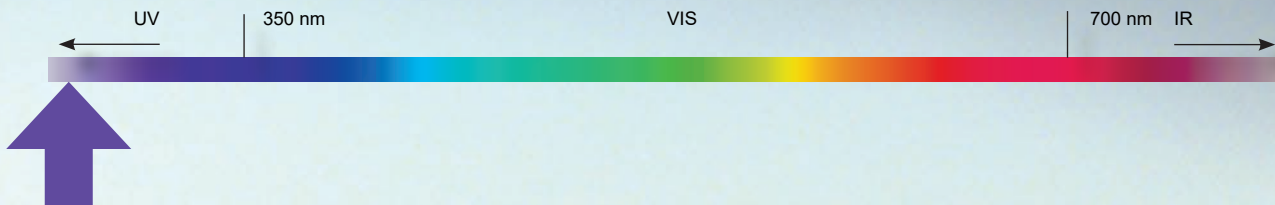


XUV MIRROR XUV 93BW7

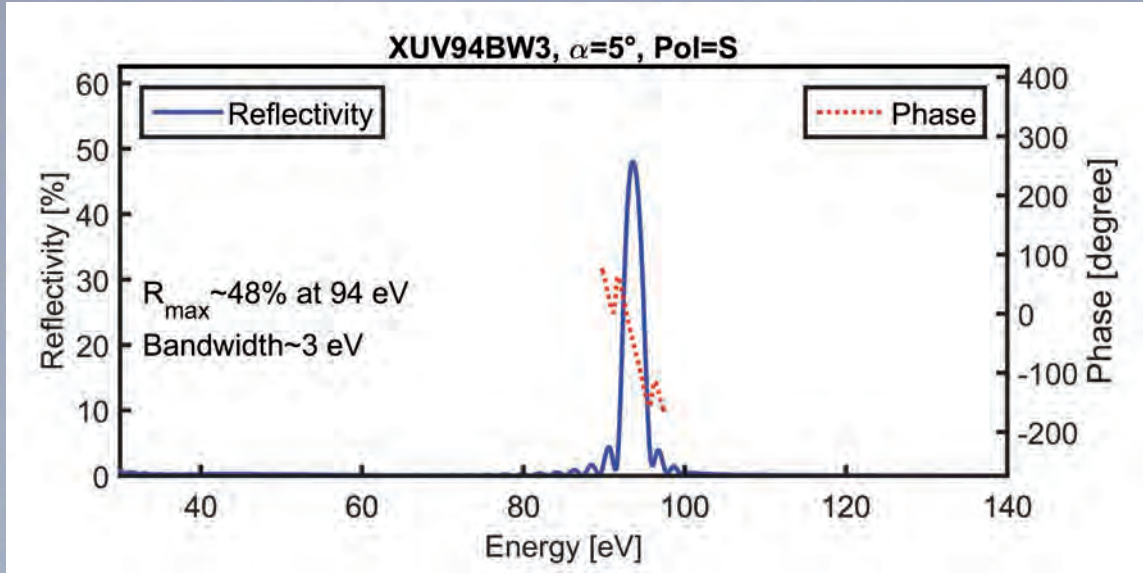


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	P

Spectral category	XUV
Spectral working range low end	12.4 nm (87eV)
Spectral working range high end	14.3 nm (100eV)
Central wavelength	13.3 nm (93eV)
Nominal GDD	-0.002 fs ²
Maximum reflectance	28 %



XUV MIRROR XUV 94BW3

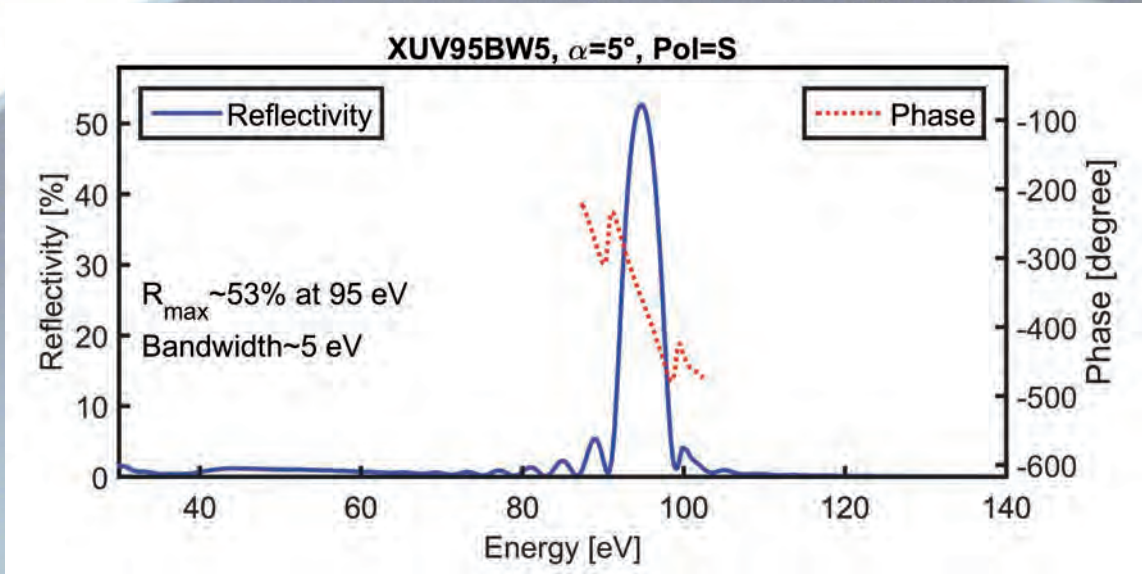


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.7 nm (90ev)
Spectral working range high end	13.8 nm (98ev)
Central wavelength	13.2 nm (94ev)
Nominal GDD	-0.024 fs ²
Maximum reflectance	48 %

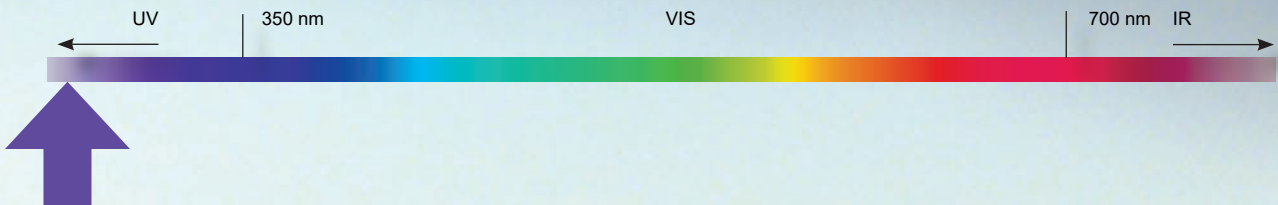


XUV MIRROR XUV 95BW5

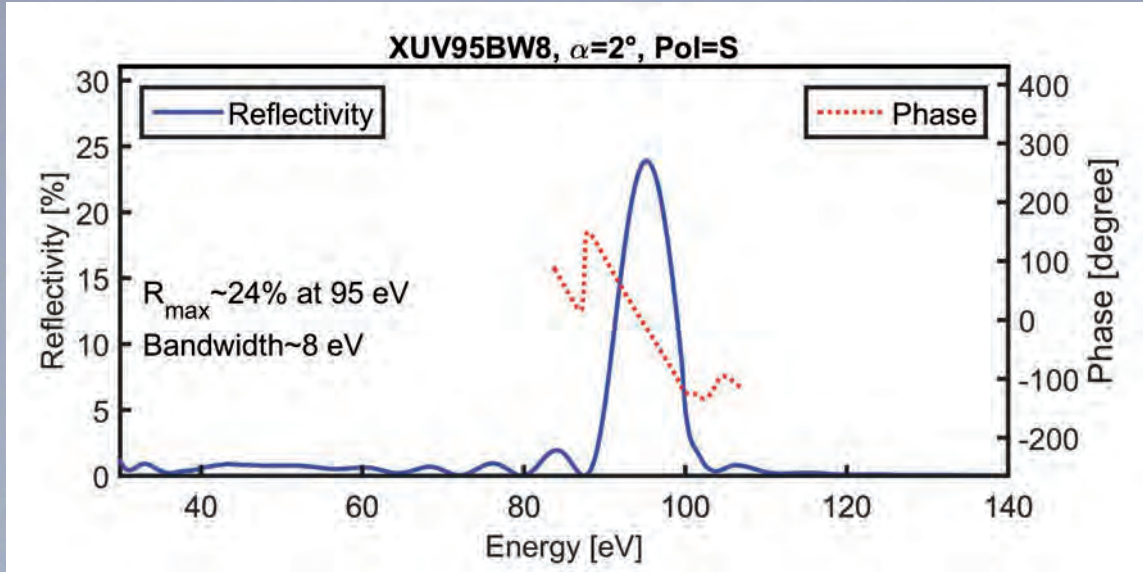


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.5 nm (91ev)
Spectral working range high end	13.6 nm (99ev)
Central wavelength	13.1 nm (95ev)
Nominal GDD	-0.004 fs ²
Maximum reflectance	53 %



XUV MIRROR XUV 95BW8

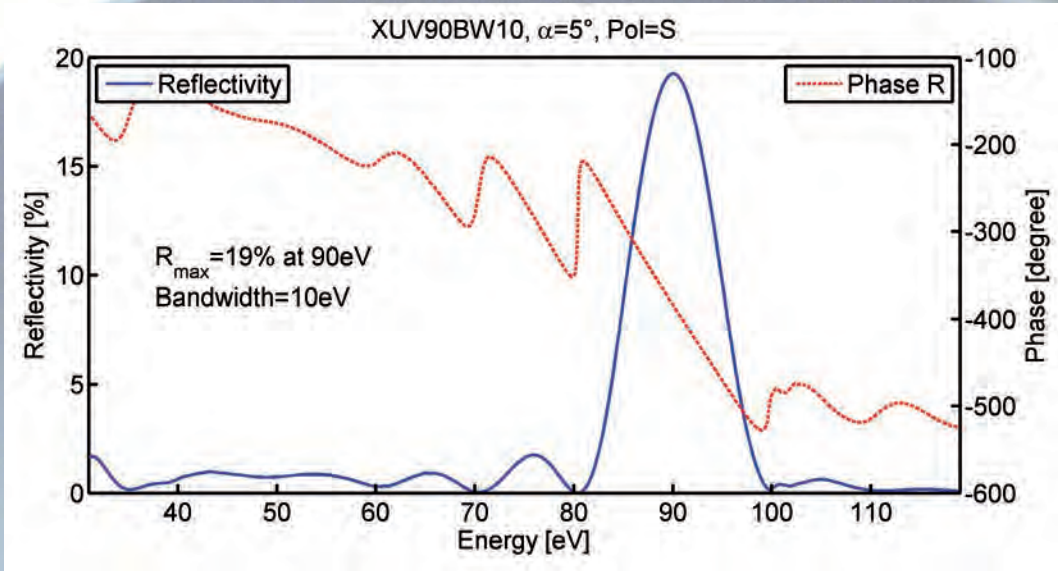


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	2
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12.2 nm (88eV)
Spectral working range high end	14.1 nm (102eV)
Central wavelength	13.1 nm (95eV)
Nominal GDD	0.004 fs ²
Maximum reflectance	24 %

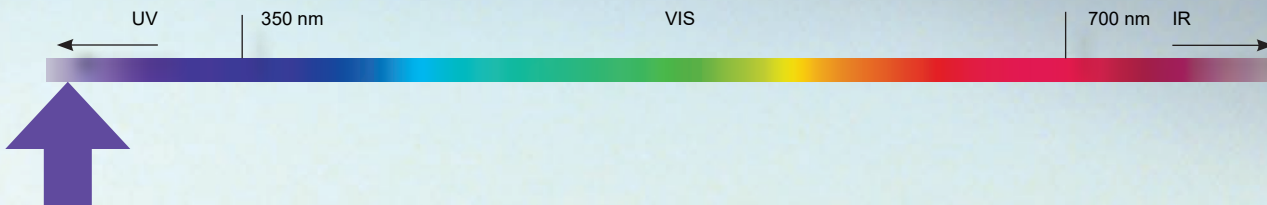


XUV MIRROR XUV 90BW10

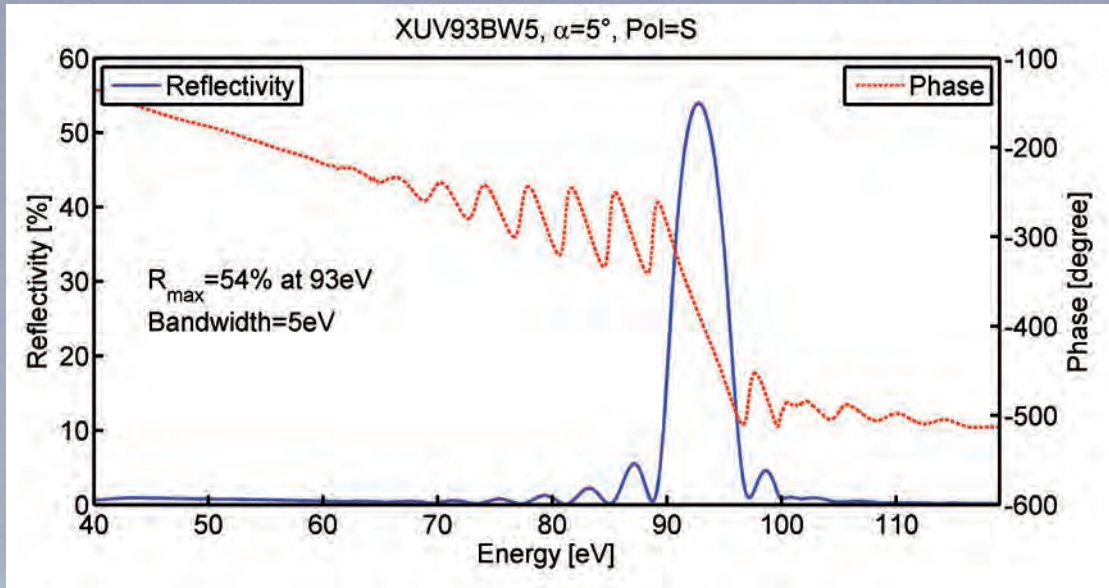


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12 nm (81eV)
Spectral working range high end	15 nm (99eV)
Central wavelength	13 nm (90eV)
Nominal GDD	0 fs ²
Maximum reflectance	19 %



XUV MIRROR XUV 93BW5

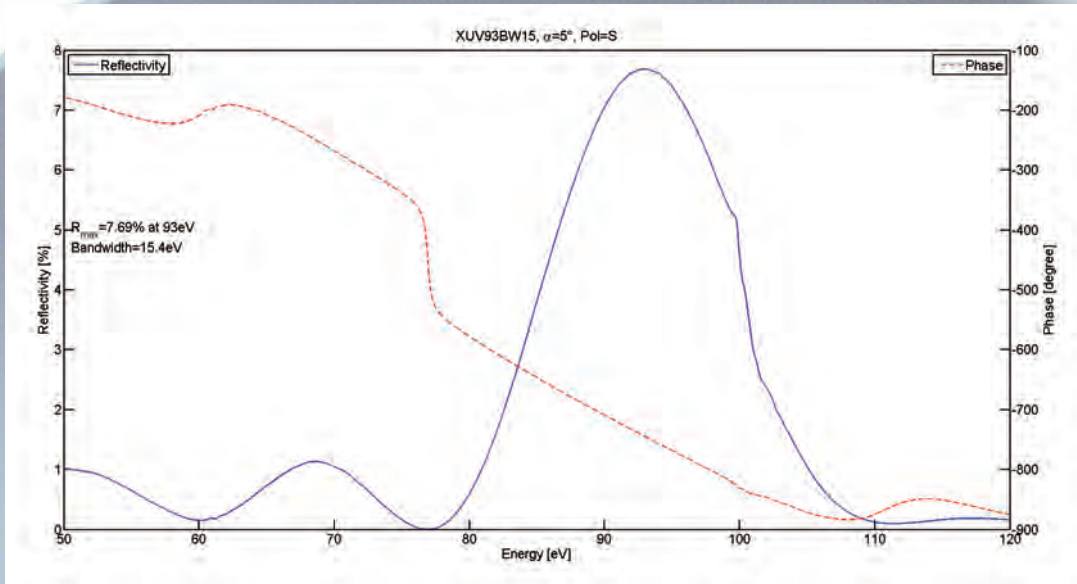


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12 nm (89ev)
Spectral working range high end	13 nm (97ev)
Central wavelength	13 nm (93ev)
Nominal GDD	0 fs ²
Maximum reflectance	54 %

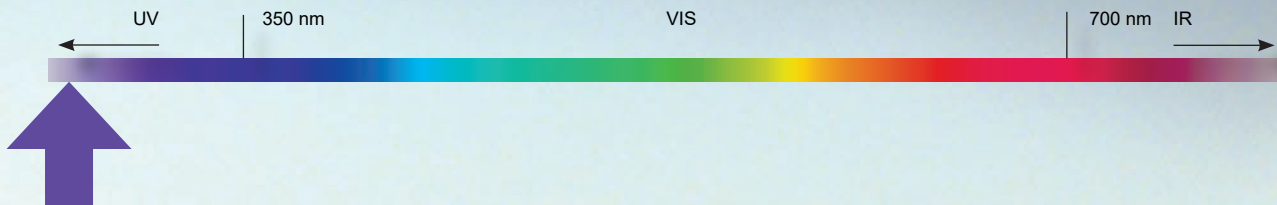


XUV MIRROR XUV 93BW15

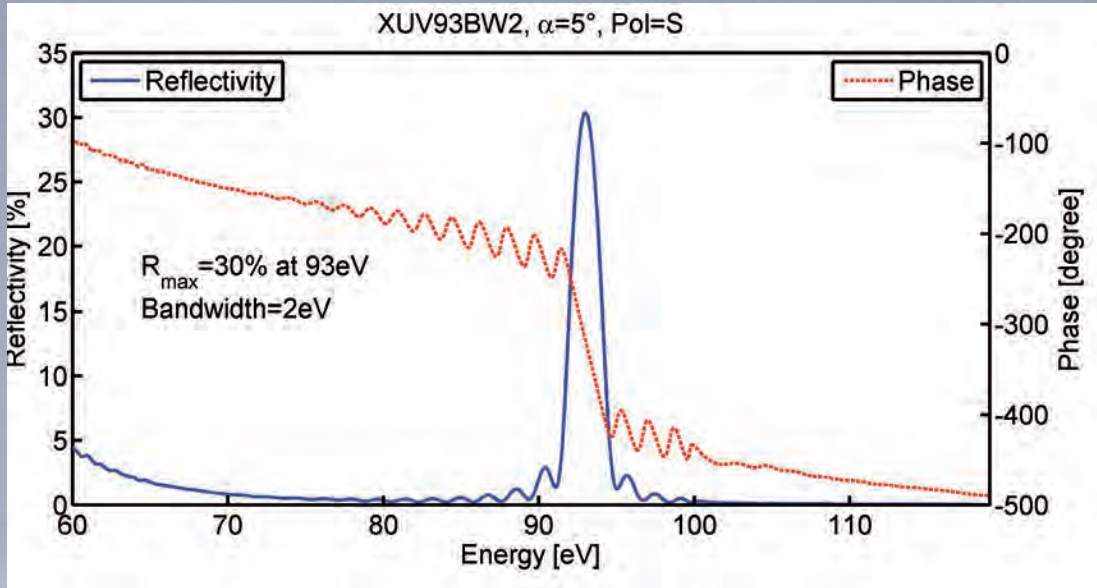


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11 nm (77ev)
Spectral working range high end	16 nm (110ev)
Central wavelength	13 nm (93ev)
Nominal GDD	0 fs ²
Maximum reflectance	8 %



XUV MIRROR XUV 93BW2

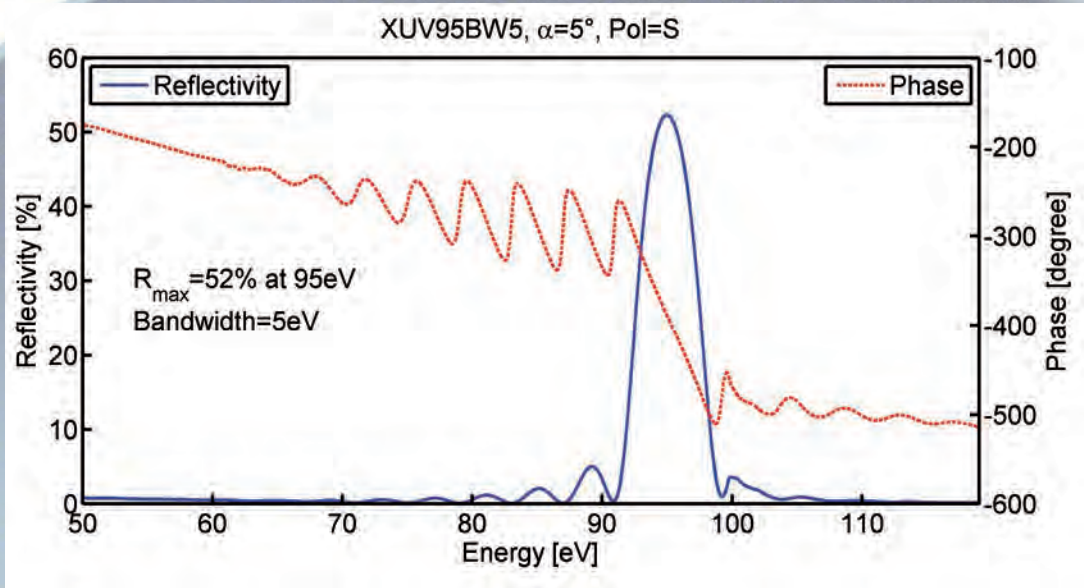


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12 nm (90ev)
Spectral working range high end	13 nm (97ev)
Central wavelength	13 nm (93ev)
Nominal GDD	0 fs ²
Maximum reflectance	30 %



XUV MIRROR XUV 95BW5

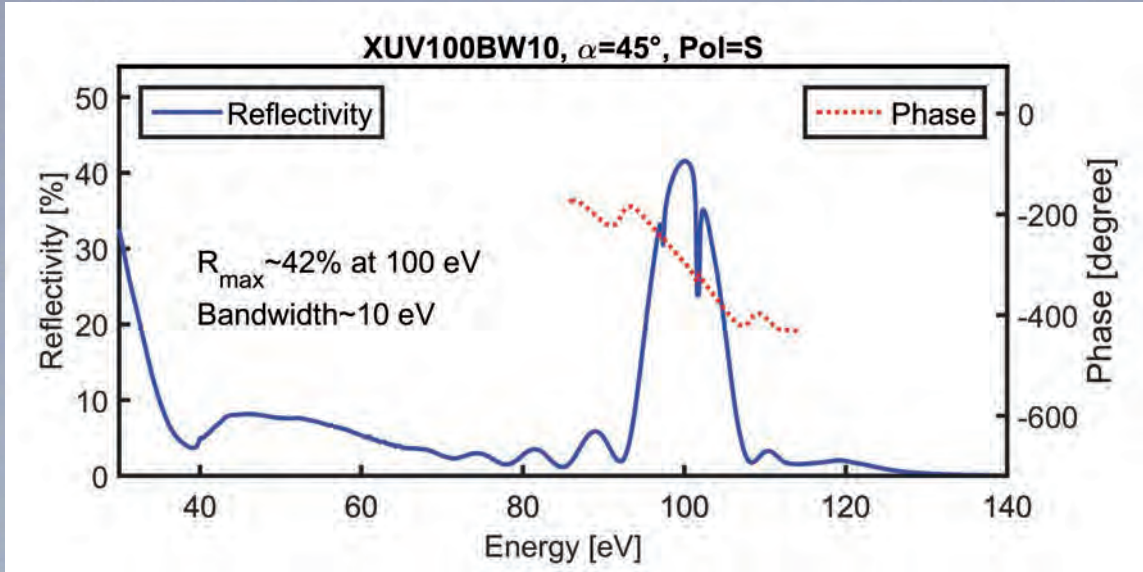


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	12 nm (91ev)
Spectral working range high end	13 nm (99ev)
Central wavelength	13 nm (95ev)
Nominal GDD	0 fs ²
Maximum reflectance	52 %



XUV MIRROR XUV 100BW10

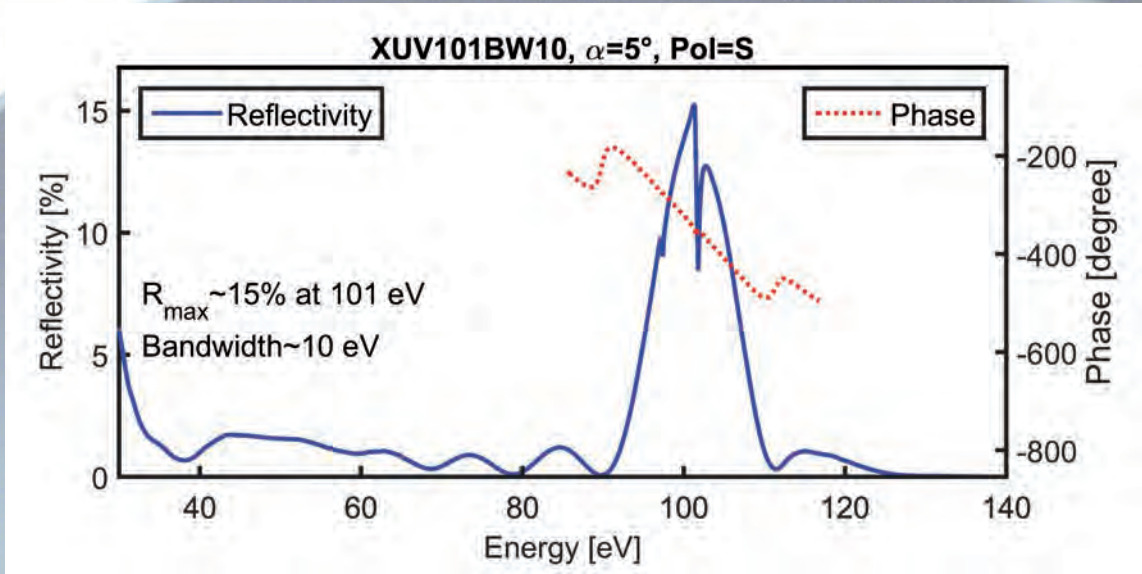


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11.3 nm (91eV)
Spectral working range high end	13.6 nm (110eV)
Central wavelength	12.4 nm (100eV)
Nominal GDD	-0.01 fs ²
Maximum reflectance	42 %

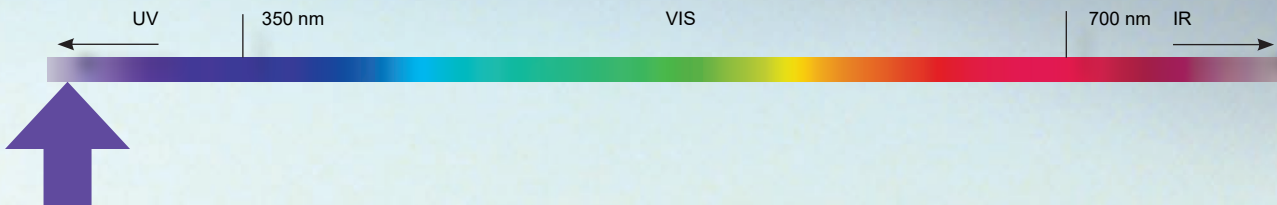


XUV MIRROR XUV 101BW10

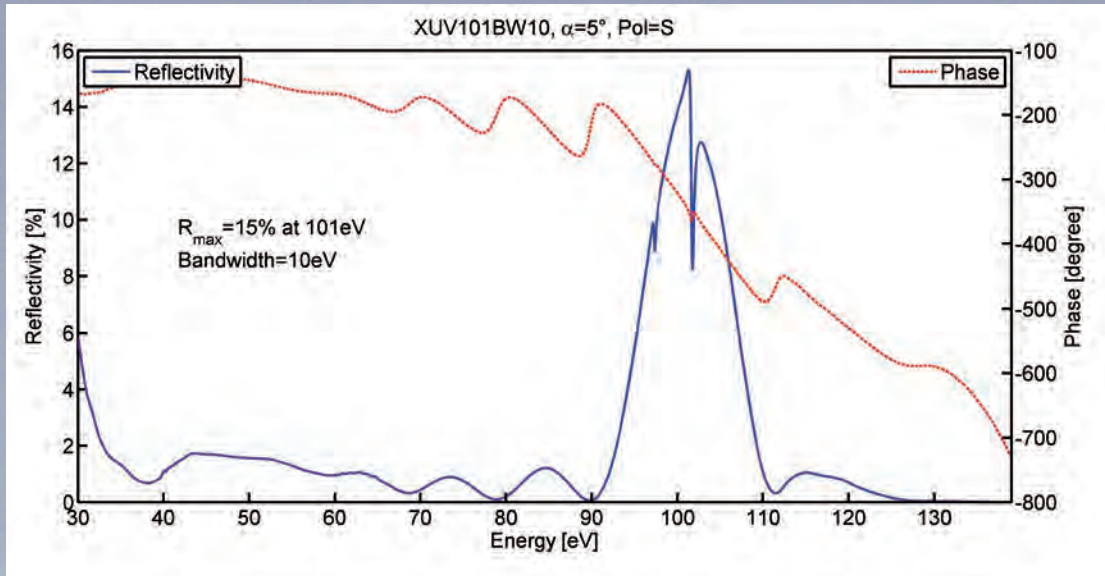


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11.2 nm (90eV)
Spectral working range high end	13.8 nm (111eV)
Central wavelength	12.3 nm (101eV)
Nominal GDD	0.001 fs ²
Maximum reflectance	15 %



XUV MIRROR XUV 101BW10

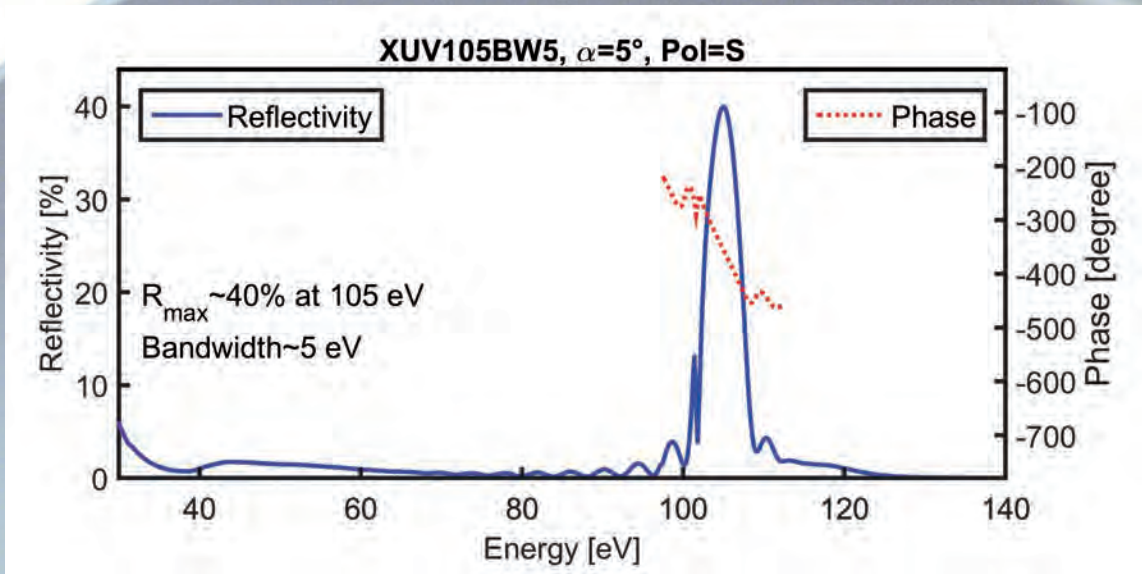


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11 nm (90eV)
Spectral working range high end	13 nm (111eV)
Central wavelength	12 nm (101eV)
Nominal GDD	0 fs ²
Maximum reflectance	15 %

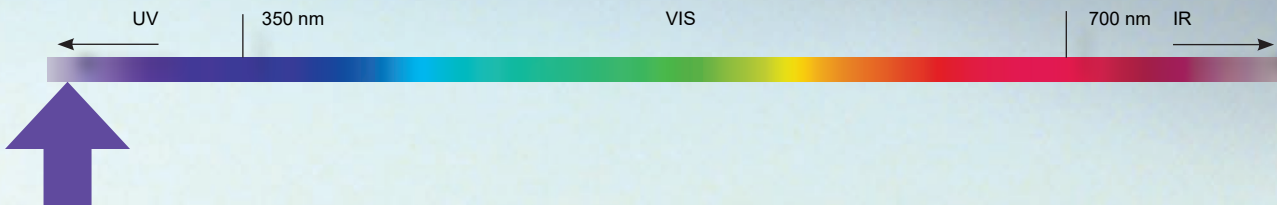


XUV MIRROR XUV 105BW5

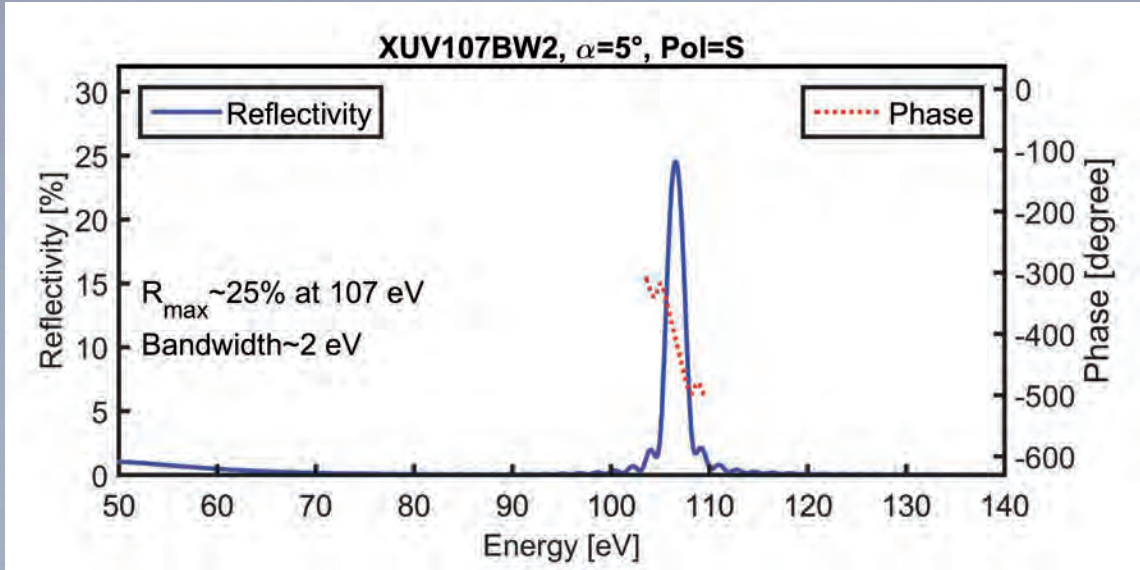


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	10.2 nm (96eV)
Spectral working range high end	12.9 nm (122eV)
Central wavelength	11.8 nm (105eV)
Nominal GDD	-0.014 fs ²
Maximum reflectance	40 %



XUV MIRROR XUV 107BW2

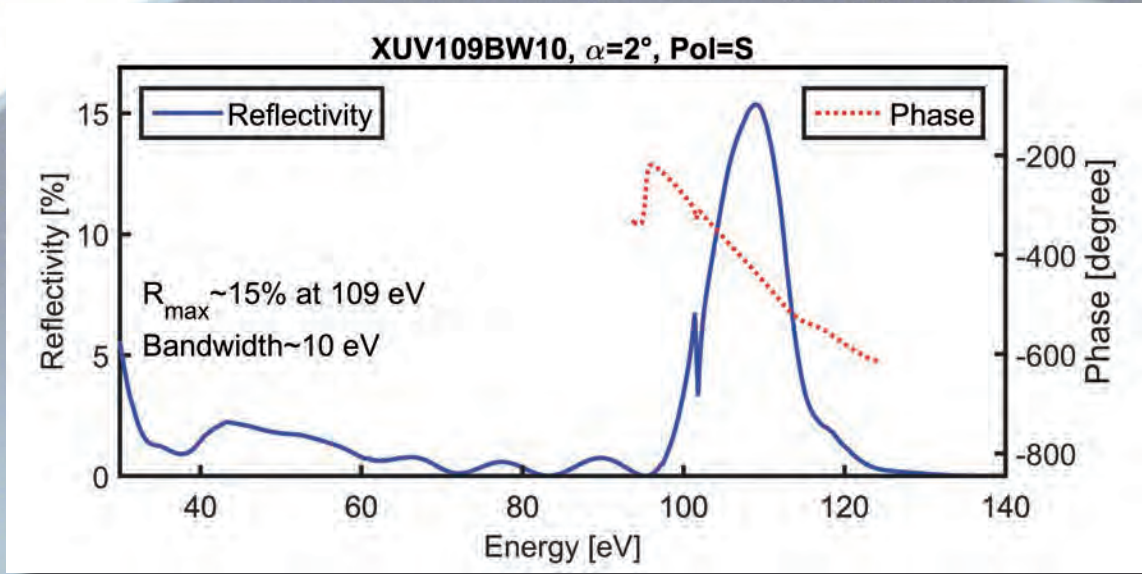


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11.3 nm (104eV)
Spectral working range high end	11.9 nm (110eV)
Central wavelength	11.6 nm (107eV)
Nominal GDD	-0.01 fs ²
Maximum reflectance	25 %

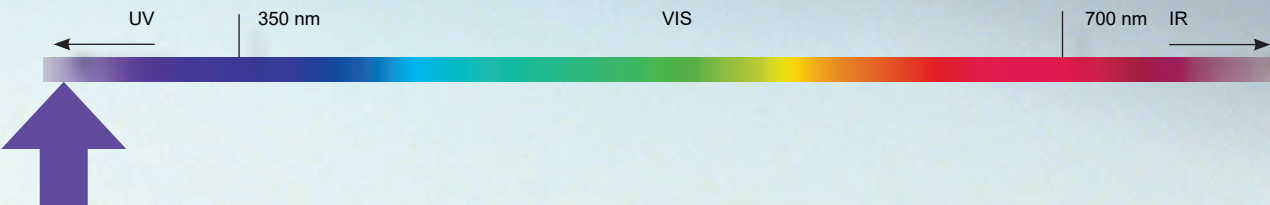


XUV MIRROR XUV 109BW10

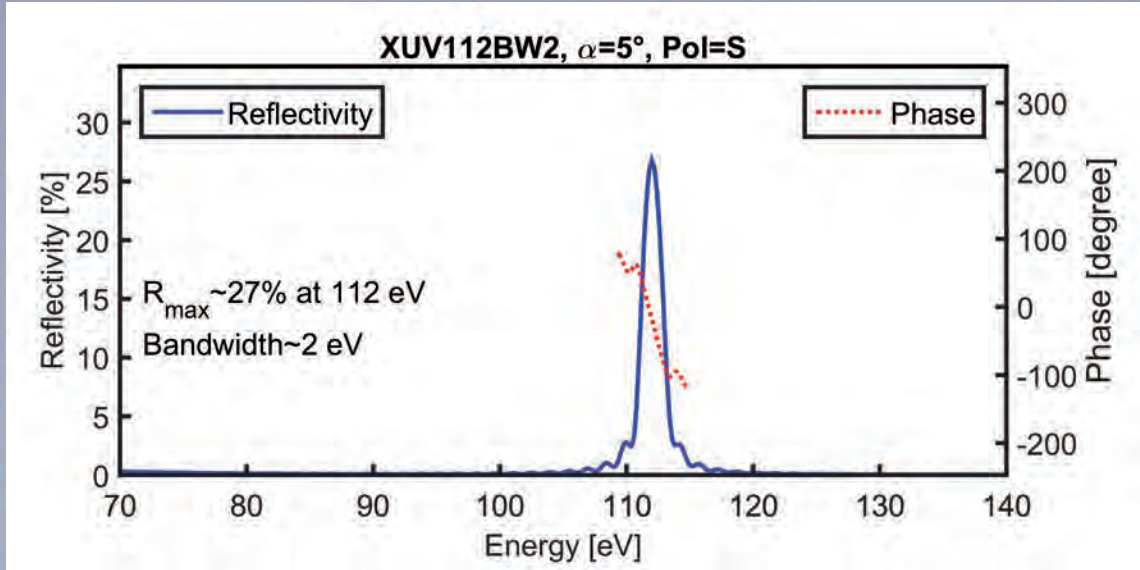


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	2
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	9.9 nm (97eV)
Spectral working range high end	12.8 nm (125eV)
Central wavelength	11.4 nm (109eV)
Nominal GDD	-0.006 fs ²
Maximum reflectance	15 %



XUV MIRROR XUV 112BW2

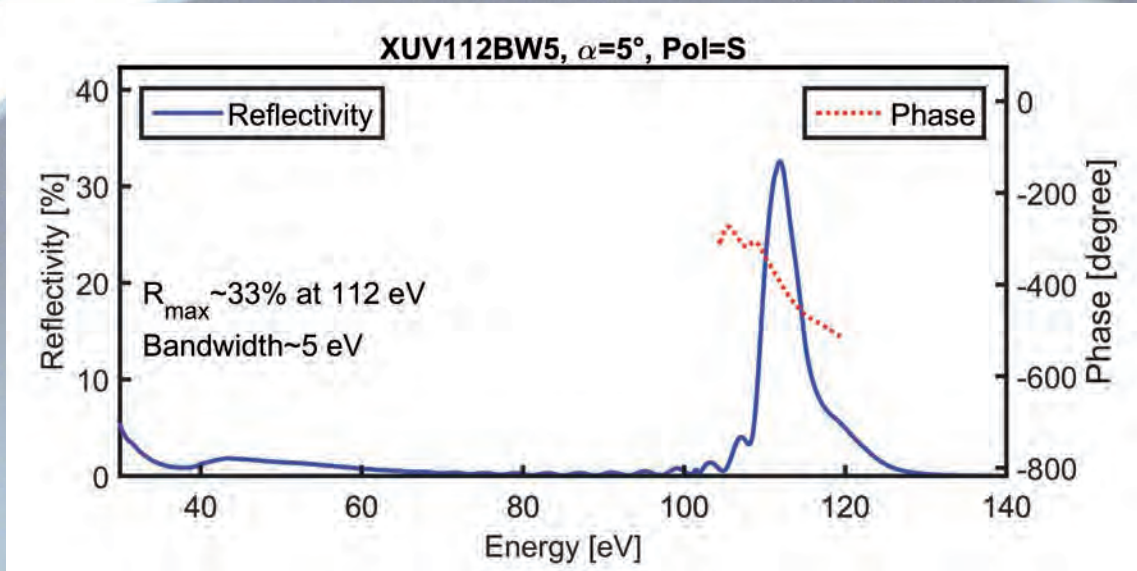


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	10.8 nm (109ev)
Spectral working range high end	11.4 nm (115ev)
Central wavelength	11.1 nm (112ev)
Nominal GDD	-0.02 fs ²
Maximum reflectance	27 %

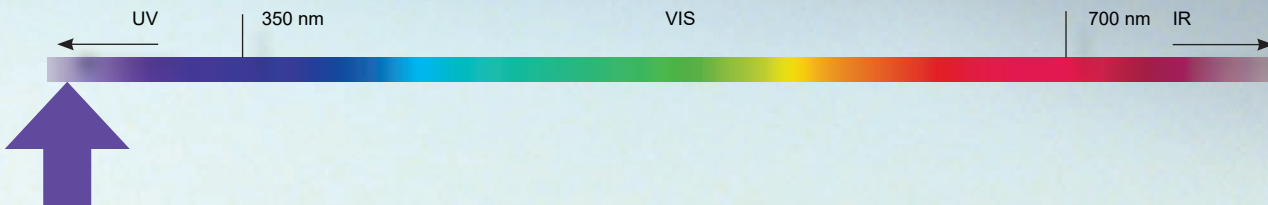


XUV MIRROR XUV 112BW5

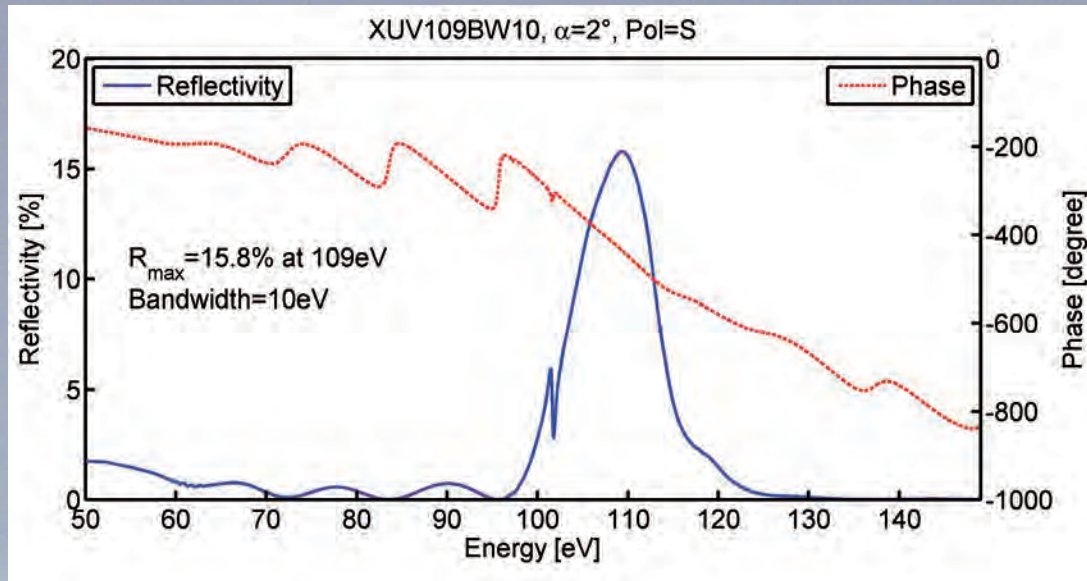


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	9.7 nm (103ev)
Spectral working range high end	12 nm (128ev)
Central wavelength	11.1 nm (112ev)
Nominal GDD	-0.017 fs ²
Maximum reflectance	33 %



XUV MIRROR XUV 109BW10

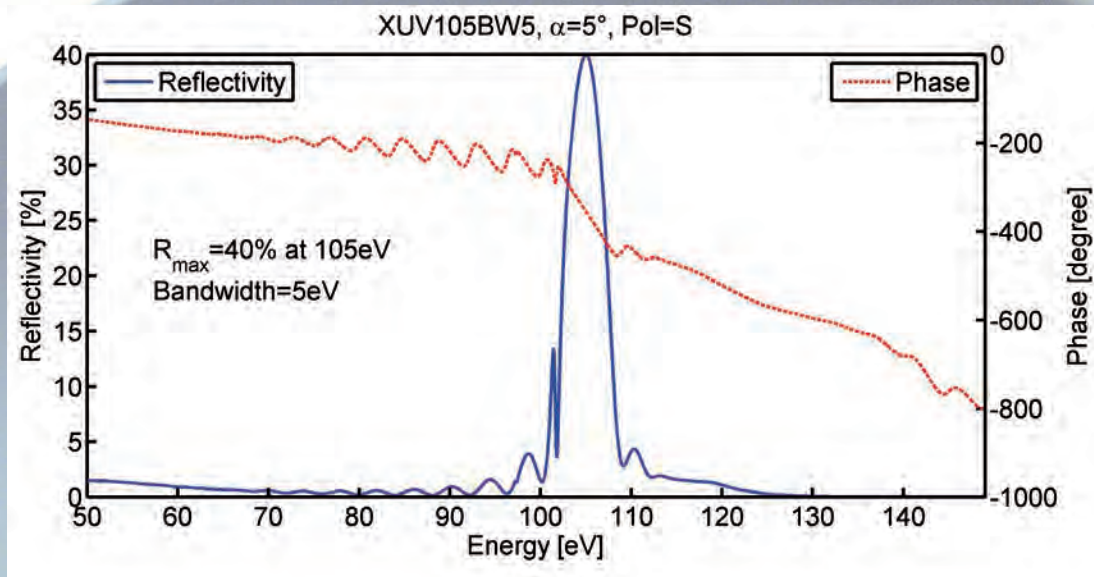


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	2
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	9 nm (97ev)
Spectral working range high end	12 nm (125ev)
Central wavelength	11 nm (109ev)
Nominal GDD	0 fs ²
Maximum reflectance	16 %



XUV MIRROR XUV 105BW5

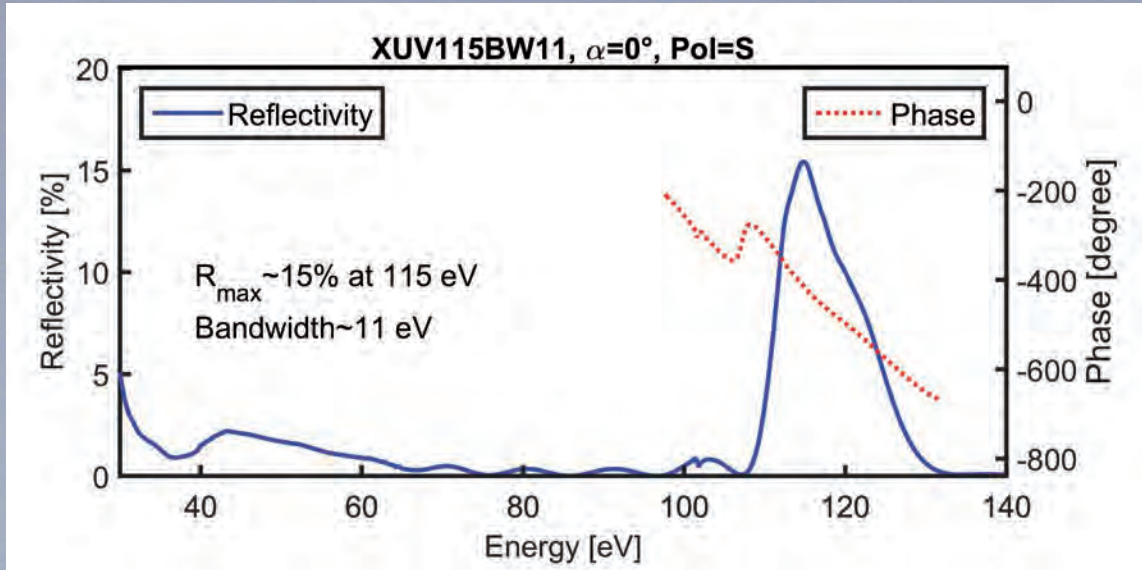


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	11 nm (100eV)
Spectral working range high end	12 nm (112eV)
Central wavelength	11 nm (105eV)
Nominal GDD	0 fs ²
Maximum reflectance	40 %



XUV MIRROR XUV 115BW11

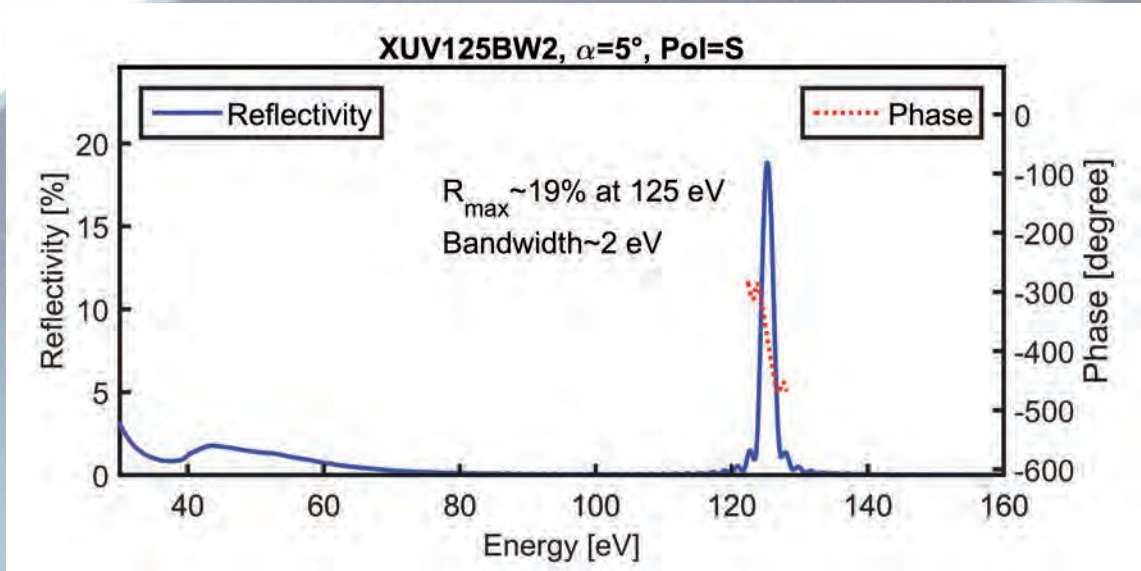


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	0
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	9.5 nm (108ev)
Spectral working range high end	11.5 nm (130ev)
Central wavelength	10.8 nm (115ev)
Nominal GDD	0.001 fs ²
Maximum reflectance	15 %

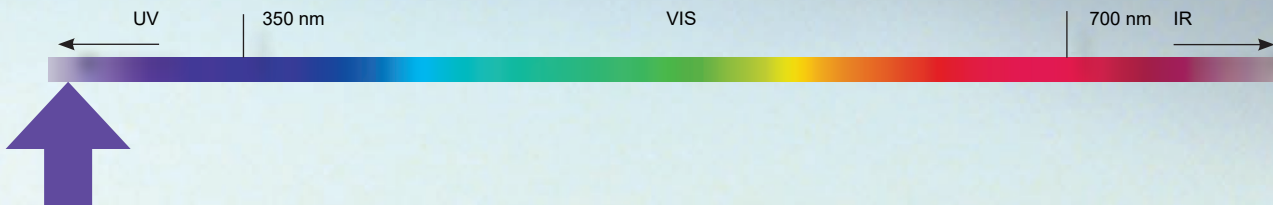


XUV MIRROR XUV 125BW2

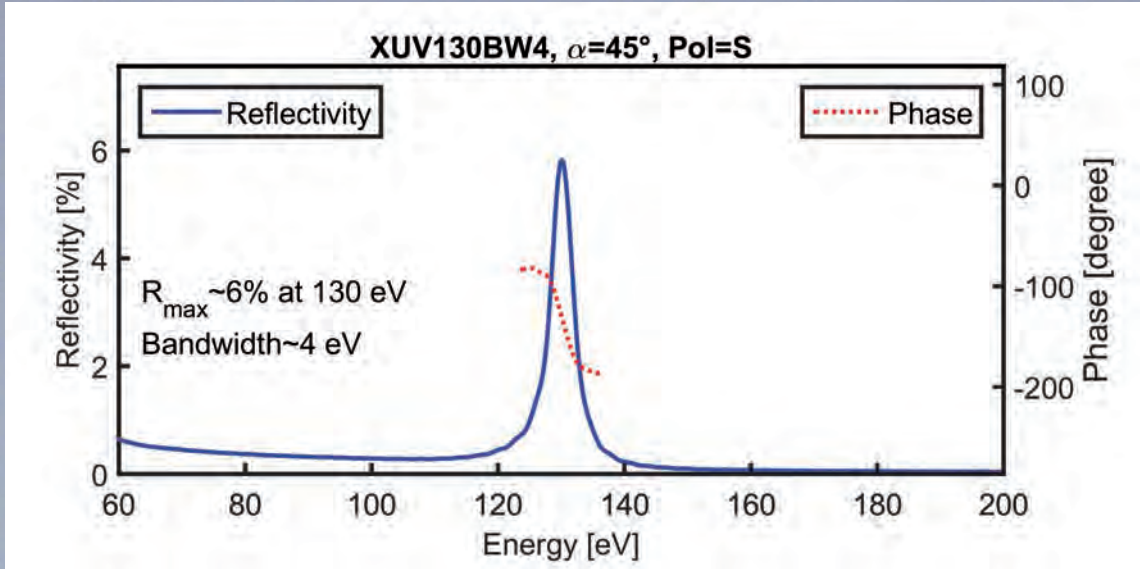


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	9.5 nm (120ev)
Spectral working range high end	10.3 nm (130ev)
Central wavelength	9.9 nm (125ev)
Nominal GDD	0.006 fs ²
Maximum reflectance	19 %



XUV MIRROR XUV 130BW4

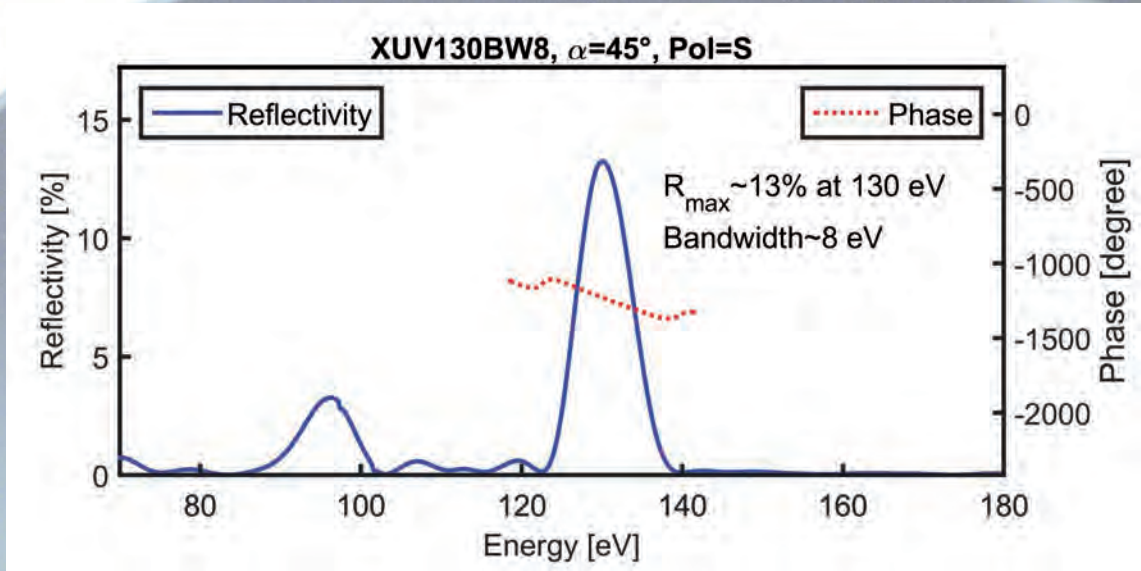


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	8.7 nm (120ev)
Spectral working range high end	10.3 nm (142ev)
Central wavelength	9.5 nm (130ev)
Nominal GDD	0.003 fs ²
Maximum reflectance	6 %

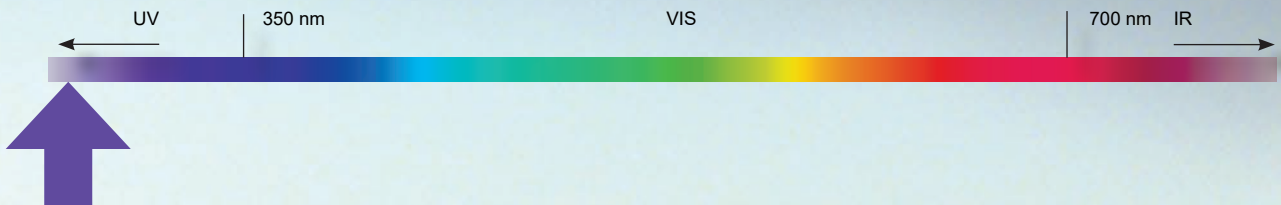


XUV MIRROR XUV 130BW8

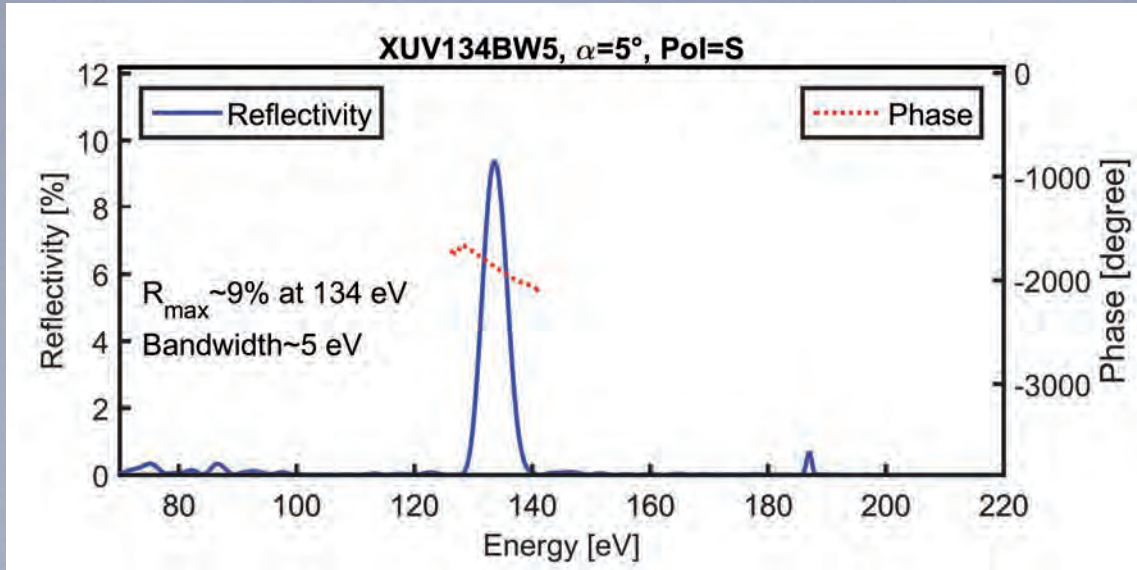


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	8.9 nm (122ev)
Spectral working range high end	10.2 nm (139ev)
Central wavelength	9.5 nm (130ev)
Nominal GDD	-0.002 fs ²
Maximum reflectance	13 %



XUV MIRROR XUV 134BW5

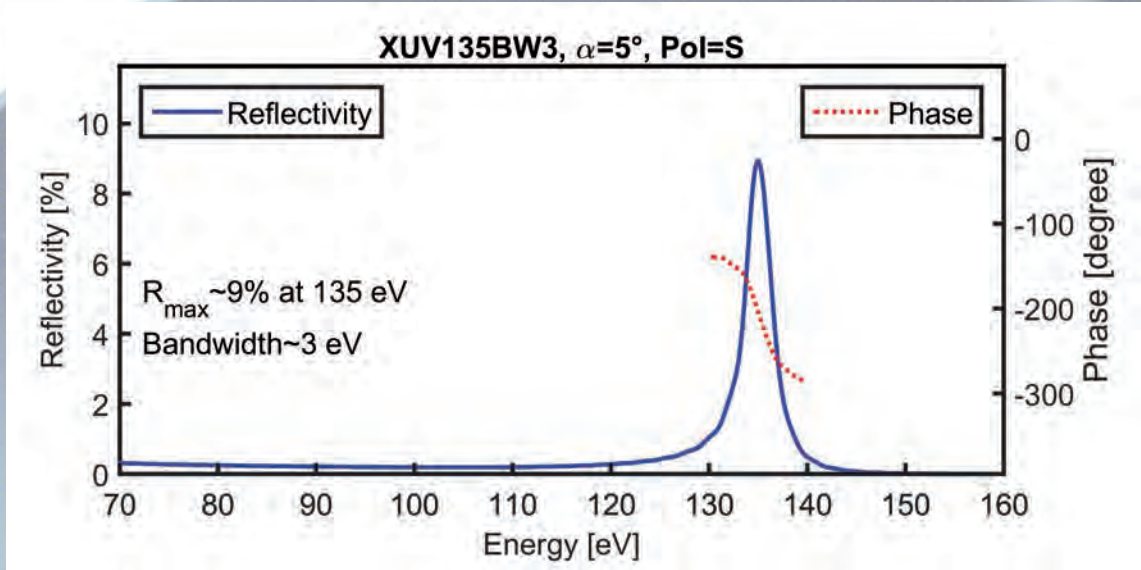


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	8.9 nm (128eV)
Spectral working range high end	9.7 nm (140eV)
Central wavelength	9.3 nm (134eV)
Nominal GDD	-0.01 fs ²
Maximum reflectance	9 %

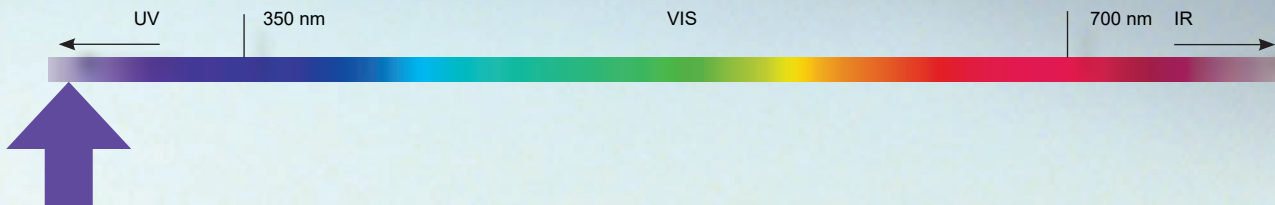


XUV MIRROR XUV 135BW3

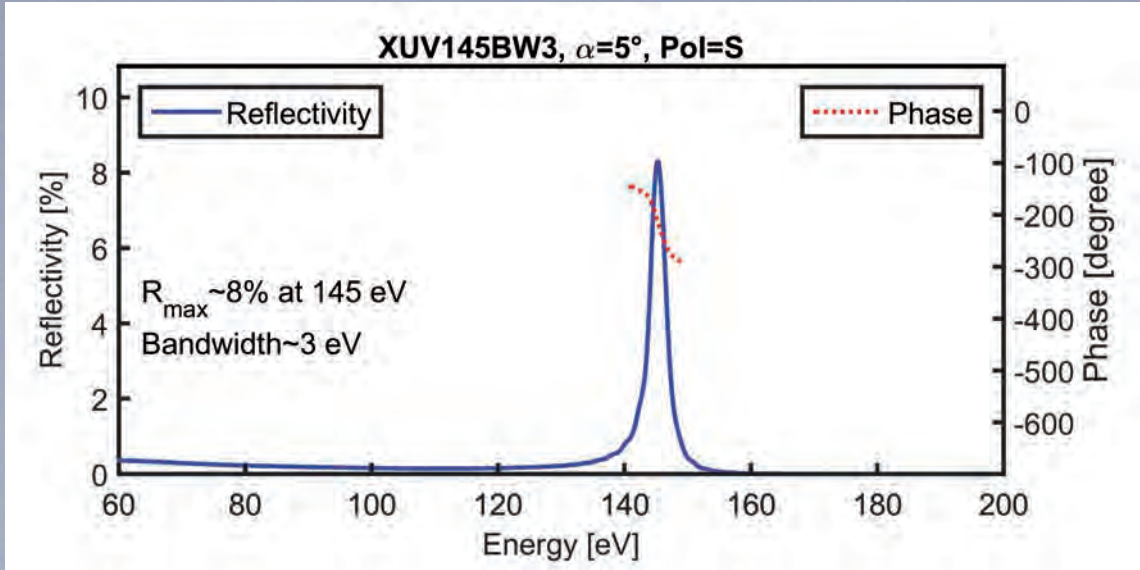


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	8.7 nm (120ev)
Spectral working range high end	10.3 nm (142ev)
Central wavelength	9.2 nm (135ev)
Nominal GDD	-0.001 fs ²
Maximum reflectance	9 %



XUV MIRROR XUV 145BW3

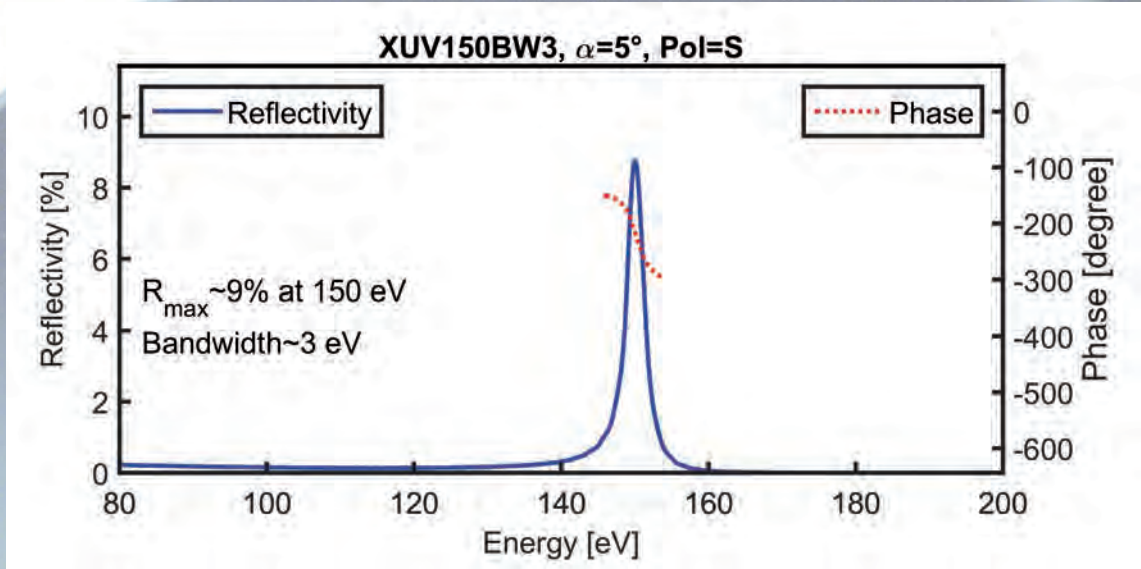


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	8.2 nm (130eV)
Spectral working range high end	9.5 nm (151eV)
Central wavelength	8.6 nm (145eV)
Nominal GDD	0.008 fs ²
Maximum reflectance	8 %

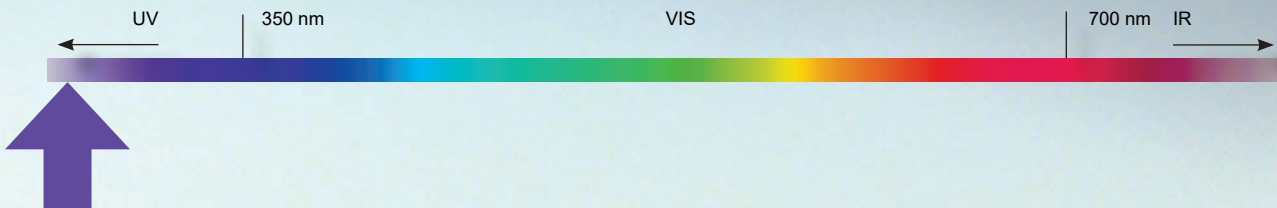


XUV MIRROR XUV 150BW3

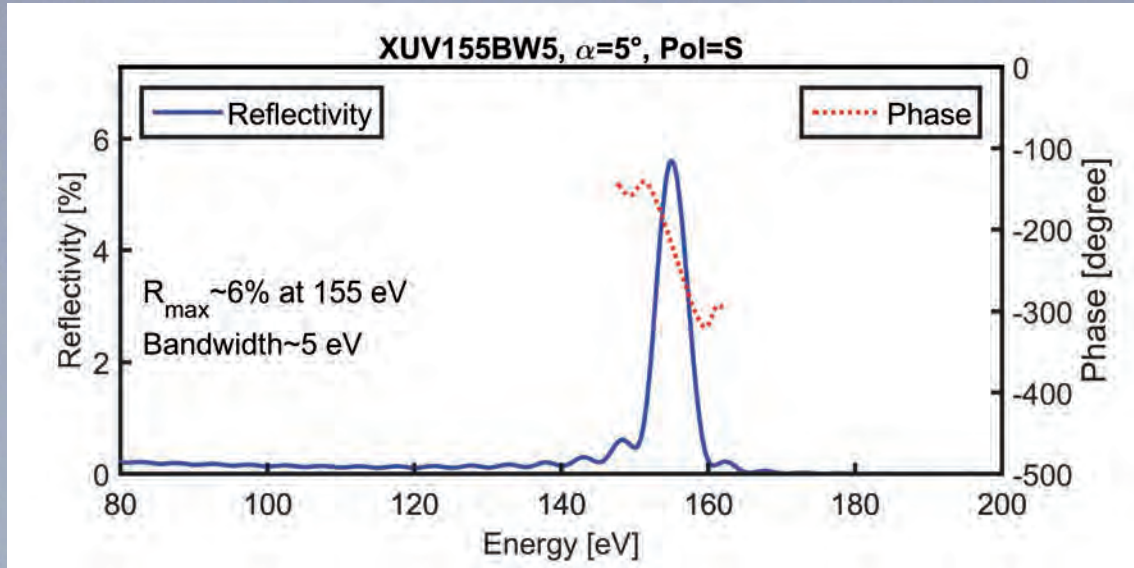


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	7.8 nm (138eV)
Spectral working range high end	9 nm (158eV)
Central wavelength	8.3 nm (150eV)
Nominal GDD	0.001 fs ²
Maximum reflectance	9 %

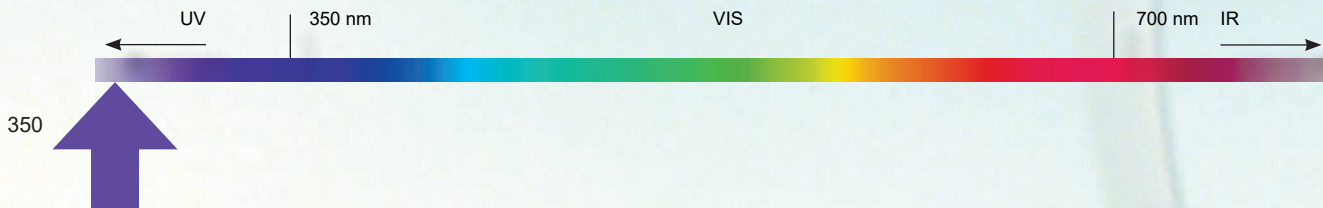


XUV MIRROR XUV 155BW5

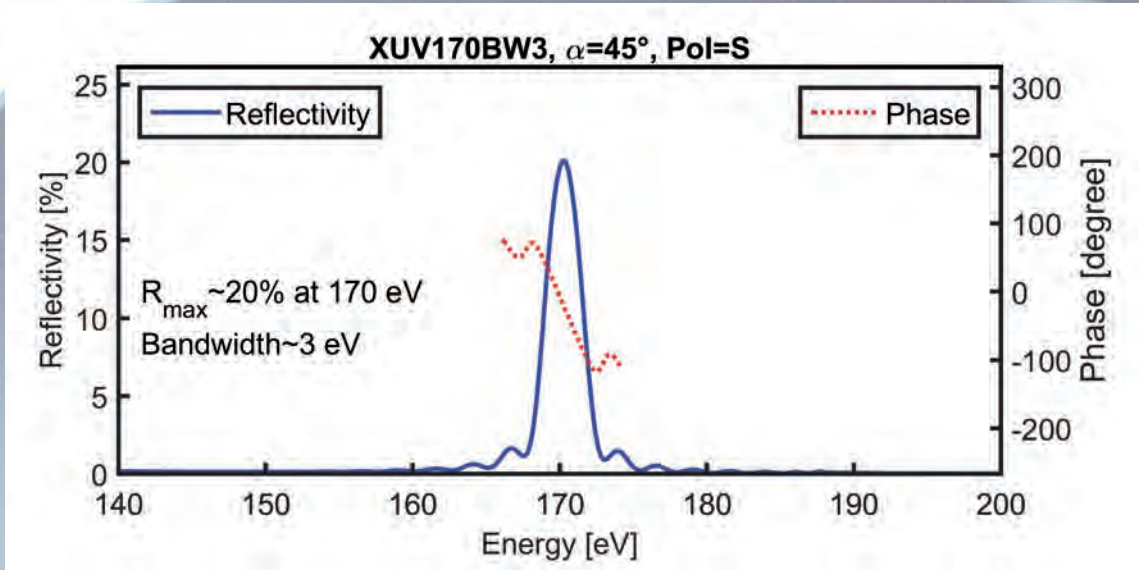


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	7.7 nm (140ev)
Spectral working range high end	8.9 nm (162ev)
Central wavelength	8 nm (155ev)
Nominal GDD	0.005 fs ²
Maximum reflectance	6 %

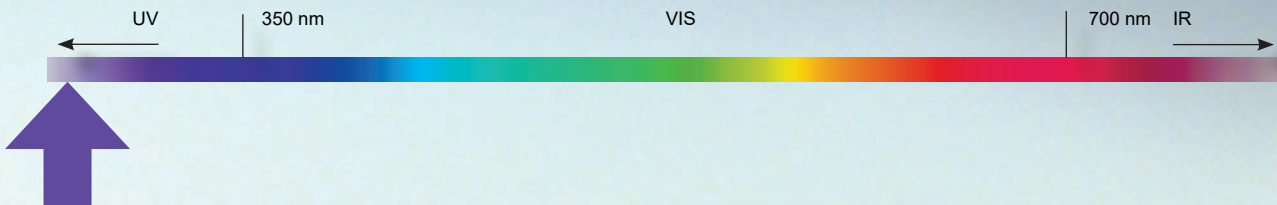


XUV MIRROR XUV 170BW3

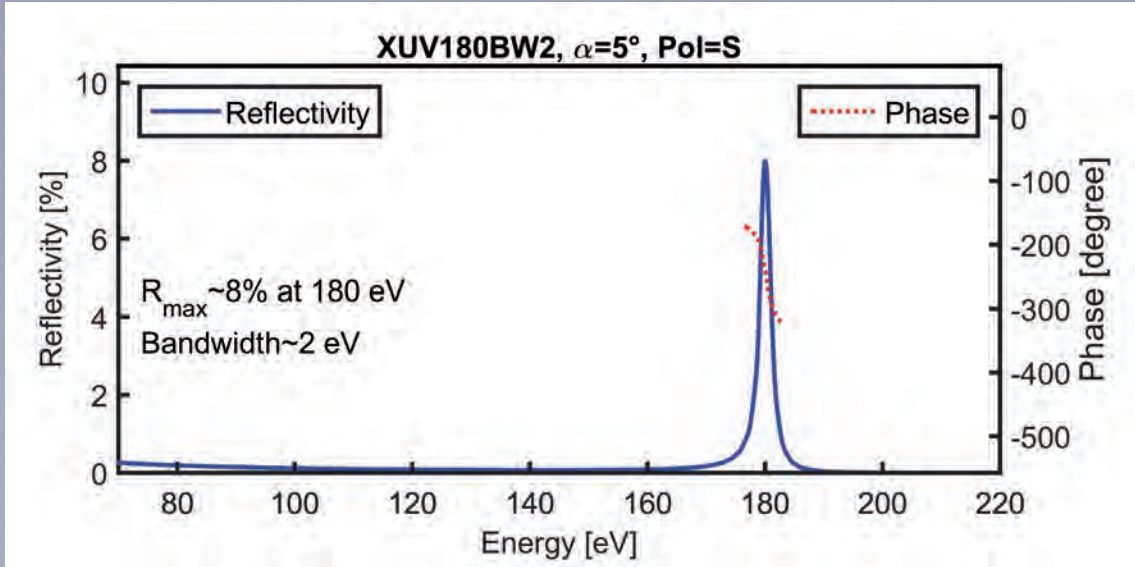


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	7.1 nm (165ev)
Spectral working range high end	7.5 nm (175ev)
Central wavelength	7.3 nm (170ev)
Nominal GDD	-0.008 fs ²
Maximum reflectance	20 %



XUV MIRROR XUV 180BW2

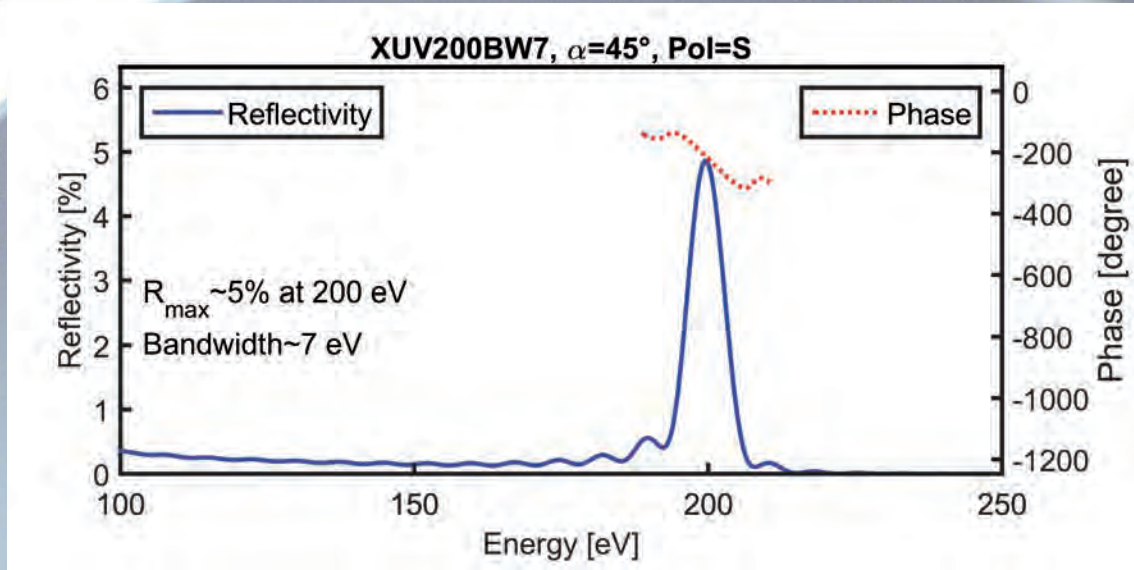


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	6.9 nm (170eV)
Spectral working range high end	7.3 nm (180eV)
Central wavelength	6.37 nm (186eV)
Nominal GDD	-0.015 fs ²
Maximum reflectance	8 %



XUV MIRROR XUV 200BW7

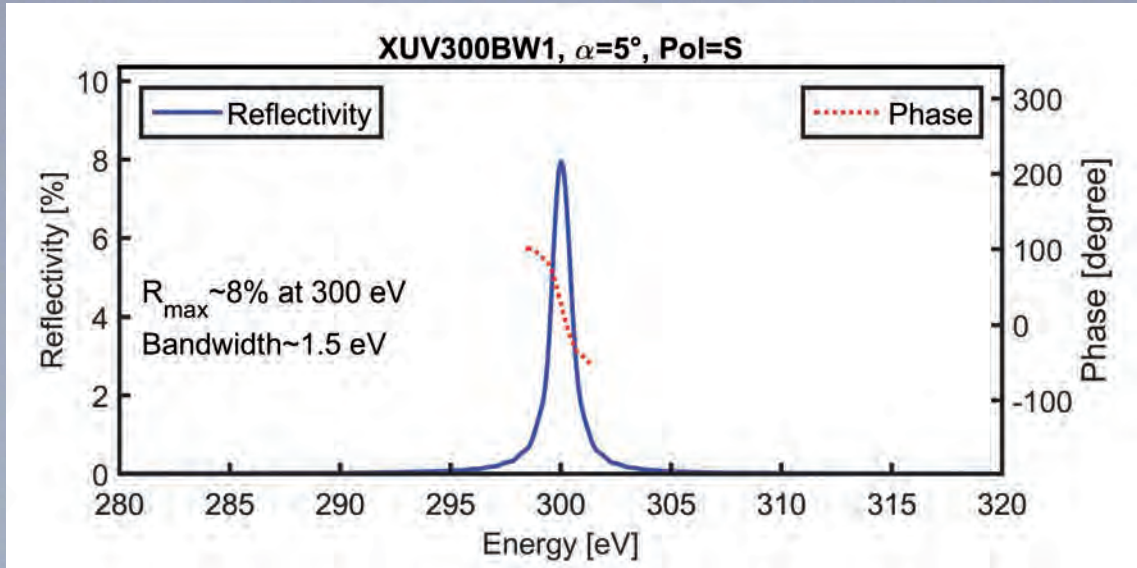


Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	45
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	6 nm (185eV)
Spectral working range high end	6.7 nm (207eV)
Central wavelength	6.2 nm (200eV)
Nominal GDD	0.003 fs ²
Maximum reflectance	5 %



XUV MIRROR XUV 200BW7



Details	
Description of the design	XUV mirror
Type	Mirror
Subtype	XUV mirror
Angle of Incidence in degrees	5
Polarization regime (primary spectral range)	s

Spectral category	XUV
Spectral working range low end	4.1 nm (297eV)
Spectral working range high end	4.2 nm (303eV)
Central wavelength	4.1 nm (300eV)
Nominal GDD	-0.15 fs ²
Maximum reflectance	8 %





Output and input couplers (OC, IC)

It is difficult to imagine the femtosecond oscillator or any cavity are built only from reflective optics. Ultrafast Innovations offers customized ICs having simultaneously high reflection on emitting wavelength and high transmission at pump wavelength. In case of broadband wavelength ranges, the dispersion of the overall cavity elements can be introduced to the optimization procedure of IC design reducing the total GDD oscillations.

There is another important element which is called output coupler (OC). OC allows to out-couple the light generated inside of the cavity. Ultrafast innovations has a new design algorithm enables to design broadband OC. The special feature of new OC is that GDD oscillations are in anti-phase to GDD oscillations of one the cavity mirrors resulting in extremely smooth residual GDD curve at the end.

Please browse UFI's design database for following examples:
(<http://www.ultrafast-innovations.com/index.php/database>)
OC47 + PC47, IR13

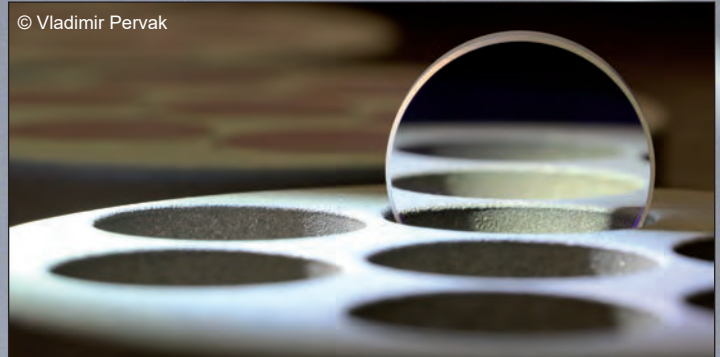
See also literature for further information and application:

- Y. Deng et al Optics Letters, Vol. 37, Issue 23, pp. 4973-4975 (2012)
- H. Fattahi et al Optics Express, Vol. 20, Issue 9, pp. 9833-9840 (2012)
- A. Marandi et al Optics Express, Vol. 20, Issue 7, pp. 7255-7262 (2012)
- O. Pronin et al. Optics Express, Vol. 19, Issue 11, pp. 10232-10240 (2011)

Metal coating (M)

The oldest type of coating is metal coating. Despite of its very simple principle it is very widespread type of coating. The metal coating containing a simple layer has good reflectivity in broadband range and doesn't introduce phase changes.

With development of technology, now we proud to offer you so called hybrid or enhanced metal coating. Hybrid or enhanced mirrors consist of a few dielectric layers on the top of metal layer. Such construction provides higher reflectivity than pure metal coating. In the same time phase remain almost unaffected.



Applications
Femtosecond pulse compression
Transport of the beam

Contact and imprint

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Court of registry: Amtsgericht München, HRB 180532

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Design: Thorsten Naeser
Pictures: Thorsten Naeser, Vladimir Pervak, Bernd Ullmann

www.ultrafast-innovations.com

