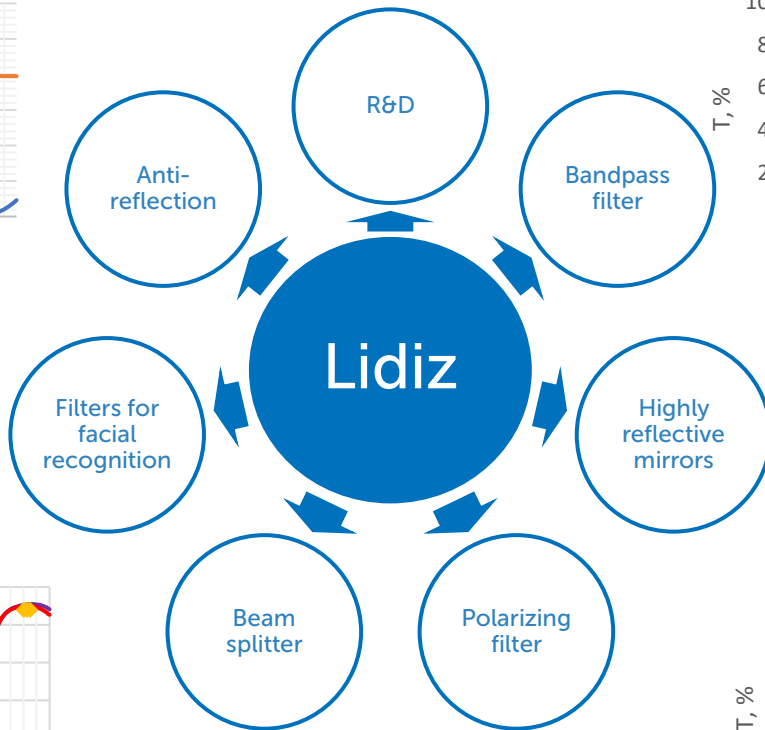
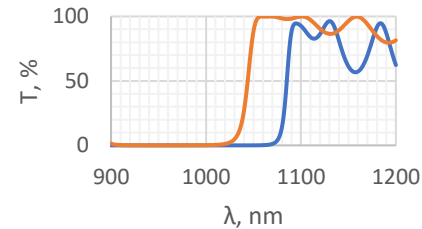
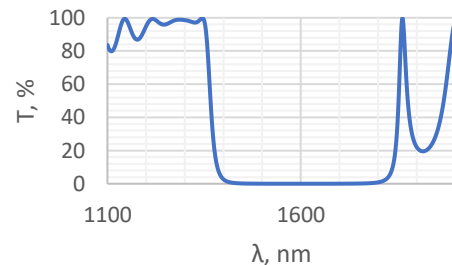
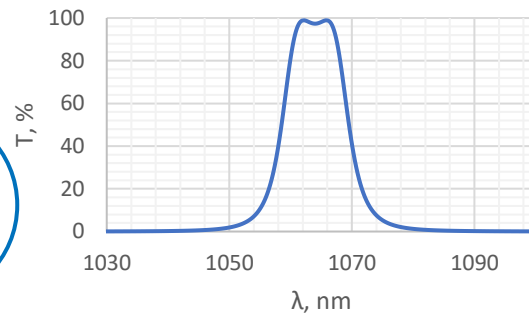
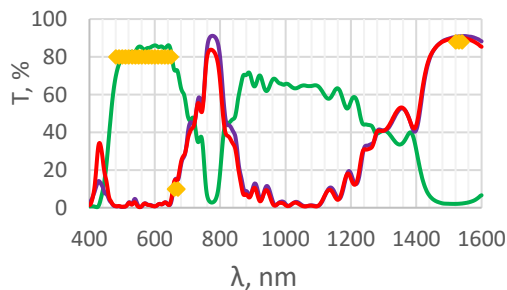
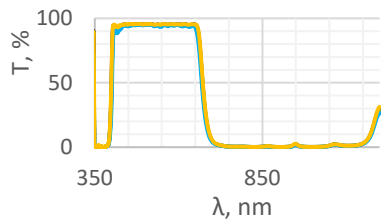
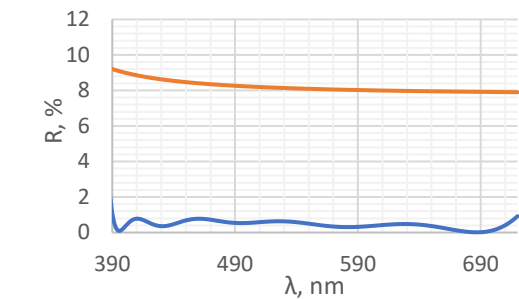




Vacuum Systems with Dual Ion-Beam sputtering technology

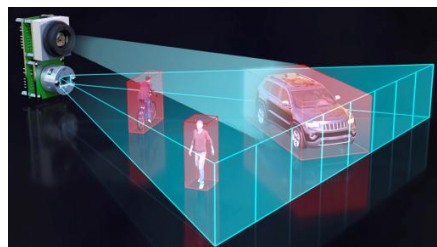
LIDIZ



- UV, VIS and NIR optics
- Low loss laser mirrors
- Telecommunication
- Customized application

To be used in:

- Sensors
- Optical systems for objectives
- Microscopes
- Telescopes
- Laser Optics
- R&D

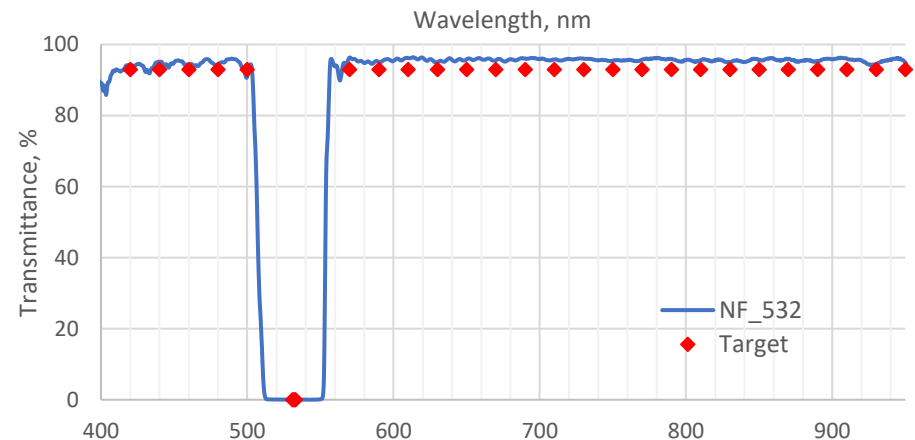
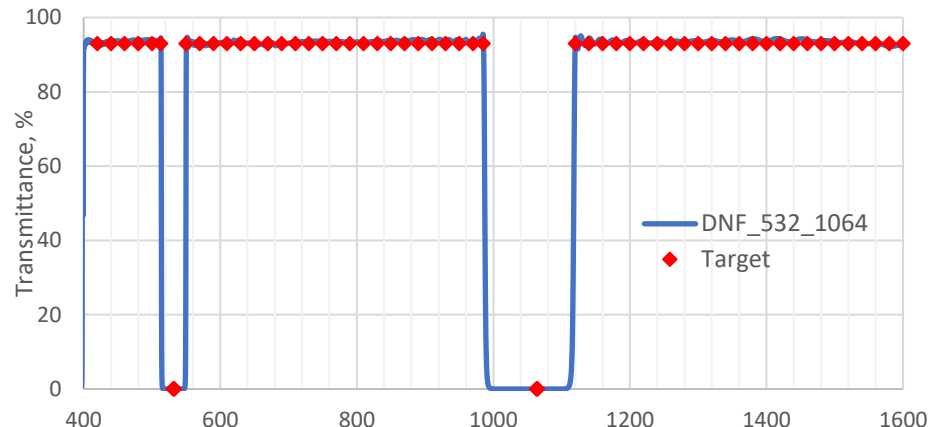


Coatings examples

Notch filters

λ_{CWL}	532 + 1064 nm
Transmission Band 1	$T_{avg} > 93\%$ 400 – 513 nm
Transmission Band 2	$T_{avg} > 93\%$ 550 – 985 nm
Transmission Band 3	$T_{avg} > 93\%$ 1120 – 1600 nm
Blocking Band 1	$OD_{abs} > 6$ $\lambda=532$ nm
Blocking Band 2	$OD_{abs} > 6$ $\lambda=1064$ nm
Full Width-Half Max FWHM (nm)	35 $\lambda=532$; 130 $\lambda=1064$
Coating	Hard coated
Surface quality	60-40
Durability	MIL-C-48497A

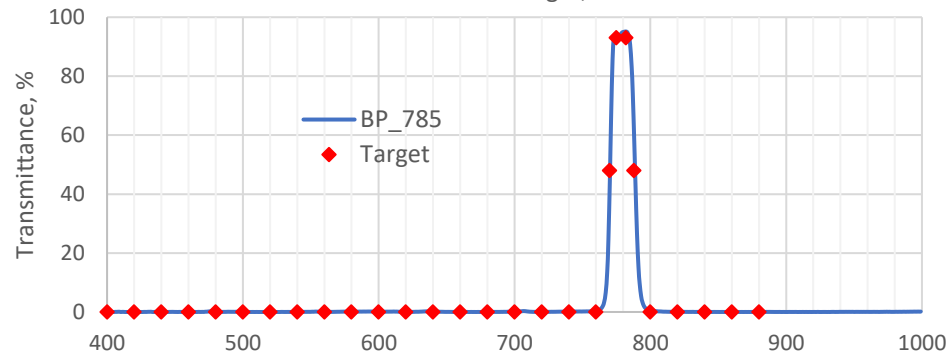
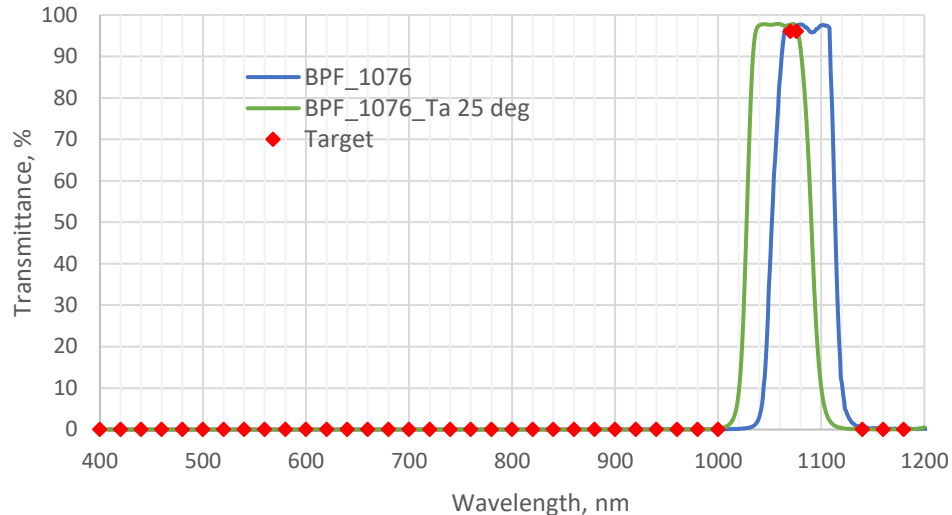
λ_{CWL}	532
Transmission Band 1	$T_{avg} > 93\%$ 400 – 500 nm
Transmission Band 2	$T_{avg} > 93\%$ 565 – 965 nm
Blocking Band 1	$OD_{abs} > 4$ 532 nm
Full Width-Half Max FWHM (nm)	45 @532
Coating	Hard coated
Surface quality	60-40
Durability	MIL-C-48497A



Band pass filters

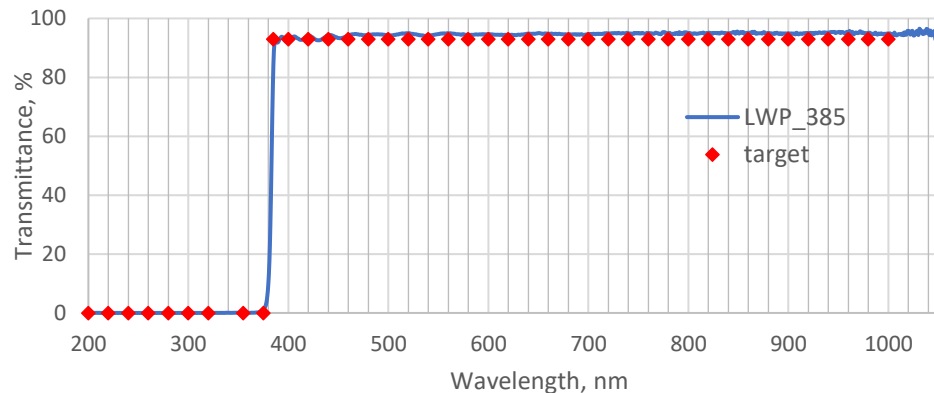
λ , nm	1076
Tr, % for $\lambda=1076$ nm	>98 for incident angle 0-20°
Blocking Band 1	OD _{abs} <3, 400-1000 nm
Blocking Band 2	OD _{abs} < 2, 1140-1250 nm
Coating	Hard coated
Surface quality	20-10
Durability	MIL-C-48497A
Substrate	RG850

λ , nm	780
Tr, % for $\lambda=775$ nm	>93 without back side AR
Full Width-Half FWHM (nm)	18
Blocking Band 1	OD _{av} <3, 400-760 nm
Blocking Band 2	OD _{av} < 3, 805-1000 nm
Coating	Hard coated
Surface quality	20-10
Durability	MIL-C-48497A
Substrate	BK7

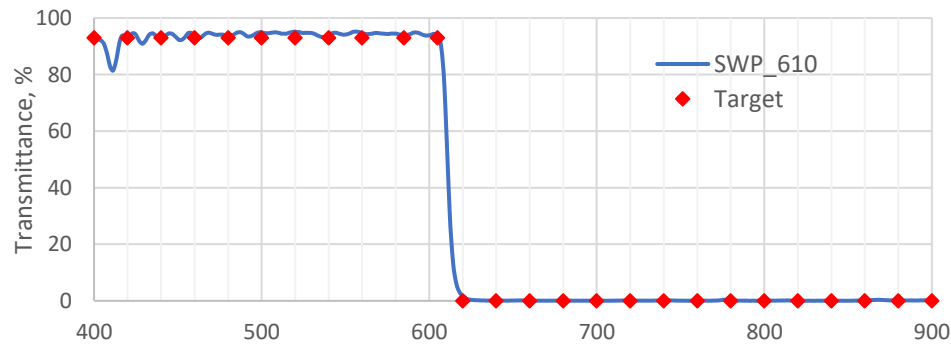


Cut filters

λ_{CWL} , nm	385
Tr av, %	>93, $\lambda=385-1050$ nm
Blocking band	$OD_{av}>3$, $\lambda=200-380$ nm
Coating	Hard coated
Surface quality	20-10
Durability	MIL-C-48497A
Substrate	Fused silica

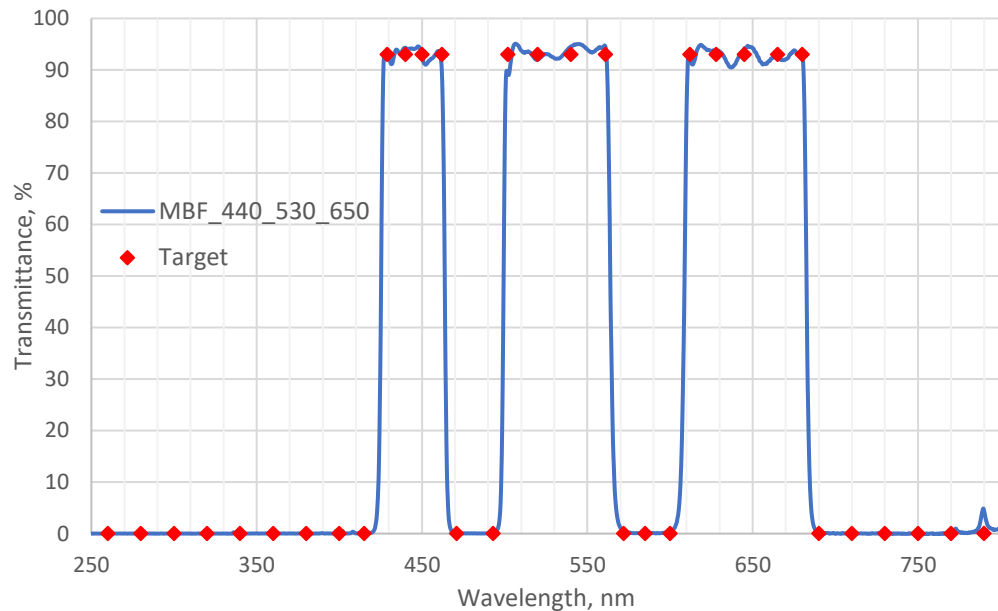


λ_{CWL} , nm	610
Tr av, %	>93, $\lambda=400-605$ nm
Blocking band	$OD_{av}>2$, $\lambda=620-900$ nm
Coating	Hard coated
Surface quality	20-10
Durability	MIL-C-48497A
Substrate	BK7



Multispectral filter

λ_{CWL} , nm	446, 532, 646
Transmission Band 1	$T_{avg} > 93\%$, $\lambda=429-462$ nm
Transmission Band 1	$T_{avg} > 93\%$, $\lambda=502-561$ nm
Transmission Band 1	$T_{avg} > 93\%$, $\lambda=612-680$ nm
Blocking Band 1	$OD_{av} > 4$, $\lambda=200-415$ nm
Blocking Band 2	$OD_{av} > 3$, $\lambda=469-471$ nm
Blocking Band 3	$OD_{av} > 3$, $\lambda=571-598$ nm
Blocking Band 4	$OD_{av} > 3$, $\lambda=690-800$ nm
Coating	Hard coated
Surface quality	40-20
Durability	MIL-C-48497A
Substrate	BK7

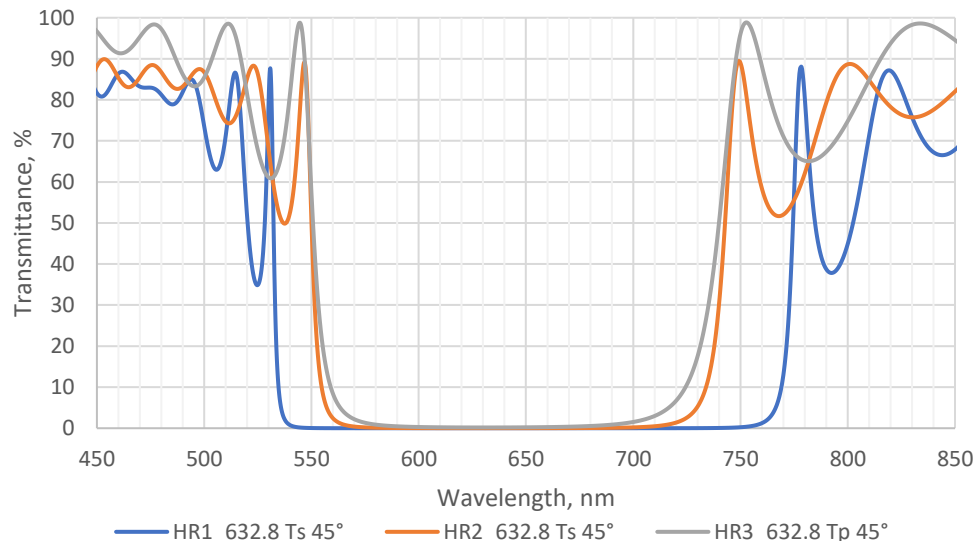


Low loss laser mirrors

Coating name	HR1
λ_{CWL} , nm	632,8
Rs, %	>99.995
Incident angle	45°
Total losses	<50 ppm
Phase anisotropy	±0,11
Durability	MIL-C-48497A
Substrate	Sitall CO-115M

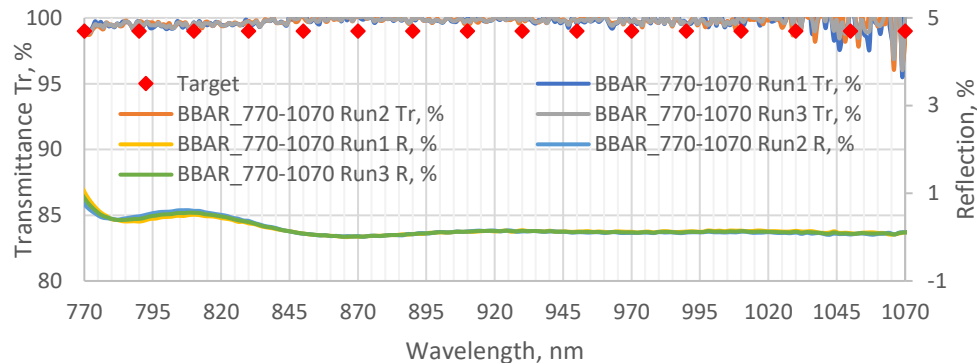
Coating name	HR2
λ_{CWL} , nm	632,8
Rs, %	>99.98±0.004
Incident angle	45°
Total losses	<50 ppm
Phase anisotropy	±0,11
Durability	MIL-C-48497A
Substrate	Sitall CO-115M

Coating name	HR3
λ_{CWL} , nm	632,8
Rp, %	>99.8
Incident angle	45°
Total losses	<50 ppm
Phase anisotropy	±0,11
Durability	MIL-C-48497A
Substrate	Sitall CO-115M

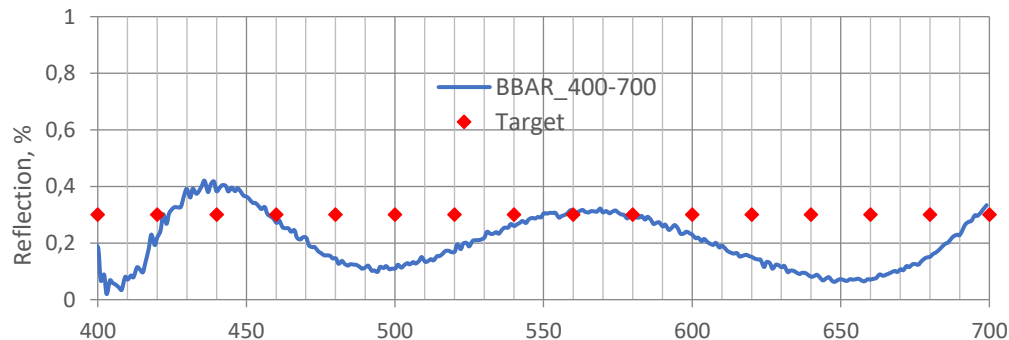


High efficiency BBAR coating

λ , nm	770-1070
Tr av, %	>99.5 double side coated
Rav, %	<1% for incident angle 0-30°
Coating	Hard coated
Surface quality	20-10
Durability	MIL-C-48497A
Substrate	BK7

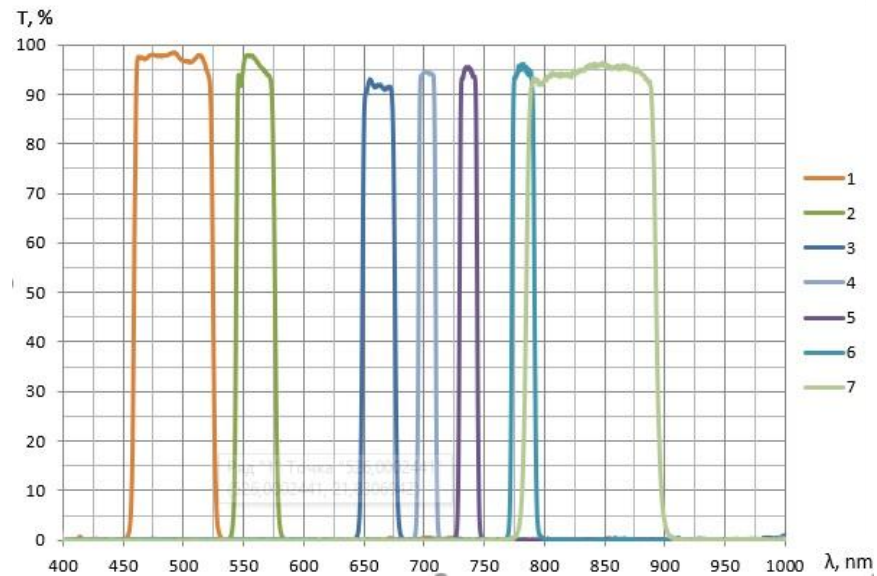
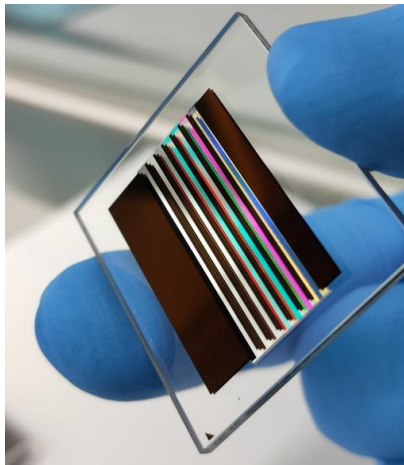


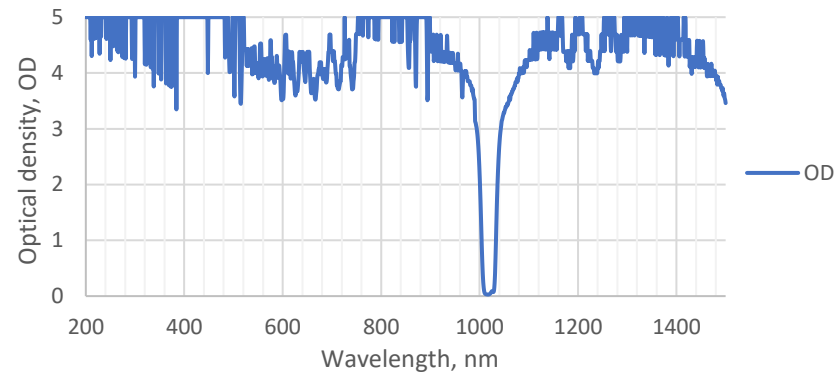
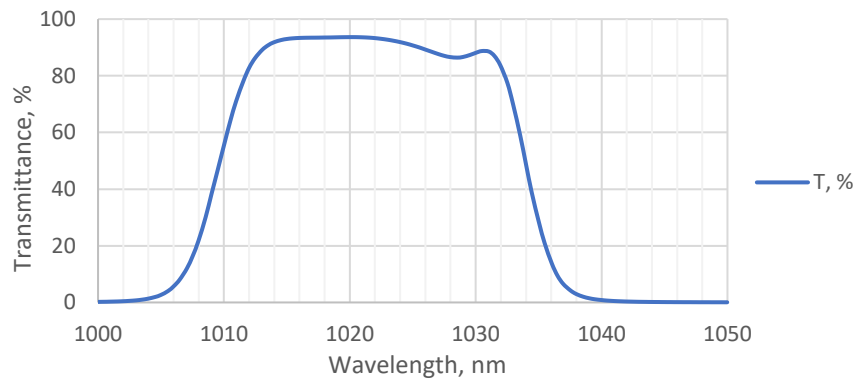
λ , nm	400-700
R av, %	< 0.3 double side coated
Coating	Hard coated
Surface quality	20-10
Durability	MIL-C-48497A
Substrate	BK7



Multi zone optical filters

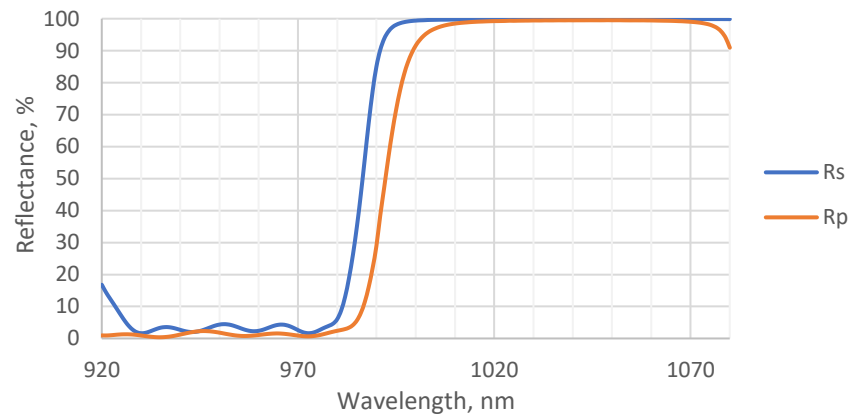
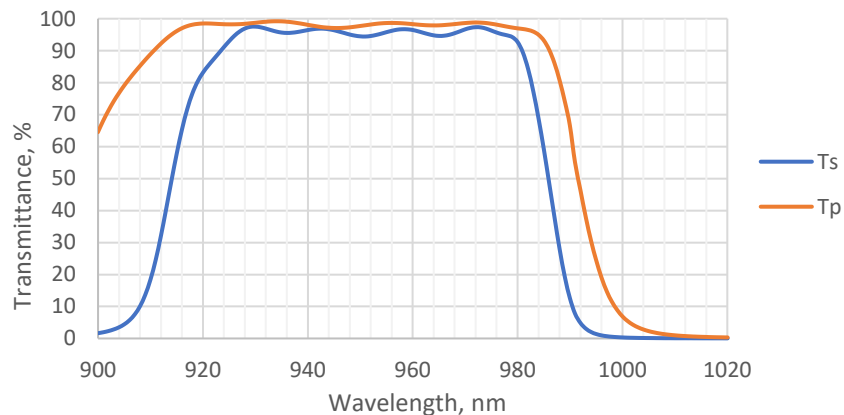
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7
Bandpass, nm	460-525	545-575	650-675	695-710	730-745	775-795	785-895
Transmission, %	>90	>90	>90	>90	>90	>90	>90
Blocking range, nm	300-1100	300-1100	300-1100	300-1100	300-1100	300-1100	300-1100





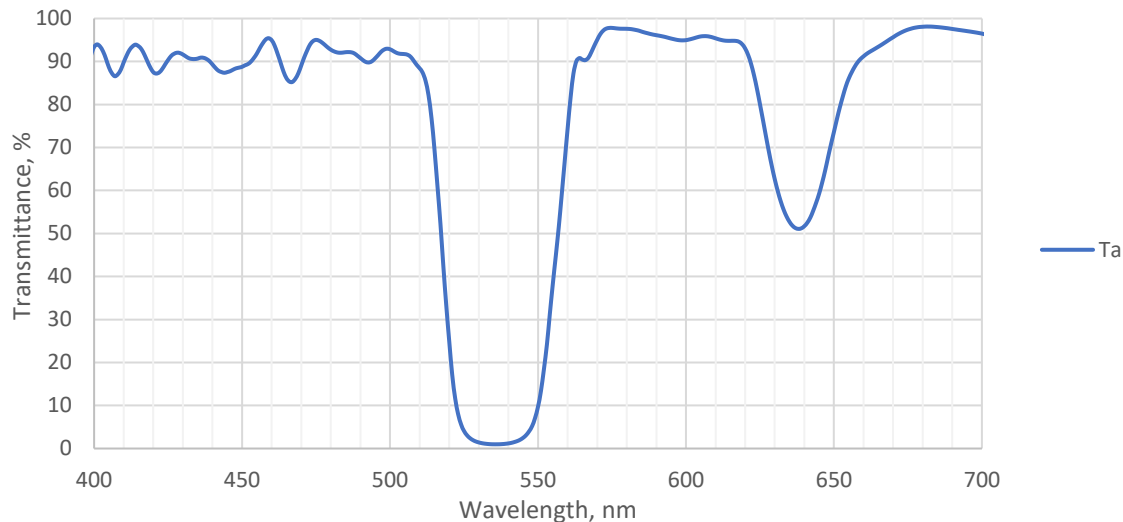
Thickness (S1+S2)	27 μm
Quantity of layers (S1+S2)	239
Center Wavelength CWL	1022 nm
Full Width Half Max FWHM	25.0 nm
Blocking (Avg) ≥ OD 4.0	from 200-975 nm
Blocking (Avg) ≥ OD 4.0	from 1075-1500 nm
Blocking (Abs) ≥ OD 3.0	from 200-960 nm
Blocking (Abs) ≥ OD 3.0	from 1090-1500 nm
T (Avg) ≥ 90%	over minimum of 20 nm bandwidth within the FWHM

HR 1020–1070 — 45 deg



Thickness (S1+S2)	11.5 μm
Quantity of layers (S1+S2)	60
Rs ($\lambda=1020\text{-}1070\text{ nm}$)	> 99.6 %
Rp ($\lambda=1020\text{-}1070\text{ nm}$)	> 99.2 %
Ts ($\lambda=940\text{-}980\text{ nm}$)	> 93 %
Tp ($\lambda=940\text{-}980\text{ nm}$)	> 97 %
Material	UVFS

NF 532+635 — 45 deg



Thickness (S1+S2)	6.8 μm
Quantity of layers (S1+S2)	56

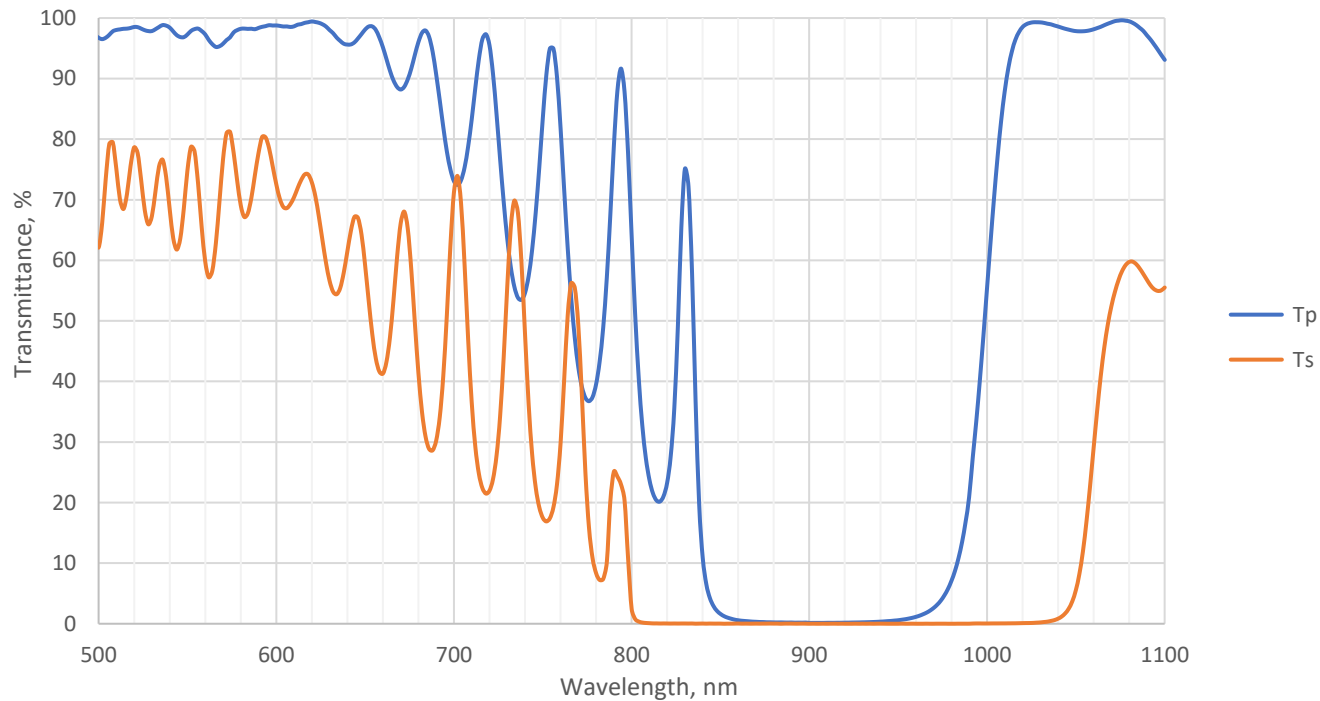
S1 – surface

Type	Dielectric coating
Wavelength range	400-700 nm
Transmission	> 95 % 400-510 nm, 655-700 nm
Reflection	> 99.5 % 532±, ~50 % 635±
Polarization	532 nm S-pol, 635 nm unpolarized
Incident angle	45 ± 3 degrees

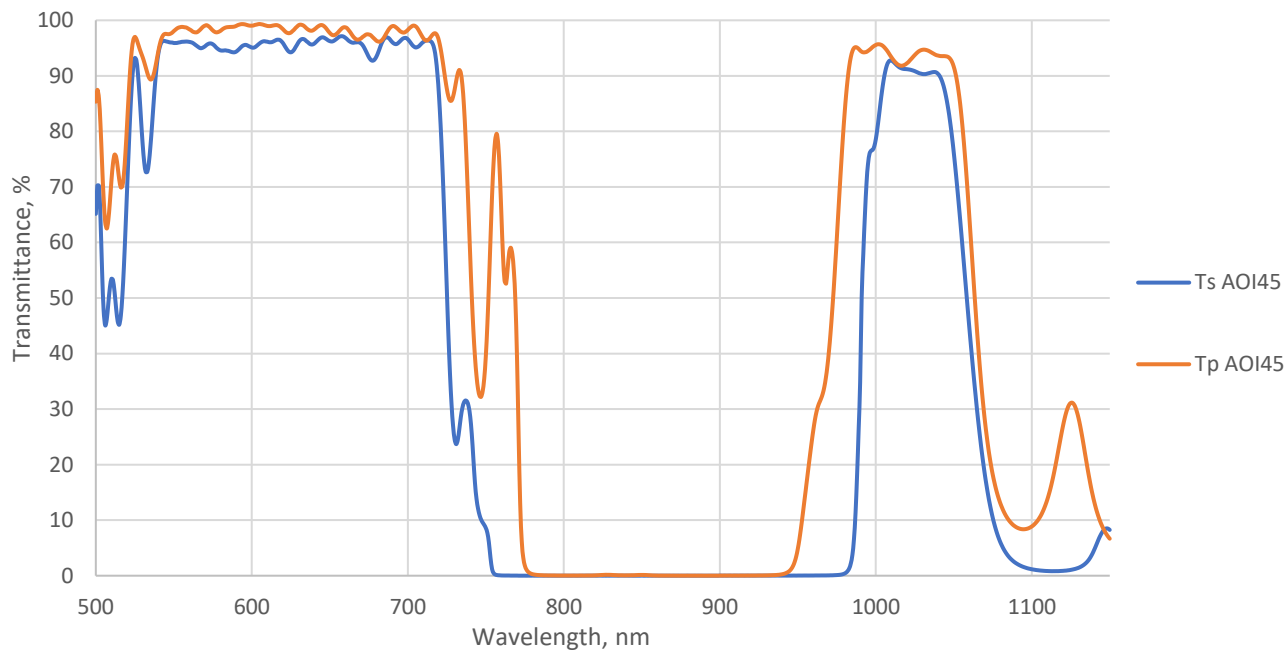
S2 – surface

Wavelength range	400-700 nm
Reflection	< 2 %
Polarization	unpolarized
Incident angle	45 ± 3 degrees

TFP 1030 — 55.4 deg



Thickness (S1)	5.5 μm
Quantity of layers (S1)	41
Tp 1030 nm	> 99 %
Ts 1030 nm	< 0.1 %
Material	UVFS



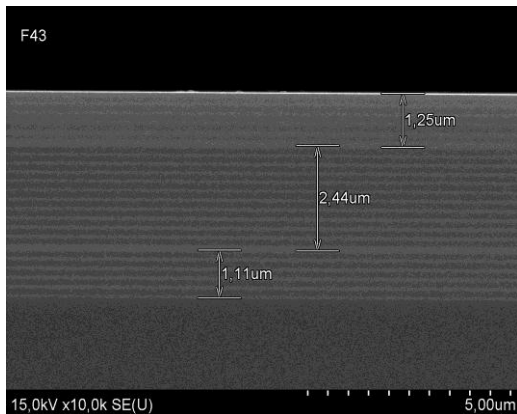
Thickness (S1+S2)	9 μm
Quantity of layers (S1+S2)	70

S1 – surface

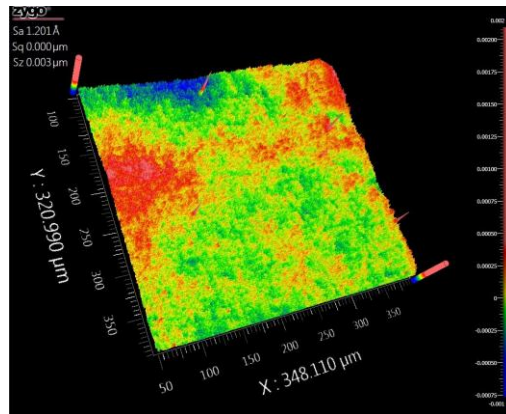
Dichroic coating	AOI $45^\circ \pm 6^\circ$
T > 90 %	550-700 nm, $T_p = T_s$
R = 99 %	800-890 nm, $R_j = R_s$
Tavg > 90 %	1000-1030 nm, AOI 45°

S2 – surface

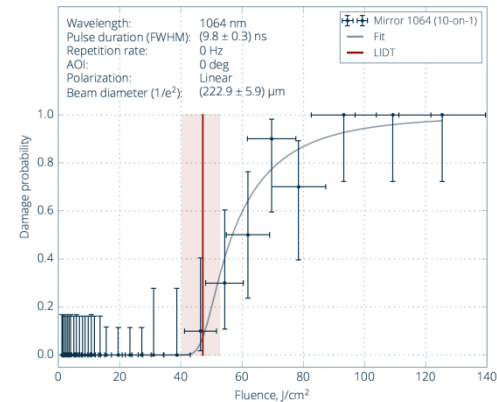
AR coating 400-1000 nm	AOI 45°
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High film density



Small roughness 1.2 Å



High LIDT

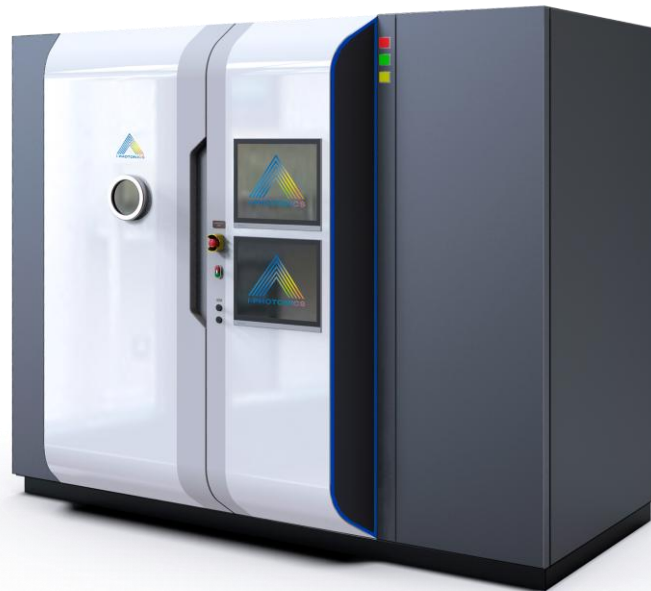
I-Photonics IBS Coaters

LIDIZ-700



RF IBS for sputtering and assistance
Automatic optical monitoring (OCP BB, SW, Dual)
Multiple choice of substrate holder (single disk, planetary, High speed)
Load-lock is available

LIDIZ-1100



RF IBS for sputtering and assistance
Automatic optical monitoring (OCP BB, SW, Dual)
Increased Throughput

GRID MATERIAL, SHAPE &
DIAMETER:

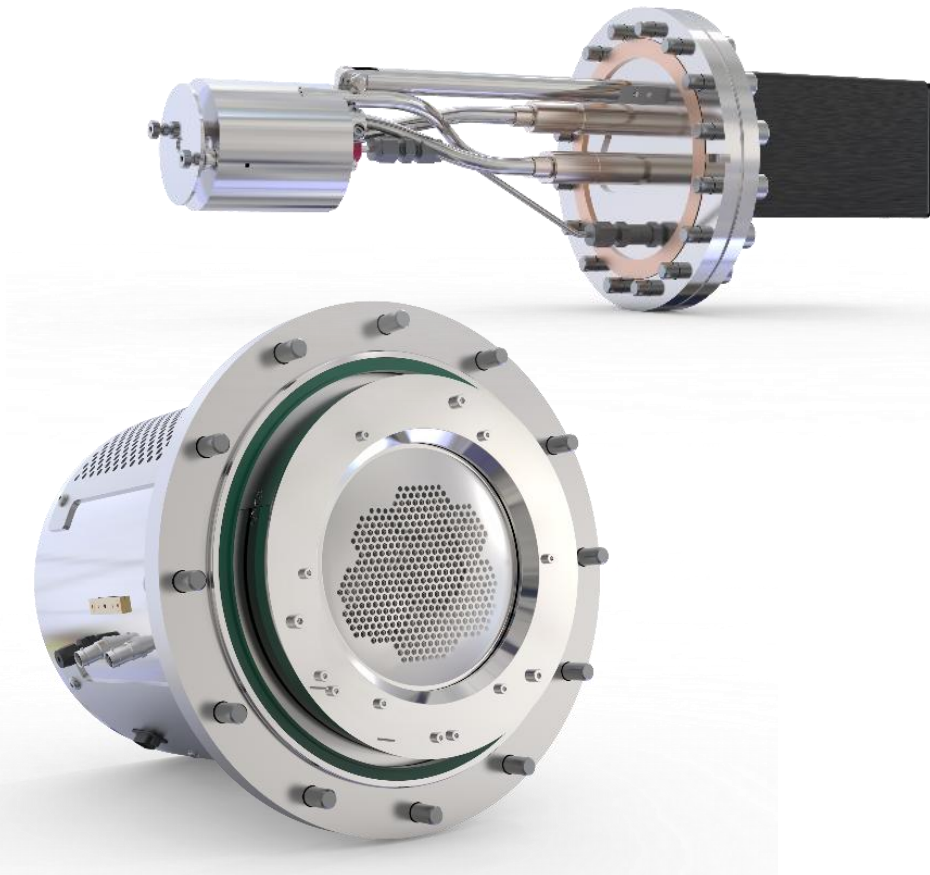
Molybdenum, Concave (for
deposition), Convex (for assisting),
120 mm, 180 mm

BEAM CURRENT:

50 – 400 mA

BEAM ENERGY:

50 – 1500 V



Substrates holder (LIDIZ 700)

SUBSTRATE HOLDER
MECHANISM:

4 planets D = 200 mm

COATING AREA:

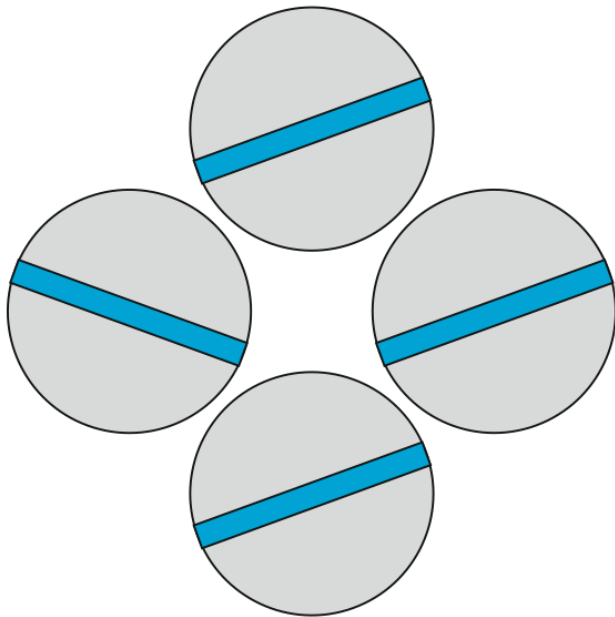
1250 cm²

UNIFORMITY:

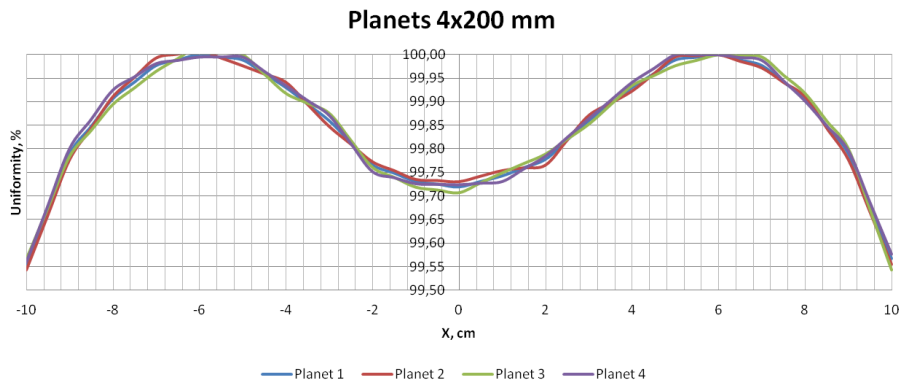
+/- 0,25% across full coating
area



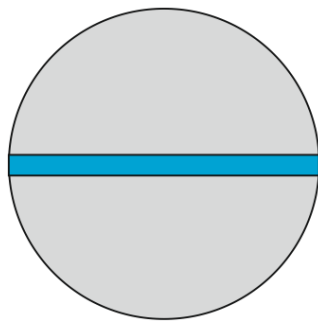
Planetary holder 4 x 200 mm



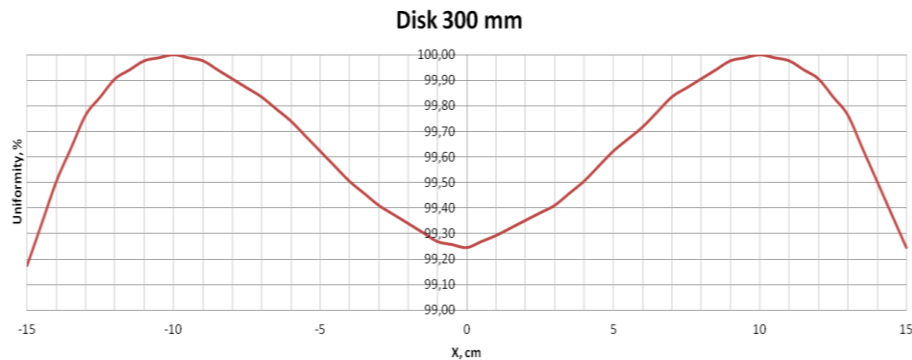
Coating uniformity with shadow mask < +/- 0,25%



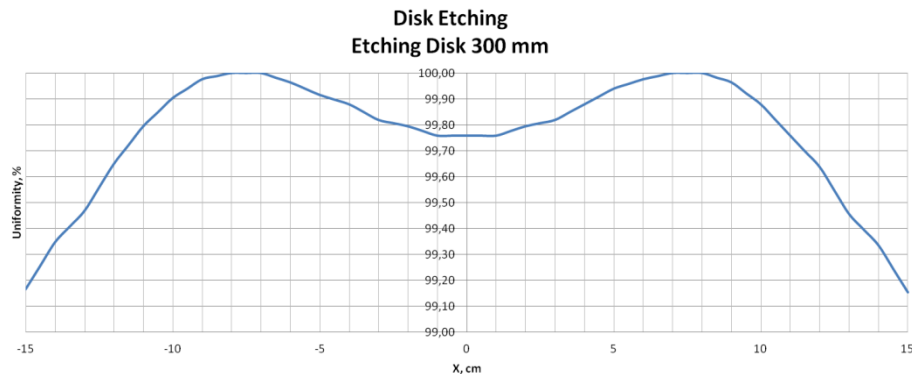
Single disk holder D = 300 mm



Coating uniformity without shadow mask < $\pm 0,5\%$



Etching uniformity without shadow mask < $\pm 0,5\%$



Disk diameter, mm	Number of planets	Coating area, cm ²	Coating area U < 0,25%, cm ²	Number of filter D = 1", U < 0,25%	Number of filter D = 2", U < 0,25%
300	1	706,5	400	40	11
200	4	1256	1256	139	35
300*	3	2119,5	1200	120	33

* Optional planetary holder 3x300 mm

TARGET HOLDER MECHANISM:

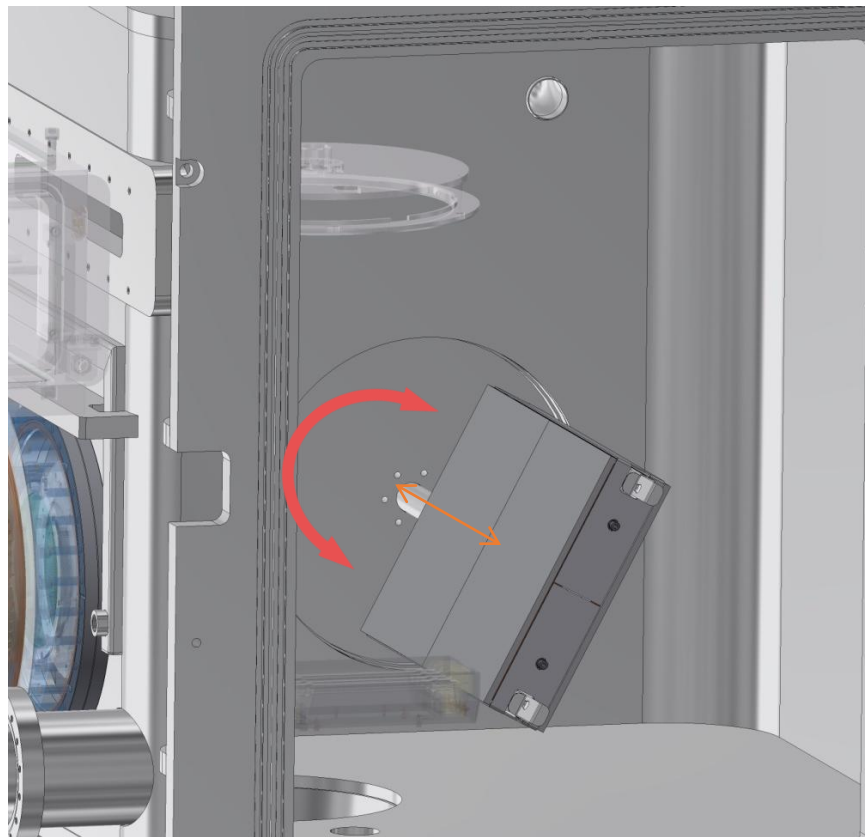
360° rotatable and horizontally moving

TARGETS MATERIALS

Ti, Ta, Nb, Zr, Hf, Al, Si, SiO₂ ,ect.

MAX NUMBER OF TARGETS FOR THE HOLDER

4 pcs.



OCP BroadBand:

380 – 1080 nm (reoptimization)

OCP SingleWave:

380 – 2500 nm

DUAL OPTICAL

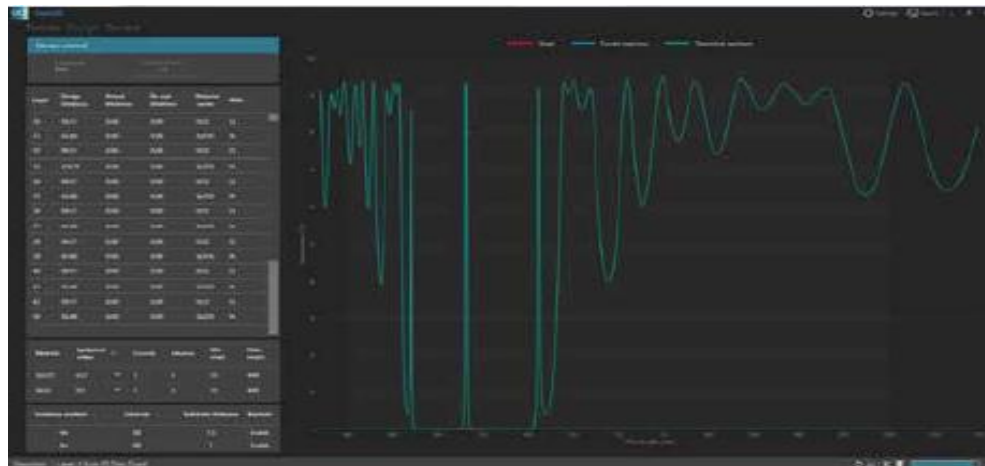
MONITORING:

BroadBand and SingleWave

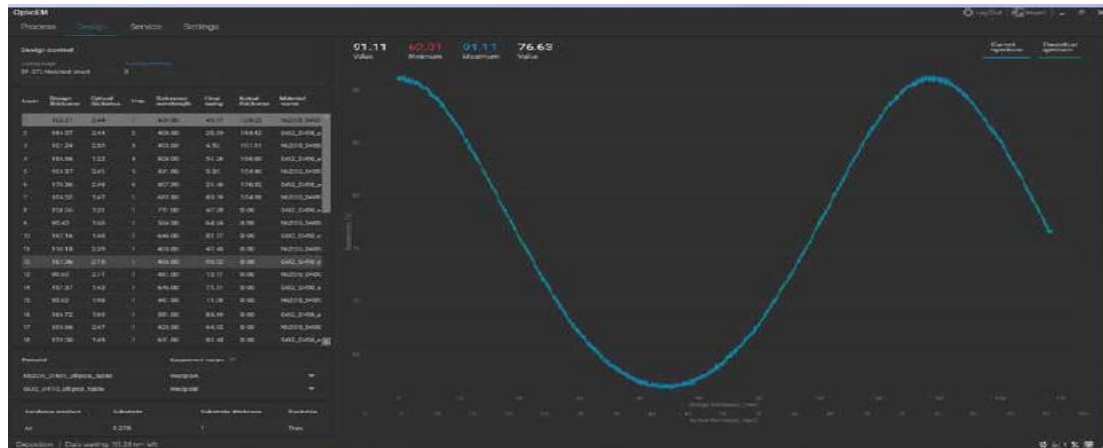


OCP BroadBand — Specifications

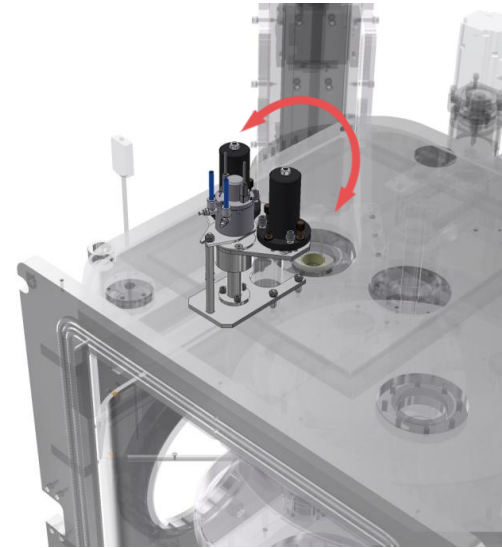
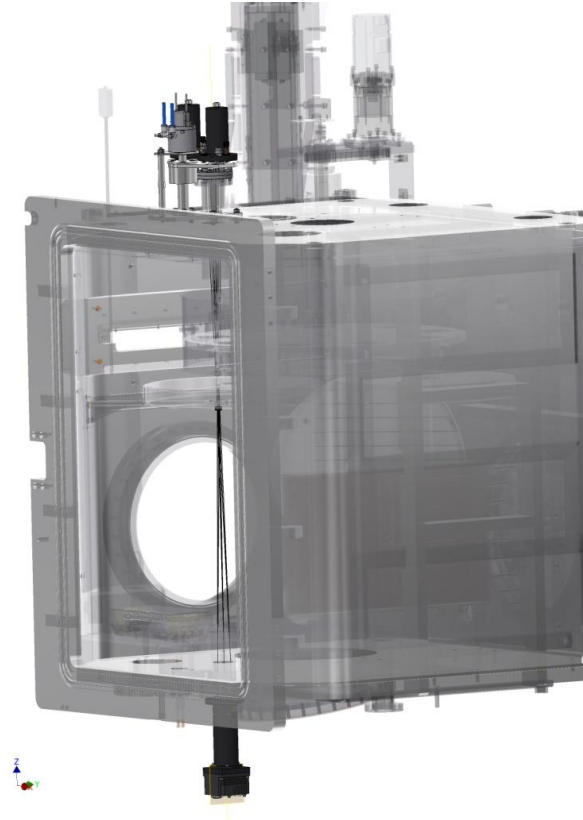
Parameter	Base model	Option NIR
Spectral Range (nm)	380-1080	1080-1650
Spectral Resolution (nm)	0,5	5
Wavelength Accuracy (nm)	0,2	1
Wavelength Repeatability (nm)	0,1	0,5
Sensors	Si	IGA
Control type	Intermittent (Direct): Transmittance	
Light Source	Halogen Lamp with DC stabilization (370-1650 nm)	
Supported Design Software	Essential Macleod, TFCalc, OptiLayer, OTF Studio	
Data transfer	OPC UA, Modbus (TCP/IP)	



Parameter	OCP SW		
	Base model	Included Option	Included Option
	VIS	NIR-1	NIR-2
Spectral Range (nm)	380-1100	1100-1650	1650-2500
Spectral Resolution (nm)	0,8	1,6	3,2
Wavelength Accuracy (nm)	±0.2	±0.4	±0.8
Wavelength Repeatability (nm)	±0.1	±0.2	±0.4



DUAL OPTICAL MONITORING: BroadBand and SingleWave



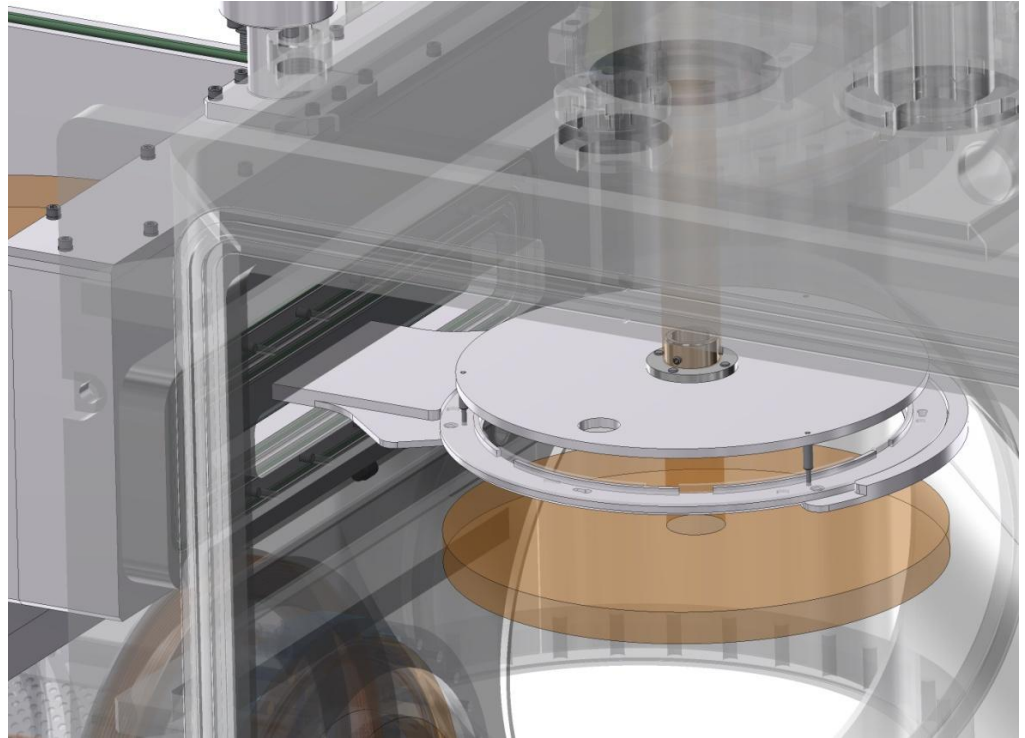
Option: Load-lock chamber (LIDIZ 700)

ROBOTIC ARM:

Automatic loading of the
substrate to process chamber
(single disk holder)

APPLICATION:

AR coating on crystals



System	LIDIZ 700	LIDIZ 1100
Substrate holder and coating area	Single disk Ø320 mm (area 700 cm ²) Planetary 4 x Ø210 mm (area 1256 cm ²) Planetary 3 x Ø320 mm (area 2100 cm ²)	Single disk Ø440 mm (area 1520 cm ²) Planetary 7 x Ø210 mm (area 2200 cm ²) Planetary 4 x Ø350 mm (area 3840 cm ²) Other planetary by request
Coating uniformity	$\leq \pm 0.25\%$ for planetary 4 x Ø210 mm $\leq \pm 0.5\%$ for single disk Ø320 mm $\leq \pm 0.5\%$ for planetary 3 x Ø320 mm	$\leq \pm 0.25\%$ planetary 7 x Ø210 mm $\leq \pm 0.5\%$ planetary 4 x Ø350 mm $\leq \pm 0.5\%$ for single disk Ø440 mm

FerroTec

EDWARDS

SMC

HTC
HIGHLIGHT TECH CORP.

INFICON

CCR Technology

ULVAC





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