

# Coating of Large Optics

## Long Shapes / Round Shapes



*"Teresa", the largest IBS machine, suitable for substrates up to Ø 550 mm*

**LASEROPTIK** uses dedicated equipment for dielectric coatings on large optics up to 2 m in length (long axis for rectangular shapes) or 550 mm in diameter with a superior spectral uniformity over the complete surface and high LIDT values. Approved automated ultrasonic and manual cleaning procedures guarantee an optimum cleanliness even on these large scale geometries.

### Possible sizes and techniques for large optics

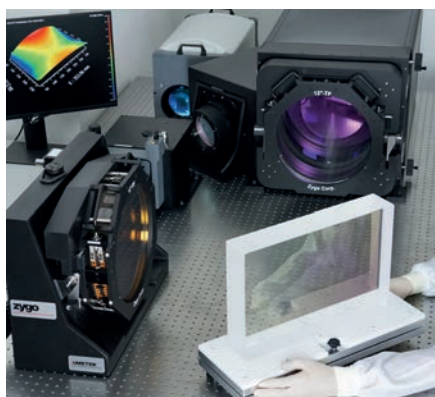
| coating technique | rectangular |             | round Ø |
|-------------------|-------------|-------------|---------|
|                   | long axis   | short axis* |         |
| IBS               | 2000 mm     | 250 mm      | 550 mm  |
| EBE               | 1200 mm     | 100 mm*     | 500 mm  |

\* at the given maximum of the long axis, can be larger with a shorter long axis



*"Maxima", the patented IBS coating machine for large, rectangular optics*

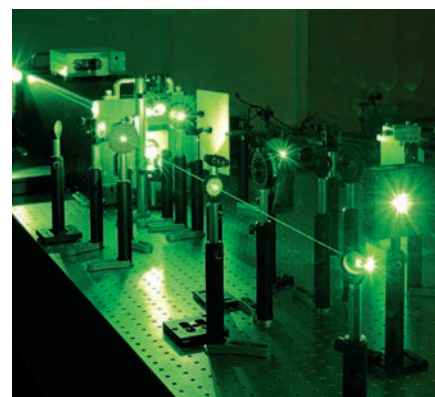
## Metal or dielectric coatings by EBE or IBS



*12" interferometer*



*Ultrasonic substrate cleaning*



*Laser testing lab*

## Dielectric IBS coatings

LASEROPTIK can coat laser mirrors that are amongst the largest in the world by using IBS

|                            |                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Max. substrate size</b> | ø 550 mm or e.g. 450 x 300 mm <sup>2</sup>                                                                               |
| <b>Metrology</b>           | 12" Zygo Verifier Fizeau Interferometer @1053 nm                                                                         |
| <b>Preparation</b>         | ultrasonic cleaning and substrate handling tools                                                                         |
| <b>Process control</b>     | reproducibility assured by in-situ optical broadband monitoring                                                          |
| <b>Application</b>         | minimized risk of stress induced crazing in vacuum, cleanable by ultrasonic cleaning machines                            |
| <b>Dispersive coatings</b> | low GDD, GTI, defined GDD and spectral width                                                                             |
| <b>LIDT</b>                | 0.9 J/cm <sup>2</sup> @805 nm 42 fs 1 kHz 45°s-pol, S-on-1, referenced to sample surface tested at ELI beamlines Prague* |



\* Willemsen, T., Chaulagain, U., Havlíčková, I., Borneis, S., Ebert, W., Ehlers, H., Gauch, M., Groß, T., Kramer, D., Laštovička, T., Nejd, J., Rus, B., Schrader, K., Tolenis, T., Vaněk, F., Velpula, P. K., Weber S. (2022)  
Large area ion beam sputtered dielectric ultrafast mirrors for petawatt laser beamlines. *Optics Express*, 30(4), 6129-6141