

Laser and Materials Technology Division

Optical Manufacturing Shop Location of Facility: LLE, Room 185

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Description of Facility:

The Optical Manufacturing Shop has the capability of supplying, coating and characterizing optical devices in dimensions up to 75 cm. This includes:

Deposition of metal and high laser damage threshold multilayer dielectric thin film coatings. High quality reflectors, polarizers, and antireflection coatings are produced by reactive evaporation with an electron- beam gun onto heated substrates. Ion-assisted deposition routinely supplements this process when required.

- Sol-gel coating for high laser-induced threshold antireflection coatings by dipping or spinning.
- Manufacture of liquid crystal polarizers and wave plates up to 200 mm
- Full metrology for optical and spectral characterization of coatings.
- Laser damage testing of substrates and coatings.

A wide range of materials may be evaporated in any of similarly equipped chambers: a 74-in coater and 56-in coater with adjustable planetary configurations to coat meter size optics, a 72-in. box coater with a 30-in. planetary, a 54-in. box coater with a 22-in. planetary, and a 40-in coater with a 13-in planetary. A 46" coater with a single planetary system is utilized for glancing angle film deposition for research in structured thin films.

Characterization equipment includes an 18-in. interferometer, several spectrophotometers, an ellipsometer, an optical profilometer, a scanning electron microscope, and optical microscopes.

The shop has the capability of fabricating specialized optics. This includes the polishing of substrates up to 300 mm in diameter to a flatness of $\lambda/20$ and an rms surface roughness of 0.5nm. The fabrication of small optics, e.g. lenses, prisms, wedges, mirrors, lenslet arrays, laser oscillator rods, etc., is done with a variety of glasses and crystals.

This fabrication shop contains two Rogers and Clark annular-ring continuous-polishing machines of 36 inches and 60 inches, respectively. Finish polishing on these machines is supported by an array of single- spindle grinding and polishing stations. The capability for grinding and polishing barrels and cylinders is available. The facility is equipped with a Zygo interferometer for characterization up to 12-in apertures.

The services of the Optical Manufacturing Shop are available to any University customer. The present shop rate is **\$104/hour**. Estimates are available by contacting [Amy Rigatti](#). Services may be contracted by submitting a University requisition or by approving the estimate and providing an account number to bill against by journal entry.

Effective: 10/2024

Archives:

- [2024](#)
- [2023](#)
- [2022](#)
- [2021](#)
- [2020](#)
- [2019](#)
- [2018](#)
- [2017](#)
- [2016](#)
- [2015](#)
- [2014](#)
- [2013](#)
- [2012](#)
- [2011](#)
- [2010](#)
- [2009](#)