Institute of Applied Physics
Friedrich-Schiller-Universität Jena

Master Thesis

in the subject area of

Resist technology for ultra large and complex sample geometries

Topic:

Large research facilities such as laser drivers for fusion power plants, mirrors for gravitational wave astronomy or X-ray optics for synchrotron radiation require very large and often heavy nanophotonic elements. Typically, nanophotonic elements such as gratings, plasmonic lenses, low noise mirrors or polarizers are fabricated by lithography followed by etching. For lithography, a well-controlled thin film of a special polymer (i.e. a photoresist) is essential. There are a number of well-established techniques known from the semiconductor industry, such as spin coating or dip coating. Unfortunately, these techniques are not applicable to the required substrate types. Therefore, we are developing swell coating as a new technique to apply such high quality resist films on ultra large and complex samples.

Task:

The task is to design, build and test the performance of a small scale prototype tool. We are looking for a student with good practical skills. The project will allow you to improve these skills and gain an insight into a well-established nanofabrication centre and its fabrication technologies. You can also learn fundamental optical characterisation techniques that are important in the semiconductor industry, such as ellipsometry, reflectometry and optical critical dimension (OCD) metrology.

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