

EUV scattering metrology with high-brightness discharge plasma source

A.Maryasov
RWTH EUV

EUV light scattering experiments on rough, periodic and quasiperiodic nanostructured surfaces were accomplished at grazing incidence angles below total external reflection ($2^\circ - 10^\circ$). High brightness EUV plasma source with in-band radiation energy of ~ 4 mJ per pulse/sr/2%bw operated at 1 kHz was used in our compact laboratory tabletop scatterometer setup. Scattering patterns were recorded and analyzed at wavelength 13.5 nm for several different multilayer coated mirrors as well as for reference single layer carbon coated mirror with roughness below 1 nm. Complementary, different periodic structures with pitch sizes down to 100 nm were investigated. Up to 14th diffraction orders were observed at 5° grazing reflection from a test 1200 l/mm gold-coated blazed grating. It shows that resulting scattering signal emerging after grazing reflection of EUV from rough surfaces at 13.5 nm can be recorded in reasonably short times (from 5 sec to 10 min) with a high-brightness gas discharge source