Design, deposition and metrology of EUV multilayer coatings for SR, FEL and space applications

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Abstract
We will report and discuss on some aspects of the design, deposition and characterization of reflecting multilayer coatings with specific spectral characteristics and enhanced temporal, thermal and radiation stability for extreme ultra-violet (EUV) applications, such as synchrotron radiation (SR), free-electron lasers (FEL) and solar plasma diagnostics.
We will present our recent results on multilayer-coated beamline optics with high uniformity of the period (in the order of ± 0.5 %) along the entire length of 250 mm. We will also show some examples of highly reflective Al-based tri-component multilayers, which were fabricated in our laboratory and characterized by grazing x-ray reflectometry and with EUV radiation. These coatings were realized for various applications in the EUV range from 17 to 35 nm including a delay line project of FEL facility in Trieste and, very recently, the FSI (full Sun imager) and HRI (high-resolution imager) EUV telescopes of future Solar Orbiter space mission.

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