

# PhotonMEADOW 2023

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## Characterization of silicon pore optics for the ATHENA observatory in the PTB laboratory at BESSY II

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For new astrophysics X-ray observatories like the Advanced Telescope for High ENergy Astrophysics (ATHENA), mirror surfaces of several hundred m<sup>2</sup> are required. As such an area is not achievable with a single mirror in space, the silicon pore optics (SPO) technology will be utilized. In the PTB laboratory at BESSY II, two dedicated beamlines are in use for their characterization with monochromatic radiation at 1 keV and a low divergence well below 2 arc sec: the X-ray Pencil Beam Facility (XPBF 1), providing a pencil beam of about 100 μm x 100 μm since 2005, and the X-ray Parallel Beam Facility (XPBF 2.0) where since 2016 beam sizes up to 7.5 mm x 7.5 mm are available while maintaining the low beam divergence. The SPOs are aligned and scanned with in-vacuum hexapods, and two electronic autocollimators are used to guaranty a hexapod positioning accuracy of 0.7 arc sec. A movable CCD-based camera system at a distance of 5 m or 12m to the SPO registers the direct and the reflected beam. The positioning of the detector can be verified by a laser tracker. XPBF 2.0 is not only used to characterize mirror stacks, but also to control the focusing properties of mirror modules (MM) - consisting of 4 mirror stacks - during their assembly at the beamline. The energy-dependent reflectance of a MM with Ir coating has been measured at two other beamlines in the entire photon energy range from 0.2 to 10 keV.

### Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

yes

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