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BEaTriX, the new facility to measure the modular X-ray optics of the ATHENA telescope with an expanded and parallel X-ray beam

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BEaTriX (Beam Expander Testing X-ray) is a unique facility developed at the INAF-Osservatorio Astronomico Brera (Merate, Italy) to test ATHENA's X-ray mirror. The commissioning has been successfully completed, and the facility is now open to users.

The unique BEaTriX X-ray beam approximates the one created by an astronomical source (collimated and large), and it is re-created in a small lab (about 9 m × 18 m) thanks to an innovative design. A microfocus X-ray source produces a divergent beam which is conditioned by a parabolic mirror and a set of silicon crystals, one of which is asymmetrically cut with respect to the lattice planes. The first beam line, at the energy of 4.51 keV, is operative. The beam is collimated to < 3 arcsec, with a flux of 60 photons/s/cm². Its size (170 mm × 60 mm) is sufficiently large to cover the entrance pupil of the ATHENA Silicon Pore Optics Mirror Modules (MM), generating an image at its focal length of 12 m. Its small size and vacuum modular compartments ensure a fast test rate, enabling the X-ray acceptance tests (PSF and Effective Area) of the ATHENA Silicon Pore Optics Mirror Modules (MM) at their production rate (2 MM/day), at 4.51 and 1.49 keV.

Giving the excellent results of the 4.51 keV beam-line, we have started the development of the second 1.49 keV beam line to be implemented in Merate, and a feasibility study to replicate the facility at the cosine premises, with beamlines at 1.49 and 6.4 keV

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no

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