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Integration facility for the ATHENA X-ray telescope

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The optics of ATHENA (Advanced Telescope for High-ENergy Astrophysics) –the next high-energy astrophysical mission of the European Space Agency –consists of 678 Silicon Pore Optics mirror modules integrated and co-aligned onto a common supporting structure. The integration process, already proved, exploits an optical bench to capture the focal plane image of each mirror module when illuminated by an ultra-violet plane wave at 218 nm. Each mirror module focuses the collimated beam onto a CCD camera placed at the 12 m focal position of the ATHENA telescope and the acquired point spread function is processed in real time to calculate the centroid position and intensity parameters. This information is used to guide the robot-assisted alignment sequence of the mirror modules.
To implement the above process to the entire ATHENA optics, a dedicated vertical optical bench is being designed. The facility consists of a paraboloid mirror that collects the light from an ultraviolet point source and generates a single reference plane wave large enough to illuminate the 2.6 m aperture of the X-ray telescope; a 15 m tall tower supports the CCD camera at the focal plane position, where the light from each mirror module is focused. The facility must also allow an alignment accuracy of 1 arcsec for the integration of two mirror modules per day in any arbitrary integration sequence, including the option of removing, re-aligning, or replacing any mirror module.
The detailed design of optical bench and the status of the construction activities will be presented at the conference.

Topic

Future missions

Affiliation

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