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IXPE Gas Pixel Detector test and characterization with the X-ray Calibration Facility

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The Imaging X-ray Polarimetry Explorer (IXPE) is a NASA-ASI space mission launched in 2021 and it is the current state-of-the-art of astrophysical X-ray polarimetry. It measures the linear polarization of different astrophysical sources over the photon energy range 2-8 keV.

Its core detector is the Gas Pixel Detector (GPD): it employs the photoelectric effect and the polarization is recovered from the azimuthal distribution of the photoelectron directions of emission.

GPDs are the only space-qualified detectors currently used for X-ray polarization, making systematic testing and monitoring essential, especially in view of future X-ray polarimeters. This can be implemented on ground, by testing and characterizing spare GPDs with the X-ray Calibration Facility (XCF) hosted at the University of Turin. It is an open-design setup providing photon beams with various spatial and energy configurations and offering both unpolarized and linearly polarized beams, the latter obtained through Bragg diffraction. It enables different kind of studies like GPD systematic effects, the intrinsic source polarization or long-term GPD response variations.

Initially conceived as a calibration source to qualify GPDs, the XCF can satisfy evolving requirements to support R&D programs of innovative position, energy and polarization-sensitive X-ray detectors.

Eligibility for "Best presentation for young researcher" or "Best poster for young researcher" prize

Yes

Author: Mr TUGLIANI, Stefano (UNITO - INFN Sezione Torino)

Co-authors: Prof. BONINO, Raffaella (UNITO - INFN Sezione Torino); Dr CIBRARIO, Nicolò (UNITO - INFN Sezione Torino); Dr MALDERA, Simone (INFN Sezione Torino); Mr FRASSÀ, Andrea (UNITO - INFN Sezione Torino); Dr LATRONICO, Luca (INFN Sezione Torino); Dr GORGI, Alessio (INFN Sezione Torino - INAF)

Presenter: Mr TUGLIANI, Stefano (UNITO - INFN Sezione Torino)

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