

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

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The Imaging X-ray Polarimetry Explorer (IXPE) represents the current state-of-the-art of astrophysical X-ray polarimetry. This mission is a collaboration between NASA and ASI and it has been launched on 9 December 2021: it can measure the linear polarization of different astrophysical sources over the photon energy range 2-8 keV.

The core of IXPE Detector Unit and future X-ray polarimetry missions is the Gas Pixel Detector (GPD). It can be calibrated and characterized using the X-ray Calibration Facility (XCF), available at the Physics Department at the University of Turin. The XCF is a table-top, open-design irradiation setup for research: it offers beams of photons at different energies and with different spatial and polarization configurations. The radiation source can be chosen between a single-anode and a multi-anode X-ray tube and, in addition, the XCF can provide two beam-lines: one of them is linearly polarized through Bragg diffraction on a number of crystals that are selected to fulfil the Bragg condition at the primary beam energy. Both beams can be monitored and characterized using a Silicon Drift Detector and a CMOS ASI ZWO Camera, adapted to acquire X-ray spectra and display the beams.

Thanks to a handling system, the GPD can measure both the unpolarized and polarized beam: a comparison between these two signals provides a way to characterize the GPD itself. In addition, to study long-term variations of the GPD response, it is possible to use a  $^{55}\text{Fe}$  radiative source.

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.

## Collaboration

### Role of Submitter

I am the presenter

**Primary author:** TUGLIANI, Stefano (Università di Torino / INFN)

**Co-authors:** FRASSÀ, Andrea (Università degli studi di Torino); LATRONICO, Luca (Istituto Nazionale di Fisica Nucleare); AGLIETTA, Marco (Istituto Nazionale di Fisica Nucleare); CIBRARIO, Nicolò (Istituto Nazionale di Fisica Nucleare, Università degli studi di Torino); BONINO, Raffaella (Istituto Nazionale di Fisica Nucleare, Università degli studi di Torino); MALDERA, Simone (Istituto Nazionale di Fisica Nucleare)

**Presenter:** TUGLIANI, Stefano (Università di Torino / INFN)

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