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The IXPE calibration, from ground to space

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IXPE (Imaging X-ray Polarimetry Explorer) is the Small Explorer space mission developed in a partnership between NASA and ASI that is unveiling the polarized X-ray sky in the 2-8 kev energy band. IXPE was launched on December 9th 2021 and it is performing X-ray spectro-polarimetry of astrophysical sources, including imaging-polarimetry for extended ones and timing-polarimetry for X-ray pulsar.
The IXPE telescopes comprise three grazing incidence mirror modules coupled to three Detector Units (DUs) hosting each one a Gas Pixel Detector (GPD) polarimeter. The GPD, developed by the INFN and INAF-IAPS Italian research institutes, exploits the photoelectric effect to measure the linear polarization of the X-ray emission from astrophysical sources. Its spectroscopic (energy resolution < 20% at 6keV), timing and imaging capabilities allow IXPE to perform unprecedented polarimetric measurements with high significance.
A wide and accurate on ground calibration was carried out on the IXPE DUs at INAF-IAPS in Rome. A dedicated facility was set-up to calibrate the DUs with polarized and unpolarized X-rays at different energies in the operating energy band.
The spare DU was also calibrated with polarized and unpolarized X-ray sources at the Stray Light Test Facility of NASA Marshall Space Flight Center (MSFC) at the focus of the spare Mirror Module Assembly, designed and manufactured by MSFC itself.
Currently, the 3 IXPE DUs are up and running in space and they are periodically monitored and gain calibrated in flight by means of polarized and unpolarized radioactive sources hosted in the DU's filter and calibration wheels. We will present an overview on the IXPE calibraitons from ground to space.

Summary

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