X-ray polarimetry: a 'new' window in the X-ray sky

Abstract

By means of X-ray polarimetry it will be possible to answer in a novel way, to questions related to the acceleration phenomena in PWNe, Supernovae and Blazars, to the transport of radiation in plasma embedded in a strong magnetic field like in pulsating X-ray binaries, to questions related to the scattering in a-spherical geometries, like in AGNs and in the molecular clouds located in the galactic center region and, finally. It will probe fundamental physics in extreme gravitational and magnetic field.

Since the dawn of X-ray astronomy it has been clear the value of polarimetry in this energy range but the available techniques have always been the major limitation. Modern photoelectric X-ray polarimeters, based on the Gas Pixel Detector (GPD) technologies, overcame these limitations allowing for a sensitive measurement on hundreds of sources. Two forthcoming missions exploit the GPD technology: XIPE (the X-ray Imaging Polarimetry Explorer) that recently ended the study phase for ESA and IXPE (the Imaging X-ray Polarimetry Explorer) which has been selected as a SMEX NASA mission for a launch in 2021.

XIPE will be operated as a conventional X-ray observatory but providing polarimetry simultaneously to the usual imaging, temporal and spectral information. IXPE will make public the data to the general user shorty after the observation.

In this talk I will review the major aspects involved with this kind of measurement, the scientific targets, the mission profile and the payload of upcoming opportunities.