

Large-area X-ray polarization detector detection unit prototype

The Low-energy X-ray Polarization Detector (LPD) is a large-area and wide-field X-ray polarimeter planned to be installed on the Chinese Space Station. The LPD is used to measure the polarization of the gamma burst itself and its very early X-ray afterglow, and to carry out studies of the celestial body and radiation mechanisms at the center of the gamma burst. The LPD consists of 15 detection units with the same structure and function. We designed a detection unit prototype with six pixel detectors compactly placed on the front-end electronics board with an effective detection area of 27.36 cm^2 . A single pixel detector has 16 analog output channels, and the detector data is amplified, digitized, and transferred via the board-to-board connector to the back-end electronics board for processing. The prototype also has an internal high voltage circuit board dedicated to providing high voltages up to -4 kV. The test results show that the detection unit prototype can read out 96 channels of pixel detector data simultaneously, provide configurable data compression, storage and encoding, and meet all the functional requirements of the detection unit.

Submission declaration

Original and unpublished

Author: WANG, Hui (Central China Normal University)

Co-authors: Prof. WANG, Dong (Central China Normal University); Mr LI, Muxian (Central China Normal University); CHEN, Ran (Central China Normal University); Dr FENG, Huanbo (Guangxi University); Prof. LIU, Hongbang (Guangxi University); Mr CHEN, Kai (Central China Normal University); Mr YI, Difan (University of Chinese Academy of Sciences); Prof. LIU, Qian (University of Chinese Academy of Sciences); Prof. LI, Jin (Institute of High Energy Physics, Chinese Academy of Sciences); Prof. SUN, Xiangming (Central China Normal University); Mr XIE, Yanjun (Guangxi University); Dr ZHOU, Shiqiang (Central China Normal University); Dr ZHOU, Zhuo (Central China Normal University); Dr FANG, Ni (Central China Normal University)

Presenter: Dr FANG, Ni (Central China Normal University)

Track Classification: Applications in astrophysics