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Radiation tolerance test with 10 MeV protons and performance evaluation of pnCCD for future satellite mission HiZ-GUNDAM

Wide-field soft X-ray surveys are important for future gamma-ray burst observations. The HiZ-GUNDAM satellite will use lobster-eye optics and pnCCDs to observe soft X-ray transients such as gamma-ray bursts. In this study, the radiation tolerance of a small pnCCD with a pixel size of 75 μm and a depletion thickness of 450 μm was evaluated. In this test, radiation damage due to orbital total dose effect was given by 10 MeV proton beams as representative. As a result of performance evaluation after the test, the operating temperature and framerate range of the pnCCD required to meet the HiZ-GUNDAM mission requirement of 0.4 keV lower detectable energy was calculated.

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