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The Large Area Detector for future spectral-timing space missions

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The Large Area Detector (LAD) is an instrument concept for high-throughput spectral timing studies of compact astrophysical sources in the X-ray energy band (2-30 keV), originally proposed for the LOFT, eXTP and STROBE-X space missions. The LAD is based on an array of collimated large-area linear Silicon Drift Detectors (SDDs), that can be combined to accumulate a large effective area. The sensor architecture was specifically developed to provide the best possible performances in a constrained environment, with limited availability of volume and power. By introducing two major improvements in the detector layout, namely the almost complete suppression of charge-sharing between neighboring anodes and the reduction of the collecting anode size, we could reach promising spectral performances in previous tests. In the context of an upcoming ESA's F3 mission proposal, in which the LAD will feature as the main narrow field-of-view instrument, we combined a 10-anode prototype of the LAD sensor with a novel CMOS analog front-end Application-Specific Integrated Circuit (ASIC), named NOVA. Originally developed for the Italian Lunar Electromagnetic Monitor in X-rays (LEM-X) observatory, the NOVA ASIC demonstrated from preliminary tests to perform optimally when coupled with a large-area SDD. In this work, we will present the first performance results of the integrated detector system (NOVA ASIC and SDD prototype).

Eligibility for "Best presentation for young researcher" or "Best poster for young researcher" prize

Yes

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