

DMAPS for measuring energy depositions and tracks of Galactic Cosmic Ray and Solar Energetic Particles

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Coarsely segmented Si diode detectors are widely used in space applications for measuring the mixed radiation fields. Starting in 2012, when 5 Timepix chips were installed at the International Space Station hybrid pixel detectors have entered space radiation dosimetry and monitoring. The problems to be solved for measuring GCR and SEP events are the dynamic range of the charge signal which exceeds 80 dB, the event rates starting from 2 to 4 per cm²-s⁻¹ and reaching 55-107 per cm²-s⁻¹ (for a 4π sr field of view), and, most importantly, the fact that limited power is available from solar or other sources while the heat generated requires material (i.e., extra weight) to manage. We developed two kinds of pixel architecture: The low gain pixel can process high energy (charge) depositions up to 8 pC and the high gain can process low energy depositions by fast charged particles down to 0.5 fC.

Type of presentation (in-person/online)

online presentation (zoom)

Type of presentation (scientific results or project proposal)

Presentation on scientific results

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