

RD13 - 11th International Conference on Large Scale Applications and Radiation Hardness of Semiconductor Detectors



Contribution ID: 30

Type: **not specified**

A silicon array for cosmic-ray particle identification in space

Friday, July 5, 2013 12:35 PM (25 minutes)

A new generation of space experiments with very large geometric factors (of the order of 3 - 4 m²sr) are being designed to perform precision studies of the elemental composition of VHE cosmic nuclei and of their spectral features. In the current concept of the Gamma-400 experiment, the charge identification of the incoming particle is performed by a two-layered array of pixelated silicon sensors. Given the orbital parameters of the mission, the isotropic distribution of the incoming cosmic rays can be sampled on the 4 lateral sides of the instrument. The conceptual design of the array, covering a seamless sensitive area of the order of 1 m², will be presented together with results obtained with reduced-scale prototypes at relativistic ion beams.

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