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Next Generation TRD for CREAM Using Gas Straw Tubes and Foam Radiators

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Abstract content

The Cosmic Ray Energetics And Mass (CREAM) experiment is designed to investigate the source, propagation and acceleration mechanism of high energy cosmic-ray nuclei, by directly measuring their energy and charge. Incorporating a transition radiation detector (TRD) provides an energy measurement complementary to the calorimeter, as well as additional track reconstruction capability. The next generation CREAM TRD is designed with 4 mm straw tubes to greatly improve tracking over the previous 20 mm tube design, thereby enhancing charge identification in the silicon charge detector (SCD). Plastic foam provides a weight-efficient radiator that doubles as a mechanical support for the straw layers. This design provides a compact, robust, reliable, low density detector to measure incident nucleus energy for $3 < Z < 30$ nuclei in the Lorentz gamma factor range of 10^2 - 10^5 . This paper discusses the new TRD design and the low power front end electronics used to achieve the large dynamic range required. Beam test results of a prototype TRD are also reported.

If this papers is presented for a collaboration, please specify the collaboration

CREAM-II

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 2 (OG part 1), pages 345-348

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