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GEANT4-Based Model of the CREAM Timing Charge Scintillation Detector

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Abstract content

The CREAM instrument is a balloon-borne detector designed to measure the cosmic-ray spectrum in the 1-1000TeV energy range, with good charge resolution from protons to iron (Z = 1 to 26). The CREAM instrument has had two successful flights, both from McMurdo Station, Antarctica. CREAM-I was flown in the 2004-2005 Antarctic summer campaign and CREAM-II in 2005-2006, with a combined flight duration of approximately 70 days. The CREAM-I instrument consisted of a fast scintillation-based Timing Charge Detector (TCD), a Transition Radiation Detector and a sampling calorimeter. Here we describe a GEANT4-based model for a CREAM TCD scintillation counter, used in characterizing the charge and timing response of the counters to various incident particles. The model incorporates all counter components, including the scintillator, light guides and an approximation of the PMT readout. We compare the simulated output results to actual event signals.

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

CREAM-I

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, 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 385-388

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