

THE DESIGN OF PRECISION X-RAY TRANSITION RADIATION DETECTORS FOR COSMIC RAYS

S. P. Wakely (1), J. R. Hoerandel (1,2), F. H. Gahbauer (1), D. Mueller (3) and S. P. Swordy (4)

(1) Enrico Fermi Institute, University of Chicago, Chicago, IL 60637, USA, (2) Institut für Kernphysik, Forschungszentrum and University of Karlsruhe, 76021 Karlsruhe, Germany, (3) Enrico Fermi Institute and Department of Physics, University of Chicago, Chicago, IL 60637, USA, (4) Enrico Fermi Institute, Department of Physics, and Department of Astronomy and Astrophysics, University of Chicago, Chicago, IL 60637, USA.

wakely@ulysses.uchicago.edu

Precision transition radiation detectors (TRDs) can be a powerful tool for the determination of the energy spectra of cosmic ray nuclei up to the energies of the knee. They offer unique measurement capabilities and embody design principles which are somewhat different from those of threshold TRDs used in accelerator experiments. We will discuss the design of precision TRDs and, specifically, demonstrate how energy measurements up to Lorentz factors of $\sim 10^5$ can be made. This capability will be important in instruments designed for ACCESS-class space missions.