



## **Gamma Ray Source Studies Using Muon Tracking.**

*Saturday, July 7, 2012 3:30 PM (15 minutes)*

(KASCADE-Grande Collaboration).

High energy gamma rays produce muons in the Earth's atmosphere that can be detected and reconstructed in relatively shallow underground muon detectors such as ICECUBE and MILAGRO. Although muons of such low energy are mostly produced by charged Cosmic Ray (CR) particles, gamma produced muons (via photo-pion production) can be identified provided the detector has sufficient effective area and resolution.

A large area (128m<sup>2</sup>, E<sub>μ</sub>>0.8 GeV) streamer tube detector, located within the KASCADE-Grande detector field has been used for muon tracking studies. We discuss the possibility of observing gamma-ray sources by means of photo-pion produced single isolated muon tracks above the background of CR muons using a Muon Tracking Detector (MTD).

Properties of the photo-production process in the atmosphere and of the MTD which support the identification of gammas are discussed. The sensitivity of the technique of observing the Crab energy spectrum in the tens of GeV range is discussed. Gamma spectra accumulated from Crab and a flux correlation for Mrk 421 of photo-produced muons with the X-ray flux

(RXTE/PCA) are presented. High resolution muon tracking may provide an alternative technique for a wide field of view and large duty cycle observations of gamma sources.

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