Lidar Calibration Studies in Ground Based Gamma-Ray Astronomy

Sam Nolan*and Michael Daniel* for the H.E.S.S Collaboration

**Physics Department, Durham University, South Road, Durham, County Durham, DH1 3LE*

Abstract. **The current generation of imaging atmospheric Cherenkov telescopes have revealed a signficant number of sources emitting in the energy range from 60 GeV to 40 TeV. Being calorimetric in nature the imaging atmospheric Cherenkov technique is dependant on a good knowledge of the atmospheric conditions at the telescope site. To zeroth order the atmospheric quality during data taking is checked by reliance on background cosmic-ray trigger rate and atmospheric monitoring devices such as infra-red radiometers and starlight monitors. To first order data may be corrected by scaling to to these parameters, yet an energy calibration is not possible. However a ground-based Lidar co-located with the telescopes may offer this possibility. This study introduces a commercial 355nm Leosphere lidar deployed at the H.E.S.S. telescope site. This lidar, which can be co-pointed with the telescope system, and which will shortly be incorporated into the DAQ system, has been taking data shortly before and after measurement on a set of constant flux sources (Pulsar Wind Nebula and Supernova Remants).This work will compare the atmospheric transmission profile (derived from the lidar return signal using Klett inversion) with the derived gamma-ray rate, and cosmic-ray background trigger rate, in an attempt to check the ability of lidar technology to minimise systematic uncertainties in derived flux, and their potential to increase the active lifetime of an experiment.**

Keywords**: gamma-ray, H.E.S.S., atmosphere**

NOTE As this work is currently ongoing results will be presented in full at the conference.