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Atmospheric Monitoring with LIDAR and Infra-red Camera at Black Rock Mesa in the Utah desert

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Abstract content

An atmospheric monitoring system has installed at Black Rock Mesa in the Utah desert to study the properties of atmosphere using a LIDAR(Light Detection And Ranging) system and an infra-red(IR) camera for cosmic rays experiment. The aims of atmospheric monitoring are to calibrate observed cosmic ray's energy and to determine detectable region of the fluorescence detectors. For these reasons, the atmospheric extinction coefficient and the cloudiness should be determined precisely as possible. The LIDAR system consists of a laser device and a light receiver with a photo multiplier tube(PMT) mounting on a steerable base. The laser emits pulse lights successively into the atmosphere and the receiver detects scattered faint lights by the PMT. To determine the atmospheric extinction coefficient, a large amount of data has been acquired using LIDAR system at Black Rock Mesa commencing from July 2005. A lot of data is analyzed by means of so-called the slope method and/or the Klett's method after due consideration of atmospheric pressure effect. A result consistent with a calculation of the Rayleigh scattering is obtained for the vertical extinction coefficient above an altitude of several kilometres in a calm weather. It is also found that the one-dimensional atmospheric density model is reasonable assumption on a limitative condition in the Utah desert. The current results from the atmospheric monitoring with the LIDAR and the IR camera will be presented in full detail.

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

Telescope Array Experiment

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. 5 (HE part 2), pages 1025-1028

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