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Spectral resolved Measurement of the Nitrogen Fluorescence Emissions in Air induced by Electrons

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Abstract content

For the calorimetric determination of the primary energy of extensive air showers, measured by fluorescence telescopes, a precise knowledge of the conversion factor (fluorescence yield) between the deposited energy in the atmosphere and the number of emitted fluorescence photons is essential. The fluorescence yield of the eight strongest nitrogen emission bands between 300 nm and 400 nm has been measured by the AirLight Experiment at Forschungszentrum Karlsruhe using electrons from a Sr-90 source with energies between 250 keV to 2 MeV. Measurements have been performed in dry air, pure nitrogen, and a nitrogen-oxygen mixture at pressures ranging from 2 hPa to 990 hPa. Furthermore the influence of water vapor has been studied. The resulting absolute accuracies for the single nitrogen bands are in the order of 15 %. In the investigated energy range, the fluorescence yield proved to be independent of the energy of the ionizing electrons.

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

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, 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 989-992

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