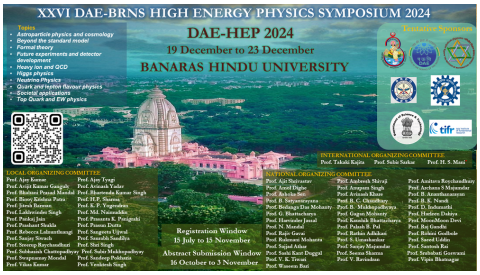

Contribution ID: **426** Type: **Oral**

Monitoring the upper atmospheric temperature and the interplanetary magnetic field with the GRAPES-3 muon telescope

Galactic cosmic rays (GCRs) are deflected by the Sun's magnetic field, resulting in significant energy-dependent temporal and spatial variations in their intensity. The muons observed at GRAPES-3 arise from extensive air showers of cosmic ray secondaries originating in the interactions of primary cosmic rays with the upper atmospheric particles. We observed strong correlations between the muon flux recorded by GRAPES-3, the upper atmospheric temperature, and the solar magnetic field at the Lagrange point L1. These correlations allowed us to measure the temperature coefficient (α_T) as -0.23 ± 0.02 $\%K^{-1}$ and the magnetic field coefficient (γ_M) as -0.57 ± 0.03 $\%nT^{-1}$. This indicates that atmospheric muon flux could serve as a promising tool for real-time monitoring of both the upper atmospheric temperature and the solar magnetic field. We will present the detailed analysis techniques and results from 22 years of operation (2001–2022) of the GRAPES-3 muon telescope.

Field of contribution

Experiment

Author: Mr PAUL, Surojit (Tata Institute of Fundamental Research, Mumbai)

Presenter: Mr PAUL, Surojit (Tata Institute of Fundamental Research, Mumbai)

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