

Colloquium

Probing the atmospheric phenomenon of thunderstorms through the GRAPES-3 muon telescope

Sunil Gupta

TIFR and BARC, Mumbai

The GRAPES-3 experiment contains a large area (560 sq.m) muon telescope that detects over 4 billion muon of energy ≥ 1 GeV every day. The constant intensity of cosmic rays gets affected by the changes occurring in the pressure and the temperature of our atmosphere as well as due to the variations in the interplanetary magnetic field which in turn get reflected into variations in the muon intensity. GRAPES-3 precision muon data allow corrections to be made for each of these phenomenon. However, even after these corrections are made the muon data display short term (~ 10 minutes) intensity decreases which occur during major thunderstorms. A detailed investigation of such events revealed that thunderstorm act as giant electrostatic capacitors capable of accelerating muon to GeV energies. In fact the measurements of muon intensity and thunderstorm electric fields can be used to estimate not just its electric potential but also its speed, area, altitude, as well as the charge and energy stored not to mention the massive power needed to sustain iGV electric potential. Each of these parameters was found to be at least an order of magnitude larger than previously reported maximum values.

Monday, Feb 19th 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H