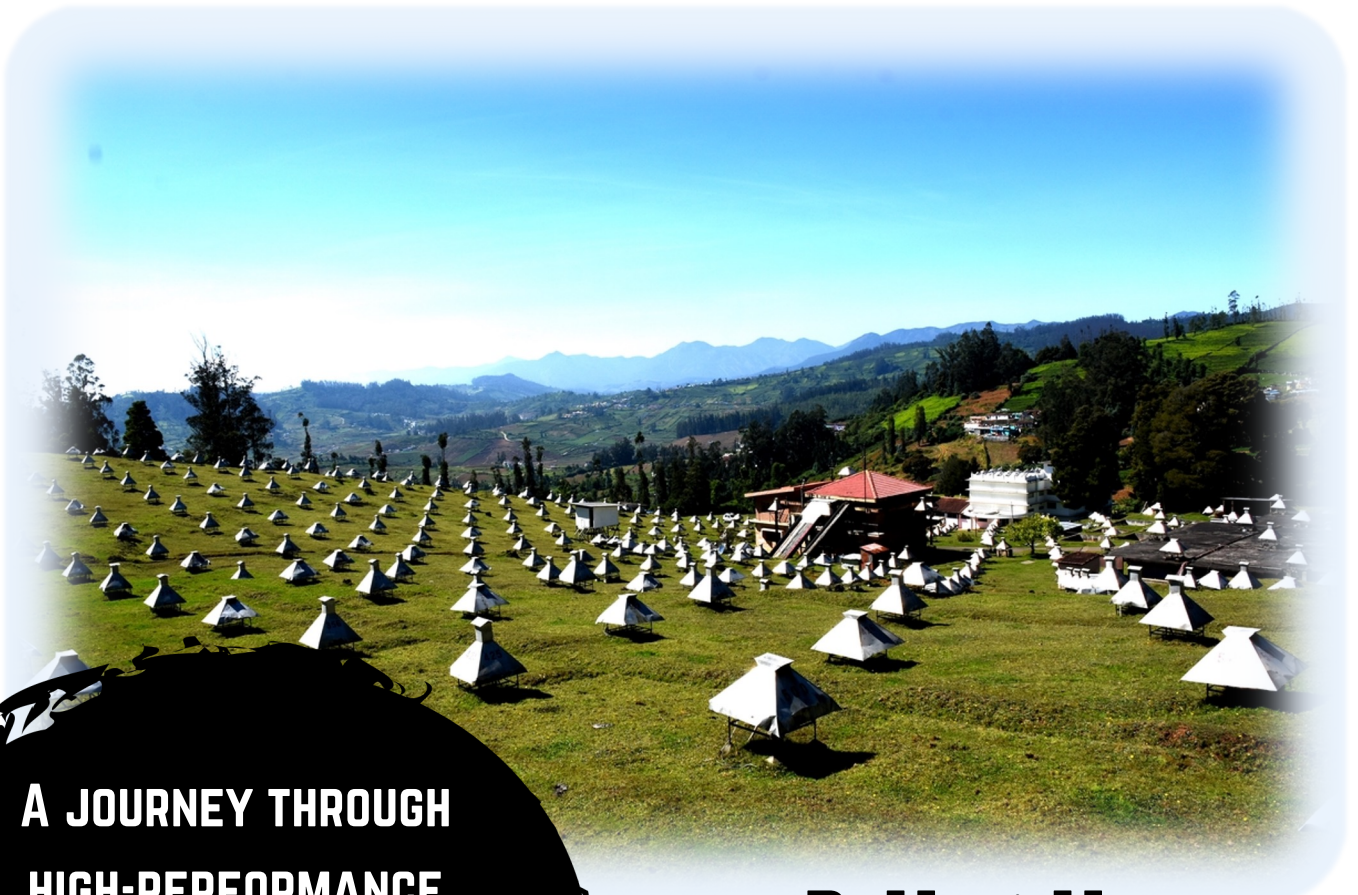


STAI

SEMINARS ON TECHNOLOGICAL ADVANCES AND
INNOVATION



**A JOURNEY THROUGH
HIGH-PERFORMANCE
COMPUTING IN
GRAPES-3: TURNING
DATA BITS TO
DISCOVERY**

B. Hari Haran



TATA INSTITUTE OF FUNDAMENTAL RESEARCH

AUG

22nd

2024

TIFR H Auditorium 11:30 Hrs

A journey through high-performance computing in GRAPES-3: Turning data bits to discovery

B. Hari Haran

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

GRAPES-3 is a high-altitude, ground-based, cosmic ray observatory located in Ooty, Tamil Nadu, India. It consists of an array of 400 plastic scintillator detectors spread over 25000 m² and a 560 m² muon telescope built using 4000 proportional counters. The GRAPES-3 experiment is in the continuous operation for more than two decades, records about three million extensive air showers in the energy range of TeV—PeV, and about four billion muons above a GeV daily. This uninterrupted data stream generates about 50 GB of raw data. Additionally, scarce hardware resources present several limitations in processing of experimental data, and Monte Carlo simulations. An Object-Oriented data analysis framework has been developed based on the C++ language and CERN ROOT libraries for efficient storage, data mining, and visualization of both experimental and simulation data as well as the monitoring of the detectors, data recording systems. Also, a 1280 job high-performance computing cluster has been built and maintained with in-house expertise, and indigenous techniques. This talk will discuss the challenges in efficient management and analysis of a large volume of data that led to some ground-breaking discoveries.

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Tea/Coffee 11:15 Hrs