TIFR Centre for Interdisciplinary Sciences, Narsingi, Hyderabad 500075

Colloquium

Cosmological Constant, Its problem(s) and the solution

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Abstract: Observations indicate that our universe can be characterised by three distinct phases of evolution: An early inflationary phase possibly driven by a scalar field, a late-time accelerated phase dominated by dark energy and a transient phase in between, dominated by radiation and matter. The late-time acceleration can be consistently modelled in terms of a cosmological constant (Λ) provided its value is extremely tiny: $\Lambda L_P^2 \approx 10^{-122}$ where $L_P = (G\hbar/c3)^{1/2}$ is the Planck length. A key issue in theoretical physics is to explain the extremely small value of this dimensionless parameter. I will describe how this value can be understood in terms of a new dimensionless parameter (CosMIn) which counts the number of modes inside a Hubble volume that cross the Hubble radius during a specified interval of time. CosMIn has the same ('conserved') value during well-defined intervals in the three phases of cosmic evolution, and this fact helps us to determine the numerical value of the cosmological constant. This approach provides a truly unified picture of cosmic evolution relating the early inflationary phase, the late accelerating phase and certain considerations of Planck scale physics. I will also discuss how these ideas are related to a description of cosmic expansion as a quest for holographic equipartition and lead to a novel paradigm to study cosmology.

Date: **Tuesday, May 21ˢᵗ 2013**
Time: 04:00PM (Tea/Coffee at 03:30PM)
Venue: Conference Hall, TCIS

All are cordially invited