S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR
Department of Astrophysics and High Energy Physics

23rd April,2024   **11.30 AM**   **FERMION / ONLINE**

SPEAKER

Prof. Madhavan Varadarajan,
Professor, Theoretical Physics
Raman Research Institute, Bengaluru

TITLE OF THE TALK

Spherical collapse and black hole evaporation

ABSTRACT

We consider spherically symmetric gravity coupled to a spherically symmetric scalar field with a specific coupling which depends on the Areal Radius. The scalar field stress energy takes the form of null dust. Its classical collapse is described by the Vaidya solution. Quantum back reaction is then incorporated through an explicit formulation of the 4d semiclassical Einstein equations. The semiclassical solution describes black hole formation together with its subsequent evaporation along a timelike 'apparent horizon'. A balance law at future null infinity relates the rate of change of a back reaction-corrected Bondi mass to a manifestly positive flux. The detailed form of this balance law together with a proposal for the dynamics of the true degrees of freedom underlying the putative non-perturbative quantum gravity theory is supportive of the paradigm of singularity resolution and information recovery proposed by Ashtekar and Bojowald. In particular all the information including that in the collapsing matter is expected, in our proposed scenario, to emerge along a single quantum extended future null infinity.

HOST FACULTY
Prof. Amitabha Lahiri
Dept. of ASTROPHYSICS AND HIGH ENERGY PHYSICS
****