



**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 November, 2023

4.00 PM

FERMION / ONLINE

SPEAKER

**Dr. Ruchika,
Post-Doctoral Fellow,
INFN (La Sapienza University of Rome), Rome, Italy**

TITLE OF THE TALK

Investigating Cosmological Tensions in low and high redshift observational data

ABSTRACT

The recent observations from the James Webb Space Telescope have led to a surprising discovery of a significant density of massive galaxies with masses of $M \geq 10^{10.5} M_{\odot}$ at redshifts of approximately $z \sim 10$. This corresponds to a stellar mass density of roughly $\rho_* \sim 10^6 M_{\odot} \text{Mpc}^{-3}$. Despite making conservative assumptions regarding galaxy formation, this finding may not be compatible with the standard Λ CDM cosmology that is favored by observations of CMB Anisotropies from the Planck satellite. Assuming Λ CDM and no systematics in the current JWST results, we propose may be an unknown systematic error in current large angular scale CMB polarization measurements or new physics is required to explain the discrepancy.

Parallely, SH0ES 2022 results confirmed more than 5 sigma deviation in determining the value of the Hubble Constant from the local distance ladder (using HST) and inverse distance ladder (utilizing Planck). Assuming both SH0ES and Planck team are not making any errors, we need to look for new physics or new theoretical models to alleviate the discrepancy/cosmological crisis. We propose the G-Transition hypothesis at local distances to come to the rescue. But before saying anything concrete, we need to see the same transitions in other local datasets like TRGB or SBF.

HOST FACULTY

**Prof. Archan S Majumdar, Senior Professor
Dept. of ASTROPHYSICS AND HIGH ENERGY PHYSICS**
