



ICTS

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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

## ICTS Colloquium

**Title** : Exquisite clutter in the multiphase circumgalactic medium

**Speaker** : Prakriti Pal Choudhury (University of Oxford, United Kingdom)

**Date** : Thursday, 15 January 2026

**Time** : 3:30 PM (IST)

**Abstract** : Hot, diffuse, ionised plasmas are organised in the potential wells of dark matter haloes at the largest scales in the Universe, forming the circumgalactic medium (CGM). Standard formation arguments predict a degree of self-similarity in CGM properties, yet observations suggest substantial diversity, most strikingly in their multiphase thermal structure. In this talk, I will focus on two complementary directions: understanding the formation and long-term maintenance of (i) the cold phase, spanning over three orders of magnitude in temperature relative to the ambient medium, and (ii) the hot phase. High-resolution, multi-wavelength observations (e.g., X-ray/radio/UV) now provide a wealth of information on these systems - especially for the intracluster medium (ICM) in the deepest potential wells - yet important discrepancies remain in multiphase characterisation. Using linear and nonlinear fluid models, we have resolved several debates about the physical conditions required for multiphase formation and proposed formation channels that naturally produce a large diversity of multiphase morphologies. I will present selected results from these works. Finally, I will discuss how persistent observational tensions point to missing microphysics in standard fluid descriptions, and how a coherent picture of macroscopic multiphase behaviour is emerging that hinges on subtle effects associated with energetically subdominant magnetic fields. I will briefly introduce these anomalous, magnetically mediated processes in the CGM.

**Venue** : Feynman Lecture Hall

Zoom Link:

<https://icts-res-in.zoom.us/j/97074344242?pwd=QFuFyPbSmbpnSUK2rbTTn2z81If5ke.1>

Meeting ID: 970 7434 4242

Passcode: 151516