**Tata Institute of Fundamental Research**
Survey No. 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy Dist., Hyderabad – 500 046

# Seminar

## Characteristics of glassy dynamics and how active self-propelled forces affect them

## Puneet Pareek

### TIFR, Hyderabad

Fast cooling of a liquid bypassing crystallisation leads to glass: the structure remains liquid-like, but dynamics differ dramatically. Moreover, many biological systems also show glassy dynamics. I will discuss the dynamical properties of glassy systems. Specifically, how the crossovers observed in different dynamical quantities are related and what are the key properties of glasses. I will then discuss a one-dimensional kinetically constrained spin model and show that a change in the relevant excitation can lead to a crossover in the autocorrelation function from stretched exponential to power law. Next, I will show the effects of active self-propelled forces, with magnitude $f_0$ and persistence time $T_p$, on the glassy dynamics. I will focus on the nontrivial aspects of activity: how it can lead to re-entrant dynamics and tunable fragility. I will also discuss how velocity correlations affect dynamical heterogeneity in active glasses, and finally discuss the role of varying the fraction of active particles in determining the system's properties.

***Thursday, Mar 26th 2026***

***16:00 Hrs (Tea / Coffee 15:45 Hrs)***

***Auditorium, TIFRH***