

Students' Annual Seminar

Glasses are different from liquids at intermediate times via two distinct mechanisms

Puneet Pareek

How are glasses different from liquids? Although their static properties are similar, the dynamics in a glassy system is dramatically different, whose source remains a mystery. Even the primary characteristics that define glasses, their nature and relations remain unclear. We combine analytical arguments and simulations of various systems in different dimensions and address these questions. Our results suggest that the myriad of glassy features are manifestations of two distinct mechanisms. Particle caging controls the mean, and coexisting slow- and fast-moving regions govern the distribution of particle displacements. All the other glassy characteristics can be related to these two mechanisms. Our results demonstrate that the Fickian yet non-Gaussian nature of glasses is not surprising, illustrate several crucial practical implications in analysing glassy dynamics data, and impose strict constraints that a correct theory of glassy dynamics must have.

Friday, Mar 31st 2023

4:00 PM (Tea / Coffee 3.45 PM)

CR-4, TIFR-H