

## **Seminar**

### **Active microrheology in glassforming liquids**

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In active micro-rheology, a single particle is pulled through the system by a constant force, as with magnetic tweezers, or it is driven by a time-dependent feedback force to obtain a "fixed velocity", as with optical tweezers. Both protocols are widely used to explore biological systems (e.g., the transport in cells) as well as various colloidal and glassforming systems. In my talk, I present molecular dynamics simulations of a model glassformer (the Kob-Andersen binary Lennard-Jones mixture), applying both force- and velocity-controlled microrheology. The two protocols lead to very different stationary states from which one can infer different properties with regard to the surrounding medium. In the fixed velocity protocol, at long times the particle is localised in a moving harmonic trap. From the mean-squared displacement (MSD), one can extract a localisation length that, in the nonlinear response regime, is related to an effective temperature. In the case of the constant force protocol, at low temperatures the stationary nonlinear response is associated with superdiffusion and intermittency, as reflected in a heterogeneous behaviour of the trajectories of different pulled particles. While some of these particles are localised for a long time, others are very mobile and move in a relatively short time over long distances. We discuss whether this low temperature behaviour can be interpreted in terms of a 'depinning transition'.

***Wednesday, Mar 11<sup>th</sup> 2026***

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

***Auditorium, TIFRH***