SPECIAL PHYSICAL CHEMISTRY SEMINAR

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4:00 pm

Room 9341
Chemistry

Separation of time scales in the continuous-time random-walk picture of glass dynamics

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On cooling, the relaxation times of a glass forming liquid increase over several orders of magnitude until, at the glass transition temperature, they reach the time scales accessible in experiments. Furthermore, a separation of relaxation times can be observed. Particularly puzzling is the separation of time scales pertaining to the viscosity and the diffusion, known as the breakdown of the Stokes-Einstein relation. Inspired by the observation of jump-like dynamics in the single-particle trajectories, i.e. long periods of localization interrupted by fast transitions to a new position, the continuous-time random walk (CTRW) has been suggested as a model for glass dynamics. In the CTRW picture, the jumps in the single-particle trajectories are identified with abstract events of a stochastic process. Interestingly, in this framework the separation of time scales appears naturally as the separation of the average time until the first event and the average time between two events. In this talk, I will introduce you to the theory of stochastic processes. In particular, I will demonstrate the important difference between the time until the first event and the time between subsequent events and discuss the consequences for the CTRW approach to glass dynamics.