

DY 59: Talk Michael Schmiedeberg

Time: Friday 9:30–10:00

Location: H19

Invited Talk

DY 59.1 Fri 9:30 H19

Energy landscape exploration approach for non-ergodic soft matter systems — ●MICHAEL SCHMIEDEBERG — Institut für Theoretische Physik 1, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

Motivated by the successful studies [1] of the athermal jamming transition by exploring the configuration space of soft colloidal particles that interact according to finite-ranged repulsive interactions, we have proposed an energy landscape exploration method of such a system at small but non-zero temperatures [2]. We find that the system can become effectively non-ergodic if the packing fraction is increased. The ergodicity breaking transition is in the universality class of directed

percolation [2] and therefore is fundamentally different from athermal jamming. Our approach can be used to predict how the glass transition density depends on temperature [3].

In future we want to extend our energy exploration method to other soft matter systems that might be trapped in metastable states because the dynamics is effectively non-ergodic. For example, the dynamics of gel networks in colloid-polymer mixtures slows down and ageing can be observed if both the breaking of colloidal bonds is rare and the network is directed percolated in space [4].

- [1] C.S. O'Hern et al., Phys. Rev. Lett. 88, 075507 (2002).
- [2] M. Maiti and M. Schmiedeberg, Scientific Reports 8, 1837 (2018).
- [3] M. Maiti and M. Schmiedeberg, ArXiv:1812.02503.
- [4] M. Kohl et al., Nature Communications 7, 11817 (2016).