Kolloquium

Theoretische Physik

Universität Konstanz

Di 21.01.20
11:45 Uhr
A 702

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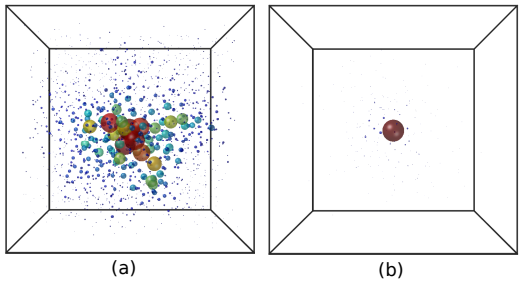
Excitations and defects in structural glasses

The nature of defects in amorphous materials, analogous to vacancies and dislocations in crystals, remains elusive. I will discuss their nature in a three-dimensional microscopic model glass-former, which describes granular, colloidal, atomic and molecular glasses by changing the temperature and density. All glasses evolve in a very rough energy landscape, with a hierarchy of barrier sizes corresponding to both localized and delocalized excitations. Collective excitations dominate in the jamming regime relevant for granular and colloidal glasses. By moving gradually to larger densities describing atomic and molecular glasses, the system crosses over to a regime dominated by localized defects and relatively simpler landscapes. I will discuss the energy and temperature scales associated to these defects and their evolution with density. Finally, I will discuss the role of quantum fluctuations and the connection of these defects with the tunnelling two-level systems that are postulated to dominate the physics of glasses at very low temperatures.



References:
C.Scalliet et al. Nature Communications 10, 5102 (2019)
D.Khomenko et al. arXiv:1910.11168