Dynamics of a model supercooled liquid confined in a cavity with amorphous boundaries

Tomás Grigera[1]

[1]*Universidad Nacional de La Plata, Argentina*

ABSTRACT

We shall present numerical results on the dynamics of a supercooled liquid confined in a spherical cavity with amorphous boundaries, i.e. boundaries made by particles of the same liquid but artificially frozen in an equilibrium configuration. This is the setup used to measure the point-to-set correlation function (which measures the spatial span of the influence of amorphous boundary conditions on a confined system), only that here we look not only at the static corelations but study the dynamical relaxation as well. By using a swap Montecarlo algorithm we measure the equilibration time of a liquid droplet bounded by the amorphous cavity, and we show that the cavity relaxation time increases with the size of the droplet, saturating to the bulk value when the droplet outgrows the point-to-set correlation length. This fact supports the idea that the point-to-set correlation length is the natural size of the Adam-Gibbs's cooperatively rearranging regions. On the other hand, the cavity relaxation time computed by a standard, nonswap dynamics, has the opposite behavior, showing a very steep increase when the cavity size is decreased. We try to reconcile this difference by discussing the possible hybridization between MCT and activated processes, and by introducing a new kind of amorphous boundary conditions, inspired by the concept of frozen external state.