Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

On Structural Relaxation in Simple Fluids TOMAS OPPELSTRUP, Lawrence Livermore National Lab. , USA, BABAK SADIGH, Lawrence Livermore National Lab. , USA, SRIKANTH SASTRY, Jawaharlal Nehru Centre for Advanced Scientific Research , India, MIKHAIL DZUGUTOV, NADA, KTH , Sweden —
We suggest a new measure of approach to the ergodic equilibrium for a system of particles. The proposed measure is of purely geometric nature, and it is based on assessing the system's progress in its configuration space. Using this measure on the system of hard spheres, we demonstrate the existence of a universal relation between the diffusion and the structural relaxation in dense liquids which manifests itself as the Stokes-Einstein relation. In the low density regime we find that this universality is broken with the onset of a secondary and slower relaxation process which is density dependant and non-existant in the normal liquid domain.

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Date submitted: 01 Dec 2004 Electronic form version 1.4