Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Anomalously Slow Dynamics in the Manhattan Model[1] PRASANTA PAL, Department of Applied Physics, Yale University, COREY O'HERN, Department of Mechanical Engineering, Yale University — We study the Brownian dynamics of hard rods in a Manhattan-like traffic grid, in which a series of narrow horizontal and vertical channels intersect at right angles and particles are forbidden from turning at the intersections. We measure the mean-square displacement (msd) as a function of packing fraction ϕ and determine the ϕ_g at which dynamical arrest occurs as a function of system size, number of intersections, and topology of the grid. We observe that structural relaxation occurs via a complex out-of-equilibrium process in which particles occupy locally dense regions of the grid and then undergo a first passage process. We compare our results for the msd and ϕ_g to that found in model glass-forming liquids in two and three dimensions.

[1]Funding from grant number NSF-CBET0625149 is acknowledged.

Prasanta Pal
Department of Applied Physics, Yale University

Date submitted: 27 Nov 2007 Electronic form version 1.4