Abstract Submitted
for the OSF08 Meeting of
The American Physical Society

Diffusion of a Concentrated Lattice Gas in a Regular Comb Structure[1] PAUL GARCIA, CHRISTOPHER WENTWORTH, Dept. of Physics, Doane College — Understanding diffusion in constrained geometries is of interest in a variety of contexts as varied as mass transport in disordered solids, such as a percolation cluster, or intercellular transport of water molecules in biological tissue. In this investigation we explore diffusion in a very simple constrained geometry: a comb-like structure involving a one-dimensional backbone of lattice sites with regularly spaced teeth of fixed length. The model considered assumes a fixed concentration of diffusing particles can hop to nearest-neighbor sites only, and they do not interact with each other except that double occupancy is not allowed. The system is simulated using a Monte Carlo simulation procedure. The mean-square displacement of a tagged particle is calculated from the simulation as a function of time. The simulation shows normal diffusive behavior after a period of anomalous diffusion that increases as the tooth size increases.

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Date submitted: 03 Sep 2008   Electronic form version 1.4