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Small system size effects in single-file diffusion T. E. SHERIDAN, Ohio Northern University — Single-file diffusion (SFD) is the diffusive motion of particles in one-dimension with the constraint that particles can not pass each other. We model SFD in a finite system using n random walkers on a periodic lattice with an average of m empty sites between walkers. The time-dependence of the mean-squared displacement (MSD) is found using a Monte Carlo simulation as a function of n for small systems with $n \leq 500$ walkers. For short times, the increase in the MSD is approximately proportional to the time t for all systems. For longer times and large n, the MSD rolls over and approaches the expected asymptotic behavior, MSD $\propto t^{1/2}$. However, for small n the MSD approaches a constant value because the finite system size limits the maximum spread of the walkers.

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