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Preliminary investigation of single-file diffusion in complex plasma rings W.L. THEISEN, T.E. SHERIDAN, Ohio Northern University — Particles in one-dimensional (1D) systems cannot pass each other. However, it is still possible to define a diffusion process where the mean-squared displacement (msd) of an ensemble of particles in a 1D chain increases with time t. This process is called single-file diffusion. In contrast to diffusive processes that follow Fick's law, msd $\propto t$, single-file diffusion is sub-Fickean and the msd is predicted to increase as $t^{1/2}$. We have recently created 1D dusty (complex) plasma rings in the DONUT (Dusty ONU experimenT) apparatus. Particle position data from these rings will be analyzed to determine the scaling of the msd with time and results will be compared with predictions of single-file diffusion theory.

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