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Diffusion of 2D Yukawa liquids under a magnetic field YAN FENG, T.P. INTRATOR, Los Alamos National Laboratory, J. GOREE, BIN LIU, Department of Physics and Astronomy, The University of Iowa — Normal and anomalous diffusion of 2D strongly coupled dusty plasmas without magnetic fields have been studied both theoretically and experimentally in the past decade. Recently, dusty plasma behaviors under magnetic fields have attracted attention, especially the Magnetized Dusty Plasma (MDPX) facility. The gyro motion due to the applied magnetic field will drastically change the collective dynamics of dusty plasmas. Here, Langevin dynamics simulations were performed to study the diffusion of individual charged particles of 2D Yukawa liquids, with a magnetic field perpendicular to the 2D plane. The gyro motion is competing with the thermal motion, and as a result, the diffusion behavior of individual particles will be suppressed by the applied magnetic field. As diagnostics of diffusion, the mean squared displacement and velocity autocorrelation function have been calculated from the simulated particle trajectories. A relationship between the diffusion and the applied magnetic field will be obtained from our simulations. Work supported by DOE, NSF and NASA.

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