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Effect of plasma density on properties of a small Debye cluster A. HERRICK, T.E. SHERIDAN, Ohio Northern University — Parameters of a twodimensional Debye cluster with six particles in a (1, 5) configuration have been measured as a function of the density of the argon discharge in which they are suspended. Particle charge, plasma Debye length, cluster temperature and mode damping rates were determined by projecting the Brownian motion of the particles onto the center of mass and breathing modes. The Debye shielding parameter  $\kappa$ is found to increase as the square root of the plasma density, and to have a value between  $\approx 0.5$  and 2, while the particle charge has a constant value  $q \approx -17000e$ , and the cluster temperature is  $\approx 400$  K, independent of plasma density.

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