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Plasmon Vibrational Delocalization in 1D Disordered Wigner Lattices SHIMUL AKHANJEE, JOSEPH RUDNICK, UCLA Dept. of Physics and Astronomy — We explore various aspects of classical 1D Wigner solids in the presence of strong disorder at $T = 0$. Two different realizations of electrostatic randomness are studied: a system of particles with spatially random charge strengths and a system of like charges interacting with an external random potential. In the random potential system we have discovered a novel type of vibrational delocalization transition of the plasma oscillations. Finite size scaling studies of the localization length and inverse participation ratio reveal an Anderson transition from extended to localized eigenmodes at larger eigenfrequencies. Other properties of the eigenmodes are also discussed in the context of this criticality. Additionally, for both models the probability density of particle spacings is examined analytically through the use of probability convolutions within a weak disorder approximation and compared to numerically relaxed ensembles. We find that the statistical configuration of the charges is sensitive to the to the specific type of quenched random distribution.

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