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Static and dynamic properties of two dimensional Coulomb clusters BISWARUP ASH, AMIT GHOSAL, Indian Institute of Science Education and Research Kolkata, Mohanpur, India-741246, JAYDEB CHAKRABARTI, S.N. Bose National Centre for Basic Sciences, Block-JD, Sector-III, Salt Lake, Kolkata-700098 — We study the temperature dependence of static and dynamic responses of small number of particles in two-dimensional traps across the thermal crossover from the solid- to liquid-like behaviors. We explore the possibility of observing the signatures of hexatic-glass like behavior for Coulomb interacting particles confined by irregular geometry. While static correlations, that investigate the translational and bond orientational order, show the footprints of hexatic like phase at low temperature, dynamics of the particles slow down considerably as the system approaches the crossover temperature. Using density correlations we probe intriguing signatures of long-lived inhomogeneities due to the interplay of disorder (arising from the irregularity in the confinement) and long-range interactions. The relaxation at multiple time scales show stretched-exponential spatial decay in irregular traps¹. Temperature dependence of characteristic time scales, depicting the structural relaxation of the system, show striking similarities with those observed for the glassy systems. Our results indicate that some of the key signatures of supercooled liquids emerge for confined systems with lower spatial symmetries.

(1) B.Ash, J.Chakrabarti, and A.Ghosal, Euro.Phys.Lett.,114,4, (2016)

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