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Nearly frozen Coulomb liquids YOHANES PRAMUDYA, SERGEY PANKOV, Florida State University, National High Magnetic Field Laboratory, EFSTRATIOS MANOUSAKIS, Florida State University, MARTECH, VLADIMIR DOBROSAVLJEVIC, Florida State University, National High Magnetic Field Laboratory — We show that very long range repulsive interactions of a generalized Coulomb-like form $V(R) \sim R^{-a}$, with $a < d$ (d-spatial dimensionality), typically introduce very strong frustration, resulting in extreme fragility of any charge-ordered state. An "almost frozen" liquid then survives in a broad dynamical range above the (very low) melting temperature T_c. Using a combination of extended dynamical mean-field theory [1] and Monte Carlo simulations we study classical lattice gas models with such long range interaction, focusing on the behavior at $T > T_c$. We find that a soft, temperature-dependent pseudo-gap emerges in this regime, reflecting strong short-range correlations that persist above the melting temperature. This "pseudo-gap" phase is characterized by unusual insulating-like, but very weakly temperature dependent transport, similar to experimental findings [2] in many low carrier density systems. [1] S.Pankov and V. Dobrosavljevic, Phys. Rev. Lett. **94**, 046402 (2005). [2] K. Lai, W. Pan, D. C. Tsui, S. Lyon, M. Muhlberger, and F. Schaffler, Phys. Rev. B **75**, 033314 (2007).

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