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Phase Diagram of the 3-D Coulomb Glass AMIN BARZEGAR, WENLONG WANG, Texas A&M University, JUAN CARLOS ANDRESEN, Royal Institute of Technology (KTH), Sweden, HELMUT G. KATZGRABER, Texas A&M University — The existence of an equilibrium glass phase for charges in a disordered potential with long-range Coulomb interactions still remains controversial. Here, we conduct an extensive study of the disorder-temperature phase diagram of the Coulomb glass model in three space dimensions. We use population annealing Monte Carlo to equilibrate the system down to very low temperatures. Our results suggest an antiferromagnetic phase for the field values $h \lesssim 0.15$. We also measure the corresponding critical exponents that show a good agreement with previous numerical studies. Outside of the antiferromagnetic region, we observe no sign of a Coulomb-glass phase at temperatures as low as $T = 0.001$ (dimensionless units). This indicates that glassy properties in the Coulomb glass are either restricted to extremely low or zero temperature, they do not exist at all, or they are heavily suppressed by finite-size effects.

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