Title:	Finite temperature phase transition in the two-dimensional Coulomb glass at low disorders
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Abstract:	We present numerical evidence using Monte Carlo simulations of finite temperature phase transition in two dimensional Coulomb Glass lattice model with random site energies at half-filling. For the disorder strengths (W) studied in this paper, we find the existence of charge-ordered phase (COP) below the critical temperature (Tc(W)). Also, the probability distribution of staggered magnetization calculated at each W shows a two-peak structure at their respective critical temperature. Thus the phase transition from fluid to COP as a function of temperature is second order for all W. We find no evidence of a spin glass phase between a fluid and the COP. Further, we have used finite-size scaling analysis to calculate the critical exponents. The critical exponents at zero disorder are different from the one found at finite disorders, which indicates that the disorder is a relevant parameter here. The critical exponent for correlation length v increases and Tc decreases with increasing disorder. Similar behaviour for v was seen in the work of Overlin et al. for three dimensional Coulomb Glass model with a positional disorder. Our study also shows that other critical exponents are also a function of disorder.
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