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Phase transitions in site diluted systems of Ising dipoles JUAN J. ALONSO, Universidad de Malaga, JULIO F. FERNANDEZ, ICMA, CSIC-Universidad de Zaragoza — By Monte Carlo simulations, we study dilute systems of Ising magnetic dipoles on simple cubic lattices. Dipoles are restricted to point along the z axis and are randomly placed in a fraction x of the L^3 sites of the lattice. For $x_c < x \leq 1$ where $x_c \simeq 0.6$ we find a thermally driven second order transition between a paramagnetic and a dipolar antiferromagnetic (AF) phase at a temperature T_o which can be fitted by $k_B T_o/\varepsilon_d \simeq 4.3(x - x_c)^{0.6}$, where ε_d is a nearest neighbor dipole-dipole interaction energy. We explore whether an equilibrium spin glass phase exists for $x < x_c$. To this end, we study the spin glass overlap parameter q between equilibrium configurations which we obtain from tempered Monte Carlo simulations for systems of N dipoles in the range $40 \leq N \leq 500$. For $x < x_c$ we find no AF phase transition. However, we observe rather large AF correlation lengths at low temperatures for $0.2 < x < x_c$. For $x = 0.35, 0.5$ and 0.6 and temperatures below $k_B T/\varepsilon_d \simeq 0.9$ x we find double-peaked distributions of $q/ < q^2 >^{1/2}$. Their shape does not change appreciably with N. For smaller values of x, for which previous results exists, we have not been able to obtain clear cut results.

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