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Comparison between two simple models for the magnetoelectric interaction in multiferroics G.E. BARBERIS, IFGW, Unicamp, Brazil, C.J. CALDERON FILHO, IFGW Unicamp, Brazil — We developed numerical calculations to simulate the magnetoelectric coupling in multiferroic compounds, using the Monte Carlo technique. Two simple models were used to simulate the compounds. In the first one, the magnetic ions are represented by a spin 1/2 2D Ising lattice of ions, and the electric lattice by classical moments, coupled one to one with the magnetic moments. The coupling between both lattices allows to the leading lattice, that is, the magnetic one, to change the orientation of the electrical dipoles in one direction perpendicular to the magnetic dipoles. This direction was chosen to accomplish the symmetry requirements of the magnetoelectric effect. In the second case, the magnetic lattice is also a 2D Ising lattice, but the electric momenta are in a lattice that also behaves as an Ising lattice, perpendicular to the magnetic moments. In this case, the one-to-one coupling of the electric and magnetic momenta is represented by a two-valued energy parameter, allowing the possibility of independent transition temperatures for both lattices. Both models contain three independent parameters. We studied the physical properties obtained with both models, as functions of the ratio of the three parameters. The results in both cases allowed us to compare changes in the physics of the models, and with the physics of compounds measured experimentally.

G.E. Barberis
IFGW, Unicamp, Brazil

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