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Magnetocaloric Effect in GdAl2 and GdNi2 Intermetallics Compounds: A Monte Carlo Study AMOS TROPER, Centro Bras. Pesquisas Fisicas, EDUARDO NÓBREGA, Centro Bras. Pesquisas Fisicas, PEDRO VON RANKE, UERJ, NILSON OLIVEIRA, UERJ — The magnetocaloric effect (MCE) is intrinsic to all magnetic materials and is due to the coupling of crystalline and magnetic lattices with the external magnetic field. The search for new magnetic materials with giant magnetocaloric effect has been challenging physicists in the last decades. Despite the theoretical works reported in the literature, many aspects of the physical processes involved in the MCE are not yet well understood. The theoretical microscopic description of this effect in pure rare earth compounds is usually made by using the Heisenberg model Hamiltonian, treated in the molecular field approximation. However, if we want to study the MCE in rare earth disordered compounds, we should go beyond the molecular field approximation in order to correctly account for the magnetic interactions present in these systems. In this work we study the MCE in rare earth Laves phase binaries e. g., $GdAl_2$ and $GdNi_2$. In order to describe the magnetic properties of these compounds, we use a classical Heisenberg-like model including disorder in the magnetic lattice. The magnetic and thermodynamic properties are calculated via the Numerical Monte Carlo simulation. The isothermal magnetic entropy changes, calculated using the Maxwell thermodynamic relation are in good agreement with the available experimental data.

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