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Influence of the Magnetic State on the Chemical Order-Disorder Transition Temperature in Fe-Ni Permalloy MARCUS EKHOLM, Linköping University, Sweden, HELENA ZAPOLSKY, Université de Rouen, France, ANDREI RUBAN, Royal Institute of Technology, Sweden, IRYNA VERNYHORA, DENIS LEDUE, Université de Rouen, France, IGOR ABRIKOSOV, Linköping University, Sweden, LINKÖPING UNIVERSITY, SWEDEN TEAM, UNIVERSITÉ DE ROUEN, FRANCE TEAM, ROYAL INSTITUTE OF TECHNOLOGY, SWEDEN TEAM — In magnetic alloys, the effect of finite temperature magnetic excitations on phase stability below the Curie temperature is poorly investigated, although many systems undergo phase transitions in this temperature range. In this study [1], we consider random Ni-rich Fe-Ni alloys, which undergo chemical order-disorder transition approximately 100 K below their Curie temperature, to demonstrate from *ab-initio* calculations that deviations of the global magnetic state from ideal ferromagnetic order due to temperature induced magnetization reduction have a crucial effect on the chemical transition temperature. We propose a scheme where the magnetic state is described by partially disordered local magnetic moments, which in combination with Heisenberg Monte-Carlo simulations of the magnetization allows us to reproduce the transition temperature in good agreement with experimental data. [1] Ekholm et al., Phys. Rev. Lett. 105:167208 (2010)

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