Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Theoretical study of disordered Fe-Ru alloys: a Monte Carlo approach[1] IAN DIAZ, Universidade Federal de Santa Catarina — We study the magnetic properties and critical behaviour of quenched $Fe_{1-x}Ru_x$ alloys on a bcc lattice, for the following ruthenium concentrations: $x = 0\%$, 4%, 6% and 8%. This study is carried out within a Monte Carlo approach employing multiple histogram reweighting to analyse the data generated in the simulations. By means of a finite-size scaling analysis of several themodynamic quantities, taking into account up to the leading irrelevant scaling field term, we find estimates of the critical exponents α, β, γ and ν and critical temperature of our model. Our results for $x = 0\%$ are in excelent agreement with those for the three-dimensional pure Ising model in the literature, as expected. We show that our estimates of critical exponents for $x = 4\%$, 6% and 8% are consistent with those reported for the transition line between paramagnetic and ferromagnetic phases of both randomly dilute and $\pm J$ Ising models. We also compare our results for the behaviour of the Curie temperature as a function of ruthenium concentration and magnetization as a function of temperature with experimental and mean-field results reported elsewhere.

[1]The author would like to to thank the Brazillian Agencies FAPESC, CNPq and CAPES for partial financial support.

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Date submitted: 18 Nov 2009 Electronic form version 1.4