Séminaire du SPEC
Lundi 16 juillet 2007, 16h00

Bt. 774 - Salle Claude ITZYKSON
Centre d'Etudes de Saclay, Orme des Merisiers
91191 Gif-sur-Yvette

ATTENTION : jour et heure inhabituels
Extended scaling scheme and its application to spin glasses

Koji HUKUSHIMA
(University of Tokyo)

Critical phenomena of continuous phase transition is one of the most sophisticated topics in the field of statistical mechanics. Recently, we proposed an extended scaling scheme [1,2] for critical phenomena of continuous phase transitions. The extended scaling expressions are systematically derived for thermodynamic observables in ferromagnets and in spin glasses. These provide good leading-order critical representations for a wide range of temperature, which is significantly enlarged as compared with the conventional scaling scheme. The expressions should be of practical importance for estimating critical exponents in spin glasses, when the data available from numerical simulation as well as experiments are those at higher temperature than T_c by a few tens percents of it. Using the extended scaling scheme, we obtained a consistent set of critical exponents of the three-dimensional Ising spin glass with bimodal distribution from finite-size scalings for different observables, in contrast to previous studies by the conventional scaling. We also discuss an extension of our scheme to treat the correction terms and its examination for some ferromagnets.

[1] I.A. Campbell, K. Hukushima and H. Takayama, Phys. Rev. Lett. 97, 117202 (2006)
[2] I.A. Campbell, K. Hukushima and H. Takayama, cond-mat/0612665.