



MECO38
38th Conference of the Middle European Cooperation in Statistical Physics
25 - 27 March 2013, ICTP, Trieste, Italy

DISORDERED POTTS MODEL ON A HIERARCHICAL LATTICE

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Abstract:

We study the critical behavior of the random q -state Potts model in the large- q limit on the diamond hierarchical lattice with an effective dimensionality $d_{\text{eff}} > 2$. By varying the temperature and the strength of the frustration the system has a phase transition line between the paramagnetic and the ferromagnetic phases which is controlled by four different fixed points. According to our renormalization group study the phase-boundary in the vicinity of the multicritical point is self-similar, it is well represented by a logarithmic spiral. We expect infinite number of reentrances in the thermodynamic limit, consequently one can not define standard thermodynamic phases in this region.