

Critical Properties of the Bond-Diluted Mixed Transverse Ising Spin System with Single-Ion Anisotropy

YAN Shi -Lei,^{1,2} DENG Ling-Ling¹ and YANG Chuan-Zhang¹

¹ Department of Physics, Suzhou University, Suzhou 215006, China

² CCAST (World Laboratory), P.O. Box 8730, Beijing 100080, China

(Received: 2000-6-1; Revised:)

Abstract: The critical properties of the bond-diluted mixed spin-1/2 and spin-1 transverse Ising system with single-ion anisotropy are investigated by means of the effective field theory with correlations. Particular emphasis is given to the square lattice for which phase diagrams are obtained. If transverse field varies in the certain ranges we find that the tricritical point is obtained for the value of the bond concentration in a restricted region. We also observe that the reentrant phase transition may occur in the present system if single-ion anisotropy parameter is not large and if transverse field is small. On the other hand, for certain values of the system parameters, new induced magnetic ordering can be obtained. We find a number of interesting phenomena that are not predicted by previous literatures. The influence of the transverse field on the behaviours of the reentrant phase transition and induced magnetic ordering is discussed. A detailed description of the phase transition is presented.

PACS: 75.40.Cx, 75.50.Cc, 75.50.Gg

Key words: bond dilution, mixed transverse field Ising system, single-ion anisotropy

[\[Full text: PDF\]](#)

Close