Exact results for a spin-one Ising model with random crystal field

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ERRATA

The dilute spin-one Ising model on a honeycomb lattice by Viktor Urumov *(J. Phys.: Condens. Matter* 1989 **1** 1159)

Exact results for a spin-one Ising model with random crystal field by Viktor Urumov *(J. Phys.: Condens. Matter* 1989 **1** 7037)

In the definition of the nearest-neighbour pair correlation function on the Kagomé lattice a factor of 2 in the denominator was inadvertently omitted. The correct expression is

$$\varepsilon_k(F) = \frac{1}{2N_{sk}} \frac{\partial \ln Z_k}{\partial F}.$$

This omission is what leads to the erroneous division by 2 of $\varepsilon_k(F)$ in equations (16) and (17) in the first paper and all equations starting from (16) in the second paper. This changes the numerical values of the critical concentrations. The correct critical concentrations for the site-diluted model are

$$p_{c1} = \frac{1+3\varepsilon_c}{2}\frac{9q}{1+9q} + \frac{3(1-\varepsilon_c)}{2}\frac{q}{1+q} = 0.899519053$$

for $\Delta = 0$ and

$$p_{c2} = (1+3\varepsilon_c)(1-\exp(-4F_c))/4 = 0.683012702$$

for $\Delta < 0$.

The critical values of the parameter p in the distribution function

$$P_1(\Delta) = p\delta(\Delta - \Delta_0 - \Delta_1) + (1-p)\,\delta(\Delta - \Delta_0 + \Delta_1)$$

in the case of random crystal fields are

$$p_{c1} = 1 - a\exp(-4F_c)/4 = 0.683012702$$

$$p_{c2} = a\exp(-4F_c)(1 - \exp(4F_c)/2b + a/8b)/4 = 0.100480947$$

$$p_{c3} = a\exp(-4F_c)/4 = 0.316987298.$$

In the case of uniform distribution of random crystal fields, the critical surface vanishes along the line

$$\Delta_0 = (a\exp(-4F_c)/2 - 1)\,\Delta_1 = -0.366025404\,\Delta_1.$$

The overall forms of the figures are not changed substantially, except in the last case (figure 4: the amended version is given here) where the increase of the range of fluctuations of the crystal field reduces the domain of the ordered phase to that of lower values of Δ_0.

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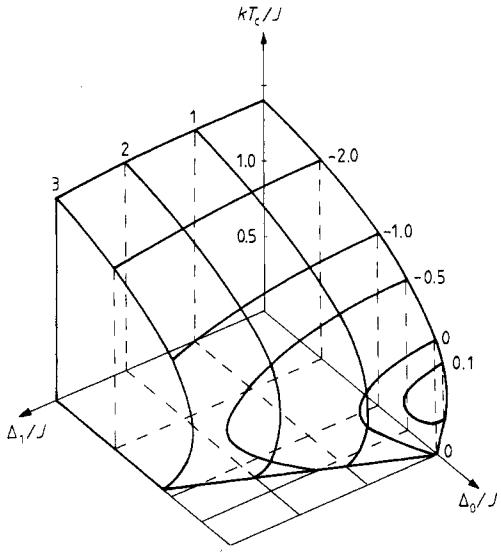

Figure 4. The critical surface kT_c/J as a function of the mean crystal field Δ_0/J and the half-width of its fluctuations Δ_1/J, which define the uniform distribution of crystal fields.