

A Solvable Decorated Ising Lattice Model

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Abstract: A decorated lattice is suggested and the Ising model on it with three kinds of interactions K_1 , K_2 , and K_3 is studied. Using an equivalent transformation, the square decorated Ising lattice is transformed into a regular square Ising lattice with nearest-neighbor, next-nearest-neighbor, and four-spin interactions, and the critical fixed point is found at $K_1=0.5769$, $K_2=-0.0671$, and $K_3=0.3428$, which determines the critical temperature of the system. It is also found that this system and the regular square Ising lattice, and the eight-vertex model belong to the same universality class.

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Key words: Ising model, square decorated lattice, critical point, universality class

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