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Numerical study of Potts models with aperiodic modulations: influence on first-order transitions[1] NILTON BRANCO, Departamento de Fisica, Universidade Federal de Santa Catarina, Florianopolis, SC, Brazil, DANIEL GIRARDI, National Institute of Science and Technology for Complex Systems, Universidade Federal Fluminense, Volta Redonda, RJ, Brazil — We perform a numerical study of Potts models on a rectangular lattice with aperiodic interactions along one spatial direction. The number of states q is such that the transition is a first-order one for the uniform model. The Wolff algorithm is employed, for many lattice sizes, allowing for a finite-size scaling analyses to be carried out. Three different self-dual aperiodic sequences are employed, such that the exact critical temperature is known: this leads to precise results for the exponents. We analyze models with $q = 6$ and 15 and show that the Harris-Luck criterion, originally introduced in the study of continuous transitions, is obeyed also for first-order ones. The new universality class that emerges for relevant aperiodic modulations depends on the number of states of the Potts model, as obtained elsewhere for random disorder, and on the aperiodic sequence. We determine the occurrence of log-periodic behavior, as expected for models with aperiodic modulated interactions.

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