[P17] Influence of quenched disorder on absorbing phase transitions in conserved lattice gas model

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Motivated by the Harris criterion, absorbing phase transitions of the conserved lattice gas (CLG) model were studied on lattices with quenched impurities, i.e., on infinite percolation networks, both in two and three dimensions. Harris criterion implies that, in a magnetic system, the pure fixed point will be unstable if the specific heat exponent is positive. For the CLG model, the specific heat exponent α calculated by the hyperscaling relation , $\alpha = 2 - d\nu$, ν being the spatial correlation length exponent in d dimensions, will be positive in two dimensions if the value of ν obtained earlier by Lubeck and Heger is employed and will be close to 0 or negative if the more recent value by Lee and Lee is used, and it was positive in three dimensions with the available value of ν. By extensive numerical simulations, it was found that, for the fraction of impurity sites less than the critical fraction, the critical exponents were found to be similar to those on a regular lattice both in two and three dimensions. When the fraction of disordered sites reached the critical fraction, the nonuniversal power-law behaviors were observed in both dimensions. These results were contrasted to the results for the contact process with quenched disorder, for which nonuniversal Griffith phase was observed when disorder was introduced, with the disorder concentration below and on the critical concentration. The nonuniversal power laws were found to be due to the dead ends and dangling ends and, eliminating those dead ends and dangling ends, it was found that the CLG model exhibited universal, new critical behavior, different from that on a regular lattice.