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Monte-Carlo simulations of the clean and disordered contact process in three space dimensions THOMAS VOJTA, Missouri University of Science and Technology — The absorbing-state transition in the three-dimensional contact process with and without quenched randomness is investigated by means of Monte-Carlo simulations. In the clean case, a reweighting technique is combined with a careful extrapolation of the data to infinite time to determine with high accuracy the critical behavior in the three-dimensional directed percolation universality class. In the presence of quenched spatial disorder, our data demonstrate that the absorbing-state transition is governed by an unconventional infinite-randomness critical point featuring activated dynamical scaling. The critical behavior of this transition does not depend on the disorder strength, i.e., it is universal. Close to the disordered critical point, the dynamics is characterized by the nonuniversal power laws typical of a Griffiths phase. We compare our findings to the results of other numerical methods, and we relate them to a general classification of phase transitions in disordered systems based on the rare region dimensionality. This work has been supported in part by the NSF under grants no. DMR-0906566 and DMR-1205803.

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