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Quantum critical behavior of the superfluid-Mott glass transition[1] THOMAS VOJTA, JACK CREWSE, Missouri University of Science and Technology, MARTIN PUSCHMANN, Technische Universität Chemnitz — We investigate the zero-temperature superfluid to insulator transition in a diluted rotor model with particle-hole symmetry. We map the Hamiltonian onto a classical XY model with columnar disorder which we analyze by means of large-scale Monte Carlo simulations. For dilutions below the lattice percolation threshold, the system undergoes a generic superfluid-Mott glass transition. In contrast to other quantum phase transitions in disordered systems, its critical behavior is of conventional power-law type with universal (dilution-independent) critical exponents which we compute with high accuracy. In addition, we study the percolation quantum phase transition across the lattice percolation threshold; its critical behavior is governed by the lattice percolation exponents. We relate our results to a general classification of phase transitions in disordered systems, and we discuss experiments.

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