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INVITED SPEAKER: Quantum critical behavior of a superfluid-insulator transition

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Abstract content
   (Max 300 words)
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We investigate the quantum phase transitions as well as the phase diagram of a two-dimensional quantum rotor model with off-diagonal disorder by means of large-scale Monte-Carlo simulations. In contrast to the exotic critical behavior found in other random quantum systems, this Hamiltonian features a conventional (finite-disorder) critical point with power-law scaling but with critical exponents that differ from the clean ones. We also address the percolation quantum phase transition across the lattice percolation threshold, and we relate our findings to a general classification of phase transitions with quenched disorder. Moreover, we discuss technical aspects of our computational approach that permit the efficient simulation of random quantum systems including anisotropic finite-size scaling and improved Monte-Carlo estimators.

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