

Abstract Submitted
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Scratched-XY Universality and Phase Diagram of Disordered 1D Bosons in Optical Lattice ZHIYUAN YAO, Department of Physics, University of Massachusetts, Amherst, MA 01003, USA, LODE POLLET, Department of Physics, Arnold Sommerfeld Center for Theoretical Physics and Center for NanoScience, University of Munich, Theresienstrasse 37, 80333 M, NIKOLAY PROKOF'EV, BORIS SVISTUNOV, Department of Physics, University of Massachusetts, Amherst, MA 01003, USA — The superfluid-insulator quantum phase transition in a 1D system with weak links belongs to the so-called scratched-XY universality class, provided the irrenormalizable exponent ζ characterizing the distribution of weak links is smaller than $2/3$. With a combination of worm-algorithm Monte Carlo simulations and asymptotically exact analytics, we accurately trace the position of the scratched-XY critical line on the ground-state phase diagram of bosonic Hubbard model at unity filling. In particular, we reveal the location of the tricritical point separating the scratched-XY criticality from the Giamarchi-Schulz one.

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