

Abstract Submitted
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Replica Symmetry Breaking in the Bose Glass STEVEN THOMSON, FRANK KRUGER, University of St Andrews — We investigate the nature of the Bose glass phase of the disordered Bose-Hubbard model and demonstrate the existence of a glass-like replica symmetry breaking (RSB) order parameter in terms of particle number fluctuations. Starting from a strong-coupling expansion around the atomic limit, we study the instability of the Mott insulator towards the formation of a Bose glass. We add some infinitesimal RSB, following the Parisi hierarchical approach in the most general form, and observe its flow under the momentum-shell renormalization group scheme. We find a new fixed point with one-step RSB, corresponding to the transition between the Mott insulator and a Bose glass phase with hitherto unseen RSB. This finding is consistent with the expectation of glassy behavior and previous results showing the breakdown of self-averaging. We discuss the possibility of measuring the glass-like order parameter in optical lattice experiments.

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