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Disorder-induced enhancement of phase coherence in trapped bosons on optical lattices PINAKI SENGUPTA, ADITYA RAGHAVAN, STEPHAN HAAS, Univ. of Southern California — Using numerical methods, we have investigated the effects of disorder on a system of interacting bosons trapped in a one-dimensional optical lattice. Our results show that there is a unique effect at small to moderate strengths of disorder if there is a Mott plateau at the center of the trap in the ordered system - long range phase coherence actually *increases* as a result of disorder. The localization effects due to correlation and disorder compete against each other which results in a partial delocalization of the particles in the Mott region leading to increased coherence. Eventually, at large disorder strengths, the phase coherence decreases. In the absence of a Mott plateau at the center, this effect is absent and the phase coherence decreases for all disorder strengths. Further analysis of the uniform (no trap) system shows that the disordered states belong to the Bose glass phase.

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