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Trap-induced scales in non-equilibrium dynamics of strongly interacting bosons RAJDEEP SENSARMA, Tata Institute of Fundamental Research, ANIRBAN DUTTA, KRISHNENDU SENGUPTA, Indian Association for Cultivation of Sciences — We use a time-dependent hopping expansion technique to study the non-equilibrium dynamics of strongly interacting bosons in an optical lattice in the presence of a harmonic trap characterized by a force constant K. We show that after a sudden quench of the hopping amplitude J across the superfluid (SF)-Mott insulator(MI) transition, the SF order parameter $\Delta_r(t)$ and the local density fluctuation $\delta n_r(t)$ exhibit sudden decoherence beyond a trap-induced time scale $T_0 \sim K^{-1/2}$. We also show that after a slow linear ramp down of J, Δ_r and the boson defect density P_r display a novel non-monotonic spatial profile. Both these phenomena can be explained as consequences of trap-induced time and length scales affecting the dynamics and can be tested by concrete experiments.

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