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Light-cone spreading of correlations after a quantum quench in the Bose-Hubbard model in 1 and 2 dimensions[1] MATTHEW FITZPATRICK, MALCOLM KENNETT, Simon Fraser University — The quench dynamics of the Bose-Hubbard model (BHM) has received considerable attention in recent years. Theoretically, it has proven challenging to study spatio-temporal correlations in the BHM in dimensions higher than one. We use the Schwinger-Keldysh technique and a strong-coupling expansion to develop a two-particle irreducible formalism that allows the study of spatio-temporal correlations in both the superfluid (SF) and Mott-insulating (MI) regimes during a quantum quench for dimensions higher than one. In this talk, we focus on quenches within the MI regime and present our numerical results for the evolution of the two-point Green's function. We observed a light-cone-like spreading of single-particle correlations in both 1D and 2D and compare our estimated propagation velocities to existing experimental and theoretical work. We also discuss how our formalism can be easily extended to disordered systems, allowing for the study of Bose glass and possibly many-body-localized states.

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