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Induced transitions in the attractive Bose-Hubbard model LEV KHAYKOVICH, FATEMA HAMODI, Bar-Ilan University — We study induced transitions between different energy levels in the one-dimensional attractive Bose-Hubbard model with periodic boundary conditions. The initial eigenstates of the model are found by the exact diagonalization of the Bose-Hubbard Hamiltonian in the limit of small systems. Then, we drive transitions between the eigenstates by inducing a weak modulation of the tunnelling rate. The knowledge of exact eigenstates allows us to identify the selection rules for transitions between the different eigenstates. One obvious selection rule is related to the translation symmetry of the system. In addition, we identify a subspace in the total Hilbert space where parity symmetry dictates another and less obvious selection rule. We then show that in the strongly interacting limit this selection rule has implications on the entire Hilbert space. We discuss its signatures on the system's dynamics and consider how it can be observed experimentally with ultracold atoms.

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