Superfluidity from correlations.

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We study a one-dimensional Bose-Hubbard gas in a lattice whose hopping energy is made to oscillate with zero time average. Such a driving suppresses first-order particle hopping while allowing even higher-order processes [1]. At a critical value of the driving amplitude, the system passes from a Mott insulator to an exotic superfluid phase whose cat-like ground state consists of two branches characterized by the preferential occupation of opposite momentum eigenstates [2]. In the absence of autonomous single-particle hopping, the resulting superfluidity is exclusively driven by correlations. We discuss how such a phase differs qualitatively from conventional superfluidity. The effect is robust against variations in experimental details [3]. We show that this system can be probed with time-of-flight experiments.

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