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**Characteristics of condensed bosons in the vicinity of Mott insulating states** KUEI SUN, SMITHA VISHVESHWARA, University of Illinois at Urbana-Champaign, COURTNEY LANNERT, Wellesley College — We study the inhomogeneous system of strongly-interacting bosons in optical lattices. We focus on the weak tunneling region wherein a condensate is predicted to exist between two Mott insulating phases. We use a pseudo-spin approximation to the Bose-Hubbard system to model the effective potential which confines the condensate order parameter and to analyze collective excitations of the system. We also consider the effect of applying a radio-frequency (RF) magnetic field in this region. We find that the RF spectrum for driving transitions from one hyperfine species of bosons to another is markedly different between the Mott insulating phase and the condensed phase. In particular, the former has one resonant peak, while the latter has two peaks which show shifts of the order of the tunneling strength between lattice sites. Our results and analyses provide a means of verifying the existence of the condensate.

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