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Some new results on two-well Bose-Hubbard problem ANDREW CARMICHAEL, University of Connecticut, MARIJAN KOSTRUN, University of Connecticut; Wesleyan University, JUHA JAVANAINEN, University of Connecticut — In continuation of our previous work, we investigate the standard Bose-Hubbard system for a fixed number of particles in a two-well configuration, using the mean-field (semiclassical) approximation and the hermitian phase operator method (quantum). We compare two situations; that in which the on-site interaction is repulsive versus that in which it is attractive. We find that the respective semi-classical phase spaces are shifted one from the other by an angle π and that the spectrum of one system, when inverted, becomes that of the other. We discuss some interesting implications of this duality on the properties of the number fluctuations in the ground state.

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