Abstract Submitted
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Interference in the Mott Insulator State of Distinguishable Particles[1] LIN TIAN, FUMITAKA FUJIWARA, TIM BYRNES, National Institute of Informatics, 2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8430, Japan , YOSHIHISA YAMAMOTO, Department of Applied Physics and E. L. Ginzton Laboratory, Stanford University, Stanford, CA 94305; National Institute of Informatics, Tokyo, Japan — Particle statistics plays a crucial role in strongly interacting quantum many-body systems. Here, we study the Hubbard model for distinguishable particles at unit filling. We show that when on-site repulsive interaction dominates over tunneling, the ground state is a Mott insulator state with higher order coherence between the particles. This result can be experimentally confirmed by the recovery of the interference pattern in the density correlation functions and is robust against non- uniformity of the interaction and tunneling parameters. We also show that this state is a maximally entangled state, in contrast to its bosonic counterpart. L. Tian, F. Fujiwara, T. Byrnes, and Y. Yamamoto, preprint, arXiv/0705.2023.

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