

Abstract Submitted
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Quantum Monte Carlo study of bilayer ionic Hubbard model¹

MI JIANG, Institute for Theoretical Physics, ETH Zurich, Switzerland and Swiss National Supercomputing Center, ETH Zurich, 6900 Lugano, Switzerland — The interaction-driven insulator-to-metal transition has been reported in the ionic Hubbard model (IHM) for intermediate interaction U , which poses fundamental interest in the correlated electronic systems. Here we use determinant quantum Monte Carlo to study the interplay of interlayer hybridization V and two types of intralayer staggered potentials: one with the same (in-phase) and the other with a π -phase shift (anti-phase) potential in two layers termed as “bilayer ionic Hubbard model”. We demonstrate that the interaction-driven Insulator-Metal transition extends to bilayer IHM with finite V for both types of staggered potentials. Besides, the system with in-phase potential is prone to metallic phase with turning on interlayer hybridization while that with anti-phase potential tends to insulators with stronger charge density order.

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