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Effects of interorbital hopping on orbital fluctuations and metal-insulator transitions. YUN SONG, Department of Physics, Trent University, LIANG-JIAN ZOU, Insititute of Solide State Physics, Chinese Academy of Sciences — We study the effects of inter-orbital hopping on orbital fluctuations and Mott-Hubbard metal-insulator transition (MIT) in the two-orbital Hubbard model within the extended linearized dynamical mean-field theory. By mapping the model onto an effective model with different bandwidths through the canonical transformation, we find that at half filling, the increases of the inter-orbital Coulomb interaction U$'$ and the Hund's coupling J drive the MIT, and the critical J_c for MIT increases with the lift of the inter-orbital hopping integral t_{ab}. Meanwhile at quarter filling and in the strong correlation regime, the system without t_{ab} exhibits MIT with the decreasing of J, and favors the orbital liquid ground state. However, the system transits from metal to insulator with the increasing of t_{ab}, accompanied with the rising of the orbital order parameter. These results show the important role of the inter-orbital hopping in the orbital fluctuation and orbital ordering.

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