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Spectral properties of orbital polarons in Mott insulators[1] KRZYSZTOF WOHLFELD, Jagellonian University, Cracow, MARIA DAGHOFER, Oak Ridge National Lab, University of Tennessee, ANDRZEJ M. OLEŚ, Jagellonian University, Cracow, Max-Planck-Institut FKF, Stuttgart, PETER HORSCH, Max-Planck-Institut FKF, Stuttgart — Since orbital symmetry is lower than SU(2), superexchange in Mott insulators with orbital degrees of freedom is typically not Heisenberg-like and hole propagation is highly nontrivial [1]. We investigate cases with Ising-like superexchange, where the hole cannot propagate by its coupling to spin fluctuations. We find that the usually neglected three-site hopping determines hole motion [2]. One realization of Ising superexchange is the Falicov-Kimball model, where only electrons with one orbital flavor can move, and the other ones are localized — then a hole inserted into the Mott insulator either moves via three-site hopping processes, or remains trapped in a small polaron. In another case of Ising exchange, a class of t_{2g} or e_g orbital systems, renormalized three-site hopping leads to one-dimensional hole propagation, with its direction determined by the orbital flavor of the hole.

[1] J. van den Brink *et al.*, Phys. Rev. Lett. **85**, 5174 (2000).
[2] M. Daghofer *et al.*, Phys. Rev. Lett. **100**, 066403 (2008).

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