REITER’S WAVEFUNCTION OF THE POLARON IN THE \( t-J \) MODEL WITH \( t_{2g} \) ORBITAL DEGENERACY

Krzysztof Wohlfeld \(^a\,^b\) Andrzej M. Oleś \(^a\,^b\) Maria Daghofer \(^c\) Peter Horsch\(^b\)

\(^a\)Marian Smoluchowski Institute of Physics, Jagellonian University, Reymonta 4, PL-30059 Kraków, Poland
\(^b\)Max-Planck-Institut FKF, Heisenbergstr. 1, D-70569 Stuttgart, Germany
\(^c\)Department of Physics and Astronomy, The University of Tennessee, Knoxville, Tennessee 37996, USA

Recently, using self-consistent Born approximation (SCBA), we showed that a single hole introduced into the undoped ground state of an orbital \( t-J \) model with \( t_{2g} \) orbital degeneracy is mobile \([1]\). This striking result contradicts the naive expectations which suggest that a hole should be trapped in this Ising-like ordered ground state. However, we demonstrated in Ref. \([1]\) that the motion of a single hole is due to the frequently neglected three-site terms and showed that this new mechanism of hole movement is fundamentally different from the hole motion via quantum fluctuations in the standard spin \( t-J \) model. Though, a more detailed understanding of this novel mechanism is needed. Hence, instead of considering the Green’s function as in Ref. \([1]\) we investigate the corresponding Reiter’s wavefunction \([2]\) calculated in the SCBA. In particular, we show how the number of orbitons associated with a hole motion depends on the superexchange parameter \( J \) and compare this result to the one obtained for the spin model.


Subject category:
1. Strongly Correlated Electrons and High Temperature Superconductivity

Presentation mode:
poster

Corresponding author:
Krzysztof Wohlfeld

Address for correspondence:
Marian Smoluchowski Institute of Physics
Jagellonian University
Reymonta 4
PL-30059 Kraków
Poland

Email address:
k.wohlfeld@uj.edu.pl