2002 Vol.37 No.5 pp.607-614 DOI:

The Antiferromagnetic Correlations in the Half-Filled Double-Exchange Model at Finite Temperature

JI An-Chun, WANG Jing, and TIAN Guang-Shan

Department of Physics, Peking University, Beijing 100871, China
(Received: 2001-11-27; Revised:)

Abstract: We extend a previous result of ours [G.S. Tian, Phys. Rev. B 63 (2001) 224413] on the antiferromagnetic spin correlations in the half-filled Hubbard model at finite temperature to the double-exchange model. To overcome the mathematical difficulty caused by the S=3/2 localized spin freedom in this model, we apply both Zener's argument and the finite-temperature spin-reflection-positivity method to show rigorously that, at any temperature T, the spin correlations in the half-filled double-exchange model are predominantly antiferromagnetic. This conclusion is completely consistent with the experimental observations and the previous theoretical results by approximate methods.

PACS: 71.10.Fd, 75.70.Pa, 71.27.+a
Key words: strongly-correlated electron systems, double-exchange model, antiferromagnetic spin correlations