Spin-orbit coupling in Fe-based superconductors

M.M. KORSHUNOV, Department of Physics, University of Florida, Gainesville, Florida 32611, USA, I. EREMIN, Institut fuer Theoretische Physik III, Ruhr-Universitaet Bochum, D-44801 Bochum, Germany, P.J. HIRSCHFELD, Department of Physics, University of Florida, Gainesville, Florida 32611, USA — The recently discovered iron-based superconductors have attracted considerable attention mainly for their unconventional pairing state. In connection with the determination of pairing symmetry, the resonance peak observed in neutron scattering experiments [1] agrees well with predicted results for the extended s-wave ($s_\pm$) gap symmetry [2]. However, recent neutron measurements shows that there is anisotropy in the spin resonance [3]. In particular, $S^z$ component is different from $S^+S^-$ component of the dynamical spin susceptibility. Such breaking of the spin-rotational invariance in the spin-liquid phase without long-range order can occur due to spin-orbit (SO) coupling. We study the role of the SO coupling in the multiorbital model for Fe-pnictides, and discuss how it influences spin resonance feature and the relation to SC pairing.


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