In-Plain Anisotropy of Charge Dynamics in Parent Compounds of Iron Pnictide Superconductors

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Undoped or underdoped iron pnictides have magnetically ordered phase transition accompanied with the structural phase transition. The magnetically ordered state exhibits the stripe-like antiferromagnetic order and is inherently anisotropic. Although it is natural to consider that the paramagnetic state be isotropic, anisotropic behaviors appear in these compounds not only below but also slightly above the transition points. We have previously investigated the origin of the anisotropy of optical conductivity in magnetically ordered state.[1] The current interest is why the anisotropy persists above the critical temperature.

Using a five-orbital model Hamiltonian with mean-field approximation, we set parameters by taking into account the orbital ordering and/or other effects to simulate the paramagnetic state with anisotropic charge transport properties. The calculated results are compared with the experimental data, and we discuss the validity of parameter sets taken in our calculation.

[1]K. Sugimoto, E. Kaneshita, and T. Tohyama, J. Phys. Soc. Jpn. **80**, 033706 (2011).