

Abstract Submitted
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Spin Dynamics and Resonant Inelastic X-ray Scattering in Chromium with Commensurate Spin-Density Wave Order KOUDAI SUGIMOTO, ZHI LI, Yukawa Institute for Theoretical Physics, Kyoto University, EIJI KANESHITA, Sendai National College of Technology, KENJI TSUTSUI, Condensed Matter Science Division, Japan Atomic Energy Agency, TAKAMI TOHYAMA, Yukawa Institute for Theoretical Physics, Kyoto University — After the discovery of iron-pnictide superconductors, the spin dynamics of itinerant antiferromagnetic systems with multi-orbital has attracted much attention. In order to elucidate such spin dynamics, we focus on a similar system, chromium, which is known to show a spin density wave (SDW), and theoretically investigate dynamical spin susceptibilities and L_3 -edge resonant inelastic X-ray scattering (RIXS) spectra [1]. We use multi-band Hubbard model composed of $3d$ and $4s$ orbitals. After the SDW mean-field approximation, we obtain the dynamical spin susceptibilities and RIXS spectra by employing random phase approximation. In our calculation, we assume the perfect commensurate SDW state. We find a collective spin-wave excitation undamped up to ~ 0.6 eV. Above the energy, excitation overlaps individual particle-hole excitations as expected. In RIXS spectra, particle-hole excitations with various orbital channels show a large spectral weight, masking the spectra of the spin collective mode. However, it may be possible to detect the spin-wave excitation in RIXS experiments in the future if resolution is high enough. [1] K. Sugimoto, Z. Li, E. Kaneshita, K. Tsutsui, and T. Tohyama, arXiv:1211.1598

Koudai Sugimoto
Yukawa Institute for Theoretical Physics, Kyoto University

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