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Spin and orbital characters of excitations in iron arsenide superconductors revealed by simulated resonant inelastic x-ray scattering TAKAMI TOHYAMA, Yukawa Institiute for Theoretical Physics, Kyoto University, EIJI KANESHITA, Sendai National College of Technology, KENJI TSUTSUI, Synchrotron Radiation Research Center, Japan Atomic Energy Agency — We theoretically examine the orbital excitations coupled to the spin degree of freedom in the parent state of the iron-arsenide superconductor, based on the calculation in a five-band itinerant model [1]. The calculated Fe L_3-edge resonant inelastic x-ray scattering (RIXS) spectra disclose the presence of spin-flip excitations involving several specific orbitals. Magnon excitations predominantly composed of a single orbital component can be seen in experiments, although its spectral weight is smaller than spin-flipped interorbital high-energy excitations. The detailed polarization and momentum dependence is also discussed with predictions for the experiments. [1] E. Kaneshita, K. Tsutsui, and T. Tohyama, Phys. Rev. B **84**, 020511(R) (2011)

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