Abstract Submitted
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Longitudinal spin excitations and magnetic anisotropy in antiferromagnetically ordered $BaFe_2As_2$[1] YUAN LI, Peking Univ, CHONG WANG, International Center for Quantum Materials, Peking University, China, RUI ZHANG, HUIQIAN LUO, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, FA WANG, International Center for Quantum Materials, Peking University, China, PENGCHENG DAI, Department of Physics and Astronomy, Rice University, LOUIS-PIERRE REGNAULT, SPSMS-MDN, UMR-E CEA/UJF-Grenoble 1, INAC, Grenoble, France — In the iron-based superconductors, there is an outstanding debate on the microscopic origin of the magnetism, whether it arises from local moments or itinerant electrons with Fermi-surface nesting. To answer this question, we performed a spin-polarized inelastic neutron scattering study of spin waves in the antiferromagnetically ordered state of $BaFe_2As_2$. Three distinct excitation components are identified, with spins fluctuating along the *c*-axis, perpendicular to the ordering direction in the *ab*-plane, and parallel to the ordering direction. While the first two "transverse" components can be described by a linear spin-wave theory with magnetic anisotropy and inter-layer coupling, the third "longitudinal" component is generically incompatible with the local moment picture. It points towards a contribution of itinerant electrons to the magnetism already in the parent compound of this family of Fe-based superconductors. (arXiv:1309.7553)

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