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Role of the spin-orbit coupling in the spin-resonance formation in Fe-based superconductors[1] M.M. KORSHUNOV, L.V. Kirensky Institute of Physics, Akademgorodok, 660036 Krasnoyarsk and Siberian Federal University, Svobodny Prosp. 79, 660041 Krasnoyarsk, Russia, YU.N. TOGUSHOVA, Siberian Federal University, Svobodny Prosp. 79, 660041 Krasnoyarsk, Russia, I. EREMIN, Institut fur Theoretische Physik III, Ruhr-Universitat Bochum, D-44801 Bochum, Germany and Kazan Federal University, 42008 Kazan, Russia, P.J. HIRSCHFELD, Department of Physics, University of Florida, Gainesville, Florida 32611, USA — Determination of the gap symmetry is an important step towards uncovering mechanism of superconductivity in Fe-based materials. One of the key experiments in support of the $s_{\pm}$ spin-fluctuation-mediated gap was observation of the spin-resonance peak in many pnictides and chalcogenides, see P.J. Hirschfeld et al., Rep.Prog.Phys. 74, 124508 (2011). Recently, in inelastic polarized neutron scattering measurements by Lipscombe et al., Phys.Rev. B 82, 064515 (2010), it was found that the peaks in the transverse and longitudinal components of the spin susceptibility of $BaFe_{1.9}Ni_{0.1}As_2$ exhibit rather different behavior, and argued that the true spin resonance exists in the transverse channel only. Here, on the basis of the 5-orbital model, we argue that this disparity arises from spin-orbit coupling. It also leads to the relative shift of the two component's resonance frequency with lower frequency one exhibiting larger enhancement.

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