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Spin resonance peak in Fe-based superconductors with unequal gaps[1] MAXIM KORSHUNOV, Kirensky Institute of Physics, Federal Research Center KSC SB RAS , VADIM SHESTAKOV, YULIYA TOGUSHOVA, Siberian Federal University — We study the spin resonance in superconducting state of iron-based materials [1] within multiband models with two unequal gaps, Δ_L and Δ_S, on different Fermi surface pockets [2]. We show that due to the indirect nature of the gap entering the spin susceptibility at the nesting wave vector the total gap $\tilde{\Delta}$ in the bare susceptibility is determined by the sum of gaps on two different Fermi surface sheets connected by . For the Fermi surface geometry characteristic to the most of iron pnictides and chalcogenides, the indirect gap is either $\tilde{\Delta} = \Delta_L + \Delta_S$ or $\tilde{\Delta} = 2\Delta_L$. In the s_{++} state, spin excitations below $\tilde{\Delta}$ are absent unless additional scattering mechanisms are assumed. The spin resonance appears in the $s_{\pm}$ superconducting state at frequency $\omega_R \leq \tilde{\Delta}$. Comparison with available inelastic neutron scattering data confirms that what is seen is the true spin resonance and not a peak inherent to the s_{++} state [3]. References: [1] P.J. Hirschfeld, M.M. Korshunov, I.I. Mazin, Rep. Prog. Phys. 74, 124508 (2011); [2] M.M. Korshunov, V.A. Shestakov, Yu.N. Togushova, Phys. Rev. B 94, 094517 (2016); [3] H. Kontani and S. Onari, Phys. Rev. Lett. 104, 157001 (2010).

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