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Spin resonance in $\mathbf{A}_x\mathbf{Fe}_{2-y}\mathbf{Se}_2$ with s-wave pairing symmetry SUDHAKAR PANDEY, Department of Physics and Astronomy, University of Iowa, Iowa City, IA 52242, ANDREY CHUBUKOV, Department of Physics, University of Wisconsin, Madison, WI 53706, USA, MAXIM KHODAS, Department of Physics and Astronomy, University of Iowa, Iowa City, IA 52242 — We study spin resonance in the superconducting state of recently discovered alkali-intercalated iron selenide materials $A_xFe_{2-y}Se_2$ (A=K,Rb,Cs) with an aim to address the basic issue of pairing symmetry and gap structure in these materials. As the Fermi surface of these materials has only electron pockets, the widely believed s^{+-} symmetry for several iron based superconductors, which implies a sign changing gap between the hole and electron pockets, becomes questionable in case of these materials. While the earlier proposed d-wave symmetry is ruled out in ARPES studies, the observations of a spin-resonance like feature in the inelastic neutron scattering experiments indicate for a sign changing gap in these materials. In this study we demonstrate that the hybridization-induced sign-changing unconventional s^{+-}-wave symmetry, where the SC gap changes its sign between the hybridized electron pockets, supports spin resonance, and the dynamical structure factor is consistent with the results of inelastic neutron scattering. This "other" s-wave symmetry is also consistent with the recent ARPES studies.

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