

Abstract Submitted
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Collapse of the spin resonance spectral weight in overdoped $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ ¹ RAY OSBORN, STEPHAN ROSENKRANZ, JOHN-PAUL CASTELLAN, EUGENE GOREMYCHKIN, DUCK-YOUNG CHUNG, HELMUT CLAUS, Argonne National Laboratory, MERCOURI KANATZIDIS, Northwestern University, TATIANA GUIDI, Rutherford Appleton Laboratory, UK — We report inelastic neutron scattering measurements of magnetic excitations in $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ over a broad range of electron band filling within the superconducting phase. In an itinerant model, these excitations are resonantly enhanced when the superconducting energy gap changes sign on different parts of the electron Fermi surface. They are therefore sensitive both to the superconducting gap symmetry and to the Fermi surface geometry. Our results show that, in addition to becoming incommensurate because of the growing mismatch in the hole and electron Fermi surface volumes, the resonant spectral weight decreases proportionally to the resonance binding energy, vanishing at $x \sim 0.72$. A tight-binding model including s_{\pm} -symmetry pairing is able to reproduce these observations confirming that the resonance arises from the pairing of band electrons.

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