

Spin-orbit coupling, anisotropic magnetic fluctuations and nodeless gap in iron-pnictides revealed by NMR

Guo-qing Zheng

^aDepartment of Physics, Okayama University, Okayama, Japan

^bInstitute of Physics, Chinese Academy of Sciences, Beijing, China

We will report on the pairing symmetry and the spin correlations in the Fe(Ni)-based superconductors $\text{ReFe(Ni)AsO}_{1-x}\text{F}_x$ (Re=Pr ¹, La ^{2,3}), LiFeAs ⁴ and $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ single crystals^{5,6}, based on our extensive NMR measurements. The spin susceptibility measured by the Knight shift decreases below T_c along all crystal directions, which indicates spin-singlet pairing. Evidences for multiple, fully-opened gaps are given. We find that the antiferromagnetic spin fluctuation is anisotropic in the spin space due to spin-orbit coupling, but becomes isotropic in the zero temperature limit ⁶, which also points to spin-singlet superconductivity with nodeless gap.

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