

NMR study of hole-doped iron-pnictide superconductor $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ ($x = 0.27 \sim 1$) (LT26)

M. Hirano^a, Y. Yamada^a, T. Saito^a, Y. Murano^a, R. Nagashima^a, H. Fukazawa^{a,c}, Y. Kohori^{a,c}, K. Kihou^{b,c}, C. H. Lee^{b,c}, A. Iyo^{b,c}, and H. Eisaki^{b,c}

^aDepartment of Physics, Chiba University, Chiba, Japan

^bNational Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

^cJST, Transformative Research-Project on Iron Pnictides (TRIP)

$\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ (BKFA) is hole-doped iron-pnictide superconductor with superconducting transition temperature T_c of 38 K ($x \sim 0.4$) - 3.5 K ($x = 1$). Recent experiments have revealed the possibility that optimally doped BKFA and one end member of the system KFe_2As_2 , have different superconducting gap symmetries, full gap and nodal gap, respectively. We performed the ^{75}As nuclear magnetic resonance measurements of BKFA with concentration $x = 0.27, 0.39, 0.58, 0.64$, and 0.69 in order to determine gap symmetry particularly in over-doped region.

Temperature dependence of spin lattice relaxation rate ($1/T_1$) below T_c gradually changes from $x = 0.39$ to 1.0 . This suggests that the superconducting gap symmetry changes smoothly from full gap into nodal-line structure. Hence, BKFA doesn't have different symmetry in optimally and end region. One explanation for this gap formation of KFe_2As_2 is horizontal line node.