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Spin lattice relaxation rate measurements in $Ba_{0.69}K_{0.31}Fe_2As_2$ by nuclear magnetic resonance[1] SANGWON OH, ANDREW MOUNCE, WILLIAM HALPERIN, Northwestern University, CHENGLIN ZHANG, PENGCHENG DAI, University of Tennessee, ARNEIL REYES, PHILIL KUHNS, National High Magnetic Field Lab — Magnetic impurities have been a problem with NMR measurements of single crystals in the K doped Ba-122 system because of extremely wide linewidth that can be more than 1MHz at low temperature [1]. We have a high quality single crystal of $Ba_{0.69}K_{0.31}Fe_2As_2$ (T_c = 34K) for which the NMR linewidth does not significantly increase at low temperatures and at very large external magnetic fields. In this sample we measure the spin-lattice relaxation rate, $1/T_1$, from 300 K to 4 K at various magnetic fields 6.4 T, 13 T, and 16 T. The rapid increase of $1/T_1T$ down to T_c on cooling can be attributed to spin fluctuations above T_c. In the superconducting state, $1/T_1$ has a kink around 20 K, and below this temperature in a field of 13 T it exhibits a power law dependence, \varpropto T^3. This behavior can be explained by an impurity effect in a superconductor with extended s-wave symmetry [2].

[1] S. Mukhopadhyay *et al.* New J. Phys. **11**, 055002 (2009)
[2] Y. Bang *et al.* Phys. Rev. B **79**, 054529 (2009)

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