^{75}As NMR study of the Flux Lines Lattice dynamics in 122 iron-based superconductors

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Since the discovery of high temperature superconductivity in iron pnictides, much attention has been addressed to the comprehension of the microscopic mechanisms leading to superconductivity, while not so many works dealing with the Flux Lines Lattice (FLL) of these type II superconductors have been published. The 122 family of pnictides superconductors offers the possibility to investigate the FLL properties in large single crystals which allow to perform broadband NMR experiments.
We performed ^{75}As NMR on an $Ba(Fe_{1-x}Rh_x)_2As_2$ single crystal with x$\sim$0.07 by measuring spin-lattice and spin-spin relaxation rates both in the normal and in the superconducting state, at different applied magnetic fields (7 T and 3 T) with $\mathbf{H}_0 \parallel c$. The high temperature behavior of $1/T_1$ can be related to Korringa's law, typical of a metal, while just below T_c we found a peak in $1/T_1$ and $1/T_2$ which is tentatively ascribed to the FLL motion. From a simple model we were able to estimate the effective correlation time τ_e of the FLL motion, as previously done for the cuprate $YBa_2Cu_4O_8$. This model allowed us to decribe also the dimensionality of the FLL, and to derive an energy barrier, related to the applied magnitude of the magnetic field.

[1] D.C Johnston, Advances in Physics **59**, 803-1061 (2010);

[2] M. Corti et al. Phys. Rev. B **54**, 13 (1996).