$^{11}$B NMR Study of Vortex Motion in MgB$_2$

MOOHEE LEE, KYUHONG LEE, K. H. KANG, B. J. MEAN, Konkuk University, Seoul 143-701, Korea, J. S. RHEE, B. K. CHO, KJ-IST 500-712, Korea — We have performed $^{11}$B nuclear magnetic resonance (NMR) measurements to investigate vortex dynamics in the polycrystalline superconductor MgB$_2$. $^{11}$B NMR spectrum, shift, transverse relaxation rate $1/T_2$ were measured down to 4.3 K at 1.8 T. The spectrum below $T_c$ exhibits a typical local field distribution for a vortex lattice under magnetic field. The peak point of the spectrum shifts toward low magnetic field due to imperfect field penetration. $1/T_2$ data, probing the slow motion of vortices, shows a single peak with a small change of the rate, contrary to the results of nickel borocarbides. Also, the relaxation profile changes from a Lorentzian decay below $T_c$ to Gaussian decay at lower temperature. It strongly suggests that thermal fluctuation of vortices is reduced at low temperature and the vortex motion is much weaker compared with nickel borocarbides.

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