

## **Penetration depth and anisotropy of $H_{C2}$ of $MgB_2$ by $^{11}B$ Nuclear Magnetic Resonance Measurements**

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$^{11}B$  nuclear magnetic resonance (NMR) measurements have been performed to investigate the vortex states of the polycrystalline superconductor  $MgB_2$ . The spectrum below  $T_c$  shows a composite structure with a narrow symmetric peak at an unshifted position and a broad asymmetric peak with a large diamagnetic shift. The broad peak dominates at low temperature and small magnetic field. We identify that the broad peak originates from the vortex state whereas the narrow peak comes from crystallites in the normal state. The narrow and broad peaks are deconvoluted to extract the respective fractions. This behavior can be understood as a consequence of significant anisotropy of the upper critical field. From the temperature and field dependence of the fraction of the broad peak, we find the temperature dependence and anisotropy of  $H_{c2}$ . We also determine the temperature dependent penetration depth from the linewidth of the broad peak.