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# カイラル $p$-波超伝導体における渦糸コア内の核磁気緩和率

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# Nuclear Magnetic Relaxation Rate in the Vortex State of a Chiral $p$-Wave Superconductor

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Site-selective nuclear magnetic resonance (NMR) method was recently revealed to be a powerful tool for experimentally investigating the electronic structure inside vortex cores in the mixed state of type-II superconductors [1–3]. We theoretically study [4,5] the site-selective nuclear spin-lattice relaxation rate $T_1^{-1}(T)$ inside a vortex core in the case of a chiral $p$-wave superconductivity [6], $\mathbf{d} = \hat{\mathbf{z}}(\hat{k}_x \pm i\hat{k}_y)$.

We calculate $T_1^{-1}(T)$ numerically within the framework of the quasiclassical theory of superconductivity. We find that $T_1^{-1}(T)$ at the vortex center depends on the sense of the chirality relative to the sense of the magnetic field [4]. $T_1^{-1}(T)$ is suppressed and almost vanishes in the $\hat{k}_x - i\hat{k}_y$ state owing to the interplay between the vorticity and chirality inside the vortex core (here, the magnetic field is applied in positive direction of the $z$ axis). We also investigate the effect of inclination of the magnetic field upon $T_1^{-1}(T)$ [5]. Our result is expected to be experimentally observed as a sign of the chiral pairing state in a superconducting material [6,7] $Sr_2RuO_4$.

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