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Anti-peak profile of the nuclear magnetic relaxation rate in a superconducting topological insulator YUKI NAGAI, Japan Atomic Energy Agency, YUKIHIRO OTA, RIST, MASAHIKO MACHIDA, Japan Atomic Energy Agency — We theoretically reveal that 3D multi-orbital topological superconductivity can be identified by a bulk measurement, i.e., the temperature dependence of nuclear magnetic relaxation (NMR) rates [1]. Superconducting topological insulators such as CuxBi2Se3, are the candidates of the bulk 3D topological superconductors [2]. We claim that the bulk measurements of NMR rates detect a 3D odd-parity fully gapped topological superconducting state in time-reversal-invariant multi-orbital systems. Below a critical temperature Tc, the NMR rate in the topological state exhibits an anti-peak profile, which is opposite to the conventional s-wave state. This inversion coherence effect comes from a twist of order parameters with respect to orbital and spin degrees of freedom. Our calculations in the model for candidates of the topological superconductors prove that this inverse effect appears as a concave temperature dependence of the NMR rates. We propose that a time-reversal-invariant orbital-singlet spin-triplet topological superconductivity is characterized by the temperature dependence of the NMR rate. [1] YN, Y. Ota and M. Machida, PRB92, 180502R (2015),YN and Y. Ota, arXiv:1605.08154, to be published in PRB. [2] S. Sasaki, et al., Phys. Rev. Lett. 107, 217001 (2011).

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