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Rotational Symmetry Breaking in a Trigonal superconductor Nb-doped Bi_2Se_3 TOMOYA ASABA, BENJAMIN LAWSON, COLIN TINSMAN, LU CHEN, PAUL CORBAE, GANG LI, Univ. of Michigan, YUNSHENG QIU, YEW SAN HOR, Missouri University of Science and Technology, LIANG FU, Massachusetts Institute of Technology, LU LI, Univ. of Michigan — Topological superconductors (TSC) have been attracting huge interest due to their potential applications to topological quantum computation. While it has been challenging to confirm TSC, recently it has been predicted that superconducting doped Bi_2Se_3 shows a nematic order in the TSC state. In this study we probed the rotational symmetry of a TSC candidate Nb-doped Bi_2Se_3 in both normal and superconducting states by torque magnetometry. The magnetic field was applied in-plane and the symmetry of magnetic anisotropic susceptibility as well as hysteresis loop was measured. While $\sin 6\phi$ dependence was observed in the normal state, $\sin 2\phi$ and $\sin 4\phi$ components become dominant instead of vanishing $\sin 6\phi$ component in the superconducting state. This indicates rotational symmetry breaking in the superconducting state, suggesting nematic order as predicted.

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