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Unconventional superconductivity in single crystal $\text{Lu}_2\text{Fe}_3\text{Si}_5$ ¹ R. GORDON, M.D. VANNETTE, C. MARTIN, Ames Laboratory, T. TAMEGAI, Y. NAKAJIMA, Department of Applied Physics, The University of Tokyo, Japan, R. PROZOROV, Ames Laboratory — Dynamic magnetic susceptibility for a single crystal of the ternary superconductor $\text{Lu}_2\text{Fe}_3\text{Si}_5$ has been measured using a tunnel diode resonator (TDR) technique. The London penetration depth exhibits non-exponential temperature dependence. We analyze the obtained superfluid density by comparing models of two-gap superconductivity, a gap with nodes or a highly anisotropic gap. The upper critical field is highly anisotropic and is unusually large. Furthermore, hysteresis in the susceptibility implies unusually strong temperature dependence of the critical current. The results are discussed in terms of possible unconventional behavior of this low- T_c superconductor.

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