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Quantum Criticality and 2-D dissipative quantum XY ferromagnetism in single crystalline YFe2Al10 from MuSR investivations¹ KEVIN HUANG, CHENG TAN, JIAN ZHANG, ZHAOFENG DING, Fudan University, DOUGLAS MACLAUGHLIN, University of California, Riverside, OSCAR BERNAL, California State University, Los Angeles, PEI-CHUN HO, California, State University, Fresno, L. WU, MEIGAN ARONSON, Stony Brook University, LEI SHU, Fudan University — We have performed Muon spin relaxation (μ SR) measurements on single crystalline YFe_2Al_{10} down to 19 mK and in magnetic fields up to ~ 100 Oe with fields applied along the b-axis and c-axis. Zero-field- μ SR measurements showed no evidence of magnetic order down to 19 mK, consistent with previous measurements. Interestingly we also find that the depolarization rate Λ is temperature independent above 1 K but displays a strong diverging temperature dependence for T < 1 K, different than what was observed for polycrystals of YFe_2Al_{10} . Longitudinal-field μSR measurements also reveals a time-field scaling for multiple temperatures in fields up to 200 Oe. From this work we find that single crystalline YFe_2Al_{10} is in close proximity to a ferromagnetic quantum critical point and find evidence that it is the first experimental realization of a 2-D dissipative XY-model ferromagnet.

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