

Abstract Submitted
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Electron Paramagnetic Resonance Spectroscopy of Hyperfine Structure of Er:YSO using Josephson Bifurcation Amplifier RANGGA P BUDOYO, KOSUKE KAKUYANAGI, HIRAKU TOIDA, YUICHIRO MATSUZAKI, WILLIAM J MUNRO, HIROSHI YAMAGUCHI, SHIRO SAITO, NTT Basic Research Laboratories — We introduce a scheme to perform electron paramagnetic resonance (EPR) spectroscopy by measuring the induced magnetization using a tunable Josephson Bifurcation Amplifier (JBA). This scheme allows us to perform EPR spectroscopy over a relatively wide range of frequency and magnetic field. Using this scheme, we performed continuous wave EPR spectroscopy of an erbium-doped yttrium orthosilicate crystal (Er:YSO) at 200 mK for magnetic fields between 0.3 and 6.5 mT and frequencies between 0.1 and 5.2 GHz. We observed multiple transitions within the range of measurement. The observed spectra agree well with the simulated spectrum, taking into account the hyperfine and quadrupole interactions of ^{167}Er . The sensitivity and sensing volume of this scheme is estimated to be about ≈ 7000 spins/ $\sqrt{\text{Hz}}$ and ≈ 0.15 pl, respectively.

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