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Observation of dark states in a superconductor diamond quantum hybrid system XIAOBO ZHU, YUICHIRO MATSUZAKI, NTT Basic Research Laboratories, ROBERT AMSUSS, Vienna Center for Quantum Science and Technology, KOSUKE KAKUYANAGI, NTT Basic Research Laboratories, TAKAAKI SHIMO-OKA, NORIKAZU MIZUOCHI, Graduate School of Engineering Science, Osaka University, KAE NEMOTO, National Institute of Informatics, WILLIAM J. MUNRO, NTT Basic Research Laboratories, KOUICHI SEMBA, National Institute of Informatics, SHIRO SAITO, NTT Basic Research Laboratories — We observed a remarkably sharp resonance (~ 1 MHz) at 2.878 GHz in the spectrum of flux qubit NV-diamond hybrid quantum system under zero external magnetic field. This width is much narrower than that of both the flux-qubit and spin-ensemble. We show this resonance is evidence of a collective dark state in the ensemble which is coherently driven by the superposition of clockwise and counter-clockwise macroscopic persistent super-currents owing in the flux qubit.

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