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Magnetic torque measurement in a gapless spin-liquid state of $EtMe_3Sb[Pd(dmit)_2]_2$ DAIKI WATANABE, YOSHINORI SENSHU, MINORU YAMASHITA, SHO TONEGAWA, TAKASADA SHIBAUCHI, YUJI MATSUDA, Department of Physics, Kyoto University, YUGO OSHIMA, REIZO KATO, Riken, TAICHI TERASHIMA, SHINYA UJI, NIMS, ILYA SHEIKIN, LNCMI — The organic Mott insulator $EtMe_3Sb[Pd(dmit)_2]_2$ with nearly identical 2D triangular lattice of $S = 1/2$ is the most promising candidate material of a quantum spin liquid, in which gapless spin excitations have been reported by the thermal transport measurements [1]. However, it remains unsettled whether the observed gapless excitations are magnetic ($S \geq 1/2$) or nonmagnetic ($S = 0$). The magnetic torque measurement is a powerful tool to probe the magnetic properties down to very low temperature, because it is not affected by isotropic impurities. We report the magnetic torque measurements of $EtMe_3Sb[Pd(dmit)_2]_2$ down to 30 mK up to 32 T. A finite magnetic susceptibility is observed at the lowest temperature. Magnetization increases linearly with the magnetic field up to 32 T without exhibiting any anomarly. These results indicate that the gapless excitations reported by the thermal conductivity measurements are magnetic and that the present system is in an algebraic spin liquid phase.

[1] M. Yamashita *et al.*, Science **328**, 1246 (2010).

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