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Gapped quantum spin-liquid state in a frustrated triangular magnet κ-(BEDT-TTF)$_2$Cu$_2$(CN)$_3$ MINORU YAMASHITA, NORIHITO NAKATA, Department of Physics, Graduate School of Science, Kyoto University, Kyoto 606-8502, Japan, YUICHI KASAHARA, TAKAHIKO SASAKI, NAOKI YONEYAMA, NORIO KOBAYASHI, Institute for Materials Research, Tohoku University, Sendai 980-8577, Japan, SATOSHI FUJIMOTO, TAKASADA SHIBAUCHI, YUJI MATSUDA, Department of Physics, Graduate School of Science, Kyoto University, Kyoto 606-8502, Japan — Unveiling the nature of quantum-spin-liquids (QSL) states, quantum fluctuation-driven disordered ground states, has been a central challenge in condensed matter physics. Especially the nature of the low-lying spin excitations and the presence/absence of the "spin gap" have been of great interest. Recently, NMR measurements have shown that a QSL state is realized in κ-(BEDT-TTF)$_2$Cu$_2$(CN)$_3$ with a nearly isotropic 2D triangular lattice structure. Here we report on our thermal-transport measurements in this compound down to 80 mK. We find that the QSL state has a full gap of ~ 0.5 K ($\sim J/500$) and the gap is hardly affected by magnetic fields up to 10 T [1], which sharply contradict recent reports of heat capacity measurements reporting a finite γ-term. We will discuss some possibilities to explain the tiny spin gap in this triangular system. [1] M. Yamashita et al., Nature Physics (in press).

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