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Negative quantum renormalization of excitation energies in the distorted kagome lattice antiferromagnet $Cs_2Cu_3SnF_{12}$ K. MATAN, Mahidol University, T. ONO, Osaka Prefecture University, Y. NAMBU, T. J. SATO, IMRAM, Tohoku University, H. TANAKA, Tokyo Institute of Technology — Magnetic excitations in the distorted kagome lattice antiferromagnet $Cs_2Cu_3SnF_{12}$ were studied using neutron scattering. At room temperature, $Cs_2Cu_3SnF_{12}$ crystalizes in the hexagonal $R\bar{3}m$ space group with the lattice parameters $a = 7.142(4)$ Å and $c = 20.381(14)$ Å. The $S = 1/2$ Cu^{2+} ions form a perfect kagome lattice. The system undergoes the structural transition at $T_s = 185$ K, doubling the in-plane lattice parameter a, and magnetic transition to the Néel state at $T_N = 20$ K. Spin-wave excitations in the ordered state can be qualitatively described by linear spin-wave theory (LSWT). However, the exchange interactions extracted from the spin-wave data are renormalized by a factor of 0.6 from those calculated by LSWT, almost irrespective of the momentum transfer. This inadequacy of LSWT is attributed to quantum effects and provides evidence of negative quantum renormalization of excitation energies in the kagome magnet. Recent results from a high-intensity pulsed neutron scattering experiment, which show the absence of high-energy spin-wave modes, will also be discussed.

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