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Spin frustration and magnetic ordering in the Mott insulating fcc-Cs_3C_{60} YUICHI KASAHARA, YUKI TAKEUCHI, TATSUAKI ITOU, YOSHIHIRO IWASA, Quantum-Phase Electronics Center, The University of Tokyo, DENIS ARCON, Jozef Stefan Institute, MATTHEW ROSSEINSKY, University of Liverpool, KOSMAS PRASSIDES, Durham University — The low-temperature magnetic state at ambient pressure has been investigated by specific heat and nuclear magnetic resonance (NMR) measurements in face-centered-cubic (fcc-) Cs_3C_{60}, which is characterized by a Mott insulating state with $S = 1/2$ spins in C_{60}^{3-} anions and a geometrical spin frustration inherent in the fcc lattice. Specific heat exhibited no sharp anomaly down to 0.4 K, but both magnetic specific heat and NMR relaxation rate revealed a broad peak around 2.5 K, indicating that the reported antiferromagnetic ordering is accompanied by a gradual freezing of electronic spins with distributed transition temperatures. These results are unexpected in the conventional fcc antiferromagnets. Interplay of geometrical frustration, orientational disorder of C_{60} molecules, and weak Mottness gives rise to the unique magnetic ground state in fcc-Cs_3C_{60}.

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