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Chirality-driven heavy-fermion behavior in kagome Hubbard model MASAFUMI UDAGAWA, YUKITOSHI MOTOME, University of Tokyo — Recently, considerable attention has been focused on the heavy-fermion behavior of transition metal compounds, such as LiV_2O_4. As to the rare-earth materials, the origin of large quasiparticle mass is attributed to the entropy associated with the localized f-electron moments. In contrast, the mechanism of heavy-fermion behavior is still unclear for the transition metal compounds because they do not possess an obvious "entropy reservoir". To explore an alternative scenario in the effect of geometrical frustration under electron correlation, we study the Hubbard model on the kagome lattice at half filling by adopting the cluster dynamical mean-field theory with the continuous-time quantum Monte Carlo method as an impurity solver. We find that the system exhibits a hierarchy of energy scale in charge, spin, and chirality degrees of freedom. The entropy associated with the chirality is released at a much lower temperature than other energy scales for spin and charge fluctuations, leading to a sharp peak in the specific heat and the single-particle spectrum. These results reveal a new chirality-driven heavy-fermion formation.

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