

Abstract Submitted
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Quasi-local critical nature of cooperative paramagnetic fluctuations in CaRuO_3 metal JAGATH GUNASEKERA, Univ of Missouri - Columbia, LELAND HARRIGER, NIST, THOMAS HEITMANN, MURR, DEEPAK SINGH, Univ of Missouri - Columbia — Ruthenate perovskites of the form ARuO_3 , where A is alkaline earth metal, hold strong promises in developing new paradigm of the quantum magnetism. CaRuO_3 is of special interest among this group. The unusual combination of the absence of magnetic order and the anomalous non-Fermi liquid properties makes it an archetypal perovskite for the exploration of the quantum magnetism. Recently, we performed detailed electric, magnetic and neutron scattering measurements on high quality polycrystalline sample of CaRuO_3 . The experimental results suggest that the underlying magnetism is depicted by the quantum mechanical fluctuations of Ru^{4+} - spins, confined to field-independent random domains that form a cooperative paramagnetic state at low temperature. The dynamic structure factor, which increases significantly below $T \sim 22$ K, manifests a linear (E/T) scaling, implying the Curie-Weiss type fluctuations with temperature as the most relevant parameter. Moreover, the linear dynamic scaling in conjunction with the divergence of the spin fluctuations mean relaxation time as $T \sim 0$ K suggest the existence of a quasi-local critical behavior in the system.

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