

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Quasi-continuum excitation in Co-doped CaRuO₃.¹ JAGATH GUNASEKERA, ASHUTOSH DAHAL, Univ of Missouri - Columbia, JOSE RODRIGUEZ, LELAND HARRIGER, NIST Center for Neutron Research, TOM HEITMANN, Missouri University Research Reactor, DEEPAK SINGH, Univ of Missouri - Columbia — Spin-1/2 systems provide a unique platform to study the interplay between magnetism and quantum mechanics that often depict novel properties, such as quantum spin liquid or singlet-to-triplet transition. In this presentation, we report an interesting observation of singlet-to-triplet transition in Co-doped CaRuO₃, even though none of the magnetic atoms (Co or Ru) exhibit spin-1/2 properties. What we have found that as Co atom gradually replaces Ru in CaRuO₃, the system tends to develop a localized excitation around $Q=1 \text{ \AA}^{-1}$ at 5.9 meV at low temperature. At roughly 20% doping percentage of Co, the inelastic excitation at low temperature is well described by singlet-to-triplet transition of $S=1/2$. As the measurement temperature increases, the localized excitation fades into a sort of Q -independent background that becomes stronger as a function of temperature. This behavior is also well manifested by ac susceptibility measurements where the dynamic susceptibility tends to get stronger as the temperature increases. Our analysis suggests that Co-doping in CaRuO₃ locally creates $3d^7$ electronic configuration, which can be described by $S=1/2$ in this disordered system.

¹U.S. Department of Energy, Office of Basic Energy Sciences under Grant No. DE-SC0014461

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Date submitted: 06 Nov 2015

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