APS March Meeting 2020

View Abstract

CONTROL ID: 3305336

TITLE: Random singlet state in the spin liquid candidate $Ba_5CuIr_3O_{12}$

Abstract Body: Understanding the role of disorder is crucial for the realization of quantum spin liquid (QSL) states in frustrated magnets, as it can lead to states mimicking QSL, but devoid of long-range entanglement. We study the thermodynamic and high magnetic field properties of the magnetic insulator $Ba_5CuIr_3O_{12}$, a QSL candidate showing no magnetic order down to 2 K. The temperature dependencies of the magnetic susceptibility and the specific heat suggest weak antiferromagnetic correlations, in stark contrast to the magnetization that does not saturate up to a field of 59 Tesla. We show that these results can be reconciled only within the framework of a disorder-dominated random singlet state. The obtained exchange coupling distribution $P(J)$ is found to be consistent with the power-law form $P(J) \sim J^{\alpha}$ with $\alpha \approx 0.6$. Our work highlights the use of high magnetic field measurements for distinguishing QSL candidates from disorder-dominated states and characterizing the latter.

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PRESENTATION TYPE: Oral

UNIT: 11.0 STRONGLY CORRELATED SYSTEMS, INCLUDING QUANTUM FLUIDS AND SOLIDS (DCMP)

SORTING CATEGORY: 11.08.00 Correlated Electron Magnetism (DCMP, GMAG) [same as 10.06.00]

Category Type: Experimental/Theoretical

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