

Subject: MATERIALS SCIENCE COLLOQUIUM, Collin Broholm, Johns Hopkins University, Spin Resonance in the d-wave Superconductor CeCoIn₅, Thursday, March 27, 2008, 11:00 a.m., Building 212, Room A-157, Stephan Rosenkranz
From: Marlene Metz <metz@anl.gov>
Date: Mon, 10 Mar 2008 15:49:05 -0500
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MATERIALS SCIENCE COLLOQUIUM

SPEAKER: Collin Broholm
Johns Hopkins University

TITLE: "Spin Resonance in the d-wave Superconductor CeCoIn₅"

DATE: Thursday, March 27, 2008

TIME: 11:00 a.m.

PLACE: Building 212, Room A-157

HOST: Stephan Rosenkranz

Refreshments will be available at 10:45 a.m

Abstract:

A range of strongly correlated metals feature an intricate mix of magnetism and superconductivity. While copper oxides famously display such behavior on the 100 Kelvin temperature scale, closely related phenomena are encountered in rare earth and actinide intermetallics on the 1 Kelvin temperature scale. Applications and two orders of magnitude in energy notwithstanding, much can be learned about both classes of materials by comparing and contrasting their properties. Following a brief introduction to the now quaint subject of heavy fermion superconductivity, I shall discuss our recent discovery of a spin resonance in the superconducting state of CeCoIn₅ [1]. A surprising result that follows from the neutron data is that the reduction in 4f inter-site spin exchange energy is substantially greater than the reduction in thermal energy associated with superconductivity. This suggests that the energy gain from strengthening near neighbor spin exchange may actually be able to drive an antiferromagnetically correlated metal to d-wave superconductivity.

[1] C. Stock, C. Broholm, J. Hudis, H. J. Kang, and C. Petrovic, Phys. Rev. Lett. 100, 087001 (2008)

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