Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Microwave Spectroscopy of Heavy Fermion Superconductors at MilliKelvin Temperatures COLIN TRUNCIK, WENDELL HUTTEMA, PAUL CARRIERE, PATRICK TURNER, DAVID BROUN, Simon Fraser University, JOHN SARRAO, Los Alamos National Laboratory, GREG STEWART, PETER HIRSCHFELD, University of Florida, WILLIAM GANNON, WILLIAM HALPERIN, Northwestern University — Heavy fermion metals are of immense interest due to the extreme renormalization of quasiparticle mass, the possibility of non-Fermi-liquid physics, and the appearance of superconductivity on the verge of magnetic order, in the vicinity of quantum critical points. The nature of these unconventional pairing states allows, in some cases, for order parameter collective modes. We have setup a novel system for high-resolution microwave spectroscopy at milliKelvin temperatures, across the frequency range 2 to 40 GHz. We are using this to study the unconventional superconducting states in a number of Ce- and U-based heavy fermion compounds. I will present a brief overview of the microwave spectroscopy system, and a summary of measurements on a number of samples including $CeCoIn_5$, where we see the existence of two quasiparticle bands, the heavier of which is largely responsible for the superconductivity, and the lighter of which remains largely uncondensed even at low temperatures.

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Date submitted: 20 Nov 2009 Electronic form version 1.4