Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Point Contact Spectroscopy Study of CeCoIn$_5$: Evidence for Unconventional Pairing in a Multi-Band Heavy Fermion Superconductor P. M. C. ROURKE, C. S. TUREL, University of Toronto, Canada; M. A. TANATAR, University of Toronto, Canada; Institute for Surface Chemistry, National Academy of Sciences Ukraine, Kiev, Ukraine, C. PETROVIC, Brookhaven National Laboratory, USA, J. Y. T. WEI, University of Toronto, Canada — Point-contact spectroscopy was performed on single crystals of the heavy-fermion superconductor CeCoIn$_5$ in the temperature range 150mK to 2.5K. A pulsed measurement technique ensured minimal Joule heating over a wide voltage range. The spectra show Andreev-reflection characteristics with multiple structures which depend on junction impedance. Spectral analysis using the generalized BTK formalism revealed two nodal order-parameter components, with amplitudes $\Delta_1=0.95 \pm 0.15\text{meV}$ and $\Delta_2=2.4\pm 0.3\text{meV}$ which evolve differently with temperature. These observations indicate a highly unconventional pairing mechanism, possibly involving multiple bands [1]. Measurements are also done in a magnetic field to study the field-evolution of the order-parameter components we observed.
Work supported by: NSERC, CFI/OIT, MMO/EMK and the Canadian Institute for Advanced Research. Work at Brookhaven supported by: Division of Materials Sciences, Office of Basic Energy Sciences, US Department of Energy under contract no. DE-AC02- 98CH10886.

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Date submitted: 05 Dec 2004

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