Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Point-contact spectroscopy of the pure and Cd-doped heavy-fermion superconductor $CeCoIn_5$** W. K. PARK, L. H. GREENE, Univ. of Illinois at Urbana, J. L. SARRAO, J. D. THOMPSON, Los Alamos National Lab., L. D. PHAM, Univ. of California-Davis, Z. FISK, Univ. of California-Irvine — Point-contact spectroscopy has been performed on pure and Cd-doped $CeCoIn_5$. Conductance spectra of $CeCoIn_5$ along three different orientations exhibit consistent features: i) background asymmetry; ii) Andreev reflection signal over similar energy scales ($\sim$1 meV) and of similarly reduced magnitudes (10 - 13%) at zero-bias.[1,2] Comparison with the extended Blonder-Tinkham-Klapwijk model calculations indicate the first spectroscopic evidence for $d_{x2-y2}$ symmetry of the superconducting order parameter.[1,2] A two-fluid model[3] will be discussed to explain the asymmetry and the reduced Andreev reflection. Cd-doped (10%) $CeCoIn_5$ exhibits intriguing conductance behaviors as a function of temperature and magnetic field, undergoing antiferromagnetic and superconducting transitions: a broad zero-bias peak below $T_N$ and two competing conductance channels below $T_c$. 1.W.K. Park *et al.*, PRB **72**, 052509 (2005); cond-mat/0507353; cond-mat/0606535. 2.W.K. Park and L.H. Greene, PRL **96**, 259702 (2006). 3. S. Nakatsuji, D. Pines and Z. Fisk, PRL **92**, 016401 (2004). Work supported by the U.S. DoE DEFG02-91ER45439 through the FSMRL and the CMM at UIUC, by NSF-DMR-0503360 at UCD & UCI, and performed at LANL under auspices of the U.S. DoE, office of Science.

Wan Kyu Park
University of Illinois at Urbana-Champaign

Date submitted: 19 Nov 2006 Electronic form version 1.4