

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Effect of heavy electron mass m^* on Andreev reflection (AR) in heavy-fermion/superconductor (HF/S) point-contacts H. STALZER, W.K. PARK, L.H. GREENE, Univ. of Illinois at Urbana-Champaign, J.L. SARRAO, J.D. THOMPSON, Los Alamos Nat. Lab., J. FREDERICK, P. CANFIELD, Ames Lab and Iowa State Univ., L.D. PHAM, Univ. of California, Davis, Z. FISK, Univ. of California, Irvine — We investigate the effect of m^* on Andreev reflection in HF/S point-contacts (PC) by measuring the differential electrical conductance at temperatures between 1.5 and 10 K. An electrochemically etched Nb tip ($T_c = 9.2$ K) is brought into contact with HF single crystals (CeCoIn_5 , CeRhIn_5 , YbAl_3) of varying m^* . Our conductance signals show a clear superconducting gap structure expected for PC in the Sharvin regime which can be fitted by the Blonder-Tinkham-Klapwijk model. Preliminary results on CeCoIn_5 at temperatures above its $T_c = 2.3$ K indicate an enhanced AR signal of similar magnitude as in Au/Nb PC which is in contrast to $\text{CeCoIn}_5/\text{Au}$ PC as reported earlier [1]. We discuss this in the context of a two fluid model which considers heaviness and bandstructure of the HF quasiparticles and which may also explain the asymmetric conductance background observed in many heavy-fermions below a characteristic temperature T^* . [1] W. K. Park *et al.*, PRB **72**, 052509 (2005). — This work was supported by the Deutsche Forschungsgemeinschaft, and U.S. DoE Award No. DEFG02-91ER45439 through the FSMRL and the CMM at UIUC and the NSF-DMR-0503360 at UC.

Laura H. Greene
Univ. of Illinois at Urbana-Champaign

Date submitted: 20 Nov 2006

Electronic form version 1.4