Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

$d_{x^2-y^2}$ paring symmetry of heavy fermion $CeIrIn_5$ remote from antiferromagnetic quantum critical point YUICHI KASAHARA, T. IWASAWA, Y. SHIMIZU, H. SHISHIDO, T. SHIBAUCHI, Kyoto University, I. VEKHTER, Louisiana State University, Y. MATSUDA, Kyoto University, Institute for Solid State Physics, University of Tokyo — Quasi-two dimensional heavy Fermion $CeIrIn_5$ involves two distinct superconducting domes in the phase diagram, which appear as a function of pressure or Rh substitution of Ir. In the analogy to $CeCu_2Si_2$, two distinct superconducting domes with different symmetry has been invoked. We report on the results of low-temperature thermal transport of $CeIrIn_5$ in the second dome, which locates away from an antiferromagnetic quantum critical point. The thermal conductivity is measured under a magnetic field rotated with respect to the crystal axes, which give direct evidence for superconducting gap structure. Clear fourfold oscillation with minima at [110] and [1-10] directions is observed as rotating magnetic field within the basal *ab*-plane, while no oscillation is observed within the *bc*-plane. In sharp contrast to previous reports that suggested E_g symmetry with horizontal line node within the *ab*-plane [1], our results are most consistent with $d_{x^2-y^2}$ symmetry with vertical line nodes along the *c*-axis. These results imply that two superconducting domes have the same gap symmetry which appears to be mediated by antiferromagnetic spin fluctuations.
[1] H. Shakeripour et al., Phys. Rev. Lett. 99, 187004 (2007).

Yuichi Kasahara
Kyoto University

Date submitted: 12 Dec 2007 Electronic form version 1.4