Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Confinement of heavy fermion to two-dimension by the fabrication of the artificial superlatattice HIROAKI SHISHIDO, Kyoto University, Kyoto Japan, TAKASADA SHIBAUCHI, Kyoto University, Kyoto Japan, TOMONARI KATO, KAZUKI YASU, Kyoto University, Kyoto Japan, HIROSHI KONTANI, Nagoya University, Nagoya Japan, TAKAHITO TERASHIMA, Kyoto University, Kyoto Japan, YUJI MATSUDA, Kyoto University, Kyoto Japan — To date the electronic structure of all heavy-fermion compounds is essentially three-dimensional. Confinement of the heavy-fermions to reduced dimensions is expected to provide a novel physical system with ultimately strong correlations and enhanced quantum fluctuations. We have grown artificial superlattices of $CeIn_3$ (m) / $LaIn_3$ (n), in which m-layers of heavy-fermion antiferromagnet $CeIn_3$ and n-layers of a non-magnetic isostructual compound $LaIn_3$ are stacked alternately, by a molecular beam epitaxy. By reducing the thickness of $CeIn_3$, we observe a suppression of antiferromagnetic order, a deviation of the Fermi liquid behavior and an enhancement of effective mass inferred from the resistivity coefficient, which imply new 'dimensional tuning' towards a quantum critical point.

Hiroaki Shishido
Research Center for Low Temperature and Materials Sciences,
Kyoto University, Kyoto Japan

Date submitted: 01 Dec 2009 Electronic form version 1.4