Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Sorting Category: 09.1.1 (E)

Quantum oscillations in LiFeAs AMALIA COLDEA, MATTHEW WATSON, Oxford University, ANTONY CARRINGTON, CARSTEN PUTZKE, ISABEL I. GUILLAMON, University of Bristol, ALIX MCCOLLAM, HMFL, Nijmegen, DAVID VIGNOLLES, DAVID LEBOEUF, LNCMI, Toulouse, IGOR MAZIN, Naval Research Laboratoratory, USA, SHIGERU KASAHARA, T. TERASHIMA, T. SHIBAUCHI, Y. MATSUDA, Kyoto University — Quantum oscillations are a powerful technique to establish with accuracy the three-dimensional topology of the Fermi surface and it has been successfully used in the study of iron-based superconductors. Here we report quantum oscillations in the 111 pnictide superconductor, LiFeAs, with T$\sim$18K, by using highly sensitive torque magnetometry in high magnetic fields (up to 58T) and at very low temperatures (0.3-4.2K). We observe clearly three different orbits around 1.5kT, 2.4kT and 2.9kT. By comparing the angular dependence of the measured frequencies with the predictions given by the first principle band calculations we conclude that the observed orbits belong to the electronic bands. The values of the quasiparticle masses for these orbits are significantly enhanced as compared with the band masses (a factor 4-5) suggesting that either that electron-electron and/or electron-phonon correlations are significant. We will compare our data with available APRES data on the same material and discuss the effect of the spin-orbit coupling. The details of the Fermi surface of LiFeAs will be compared with other iron-based superconductors. This work was supported by EPSRC (UK), EuroMagNET II, KAKENHI from JSPS and National Science Foundation, State of Florida, and the U.S. Department of Energy.

[X] Prefer Oral Session
[ ] Prefer Poster Session

Amalia Coldea
amalia.coldea@physics.ox.ac.uk
Oxford University

Date submitted: 19 Jan 2012 Electronic form version 1.4