

# 544<sup>th</sup> ASRC Seminar

Date: 13:45 ~ 14:30, 18 March

Location: Meeting room #5, Lab. Bldg-1

Speaker: Dr. William Knafo

(Laboratoire National des Champs Magnétiques Intenses)

Title: High-Magnetic Field Study  
of the Fermi surface  
in the hidden-order state of URu<sub>2</sub>Si<sub>2</sub>

I will present magnetoresistivity and Shubnikov-de Haas experiments performed on high-quality URu<sub>2</sub>Si<sub>2</sub> single crystals under pulsed high magnetic fields up to 81 T. Focus will be first given to the strong sample-dependence of the magnetoresistivity in the hidden-order phase of the system. The interplay between the magnetic and orbital properties will be emphasized by the modification of the phase diagram in a magnetic field  $H$  applied in the  $(a,c)$  plane. For  $H // c$ , characteristic fields  $\mu_0 H^* \simeq 20 - 25$  T and  $\mu_0 H_{\rho, \max}^T \simeq 30$  T are defined at a kink and maximum, respectively, of  $\rho_{x,x}$ . Fourier analyzes of Shubnikov-de Haas oscillations show that  $H_{\rho, \max}^T$  coincides with a sudden modification of the Fermi surface, while  $H^*$  lies in a regime where the Fermi surface is smoothly modified. For  $H // a$ , i) no phase transition is observed at low temperature and the system remains in the hidden-order phase up to 81 T, ii) quantum oscillations surviving up to 7 K are related to a new light orbit at the frequency  $F_\lambda \simeq 1350$  T, and iii) no Fermi surface modification occurs up to 81 T.

See also:

[1] G.W. Scheerer, W. Knafo, D. Aoki, G. Ballon, A. Mari, D. Vignolles, and J. Flouquet, Phys. Rev. B 85, 094402 (2012).

[2] G.W. Scheerer, W. Knafo, D. Aoki, M. Nardone, A. Zitouni, J. Béard, J. Billette, J. Barata, C. Jaudet, M. Suleiman, P. Frings, L. Drigo, A. Audouard, T.D. Matsuda, A. Pourret, G. Knebel, and J. Flouquet, arXiv:1311.0812v1

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