Réunions scientifiques

Séminaires

Séminaire SOLEIL

Spectroscopic evidence for Fermi liquid like energy and temperature dependence of the relaxation rate in the pseudogap of the cuprates

Dirk VAN DER MAREL

(Département de Physique de la Matière Condensée, Université de Genève, Suisse)

Invité par Pascale ROY

Lundi 22 avril à 14h00
Grand Amphi SOLEIL

Cuprate high-T_c superconductors exhibit enigmatic behavior in the non-superconducting state. For carrier concentrations near « optimal doping » (with respect to the highest T_c's) the transport and spectroscopic properties are unlike those of a Landau-Fermi liquid. On the Mott-insulating side of the optimal carrier concentration, which corresponds to underdoping, a pseudogap removes quasi-particle spectral weight from parts of the Fermi surface, and causes a break-up of the Fermi surface into disconnected nodal and anti-nodal sectors.

In this talk I will discuss our recent result which show that the near-nodal excitations of underdoped cuprates obey Fermi liquid behavior. The lifetime $\tau(\omega,T)$ of a quasi-particle depends on its energy, ω, as well as on the temperature, T. For a Fermi-liquid $1/\tau(\omega,T)$ is expected to collapse on a universal function proportional to $\omega^2+(p\pi k_B T)^2$. Magneto-transport experiments, which probe the properties in the limit $\omega = 0$, have provided indications for the presence of a T^2-dependence of the DC ($\omega=0$) resistivity of different cuprate materials. However, Fermi-liquid behavior is very much about the energy dependence of the lifetime, and this can only be addressed by spectroscopic techniques. Our optical experiments confirm the aforementioned universal ω and T dependence of $1/\tau(\omega,T)$, with $p\approx1.5$. Our data thus provide the final missing piece of evidence in favor of a Fermi liquid-like scenario of the pseudogap in the cuprates.

S. I. Mirzaei, D. Stricker , J. N. Hancock, C. Berthod, A. Georges[1], E. van Heumen[2], D. van der Marel
Département de Physique de la Matière Condensée, Université de Genève
[1]Also: École Polytechnique & Collège de France, Paris
[2]Also: Van der Waals-Zeeman Instituut, Universiteit van Amsterdam

M. K. Chan, X. Zhao, Y. Li[3], M. Greven, N. Barišić[4]
School of Physics and Astronomy, University of Minnesota
[3] Also: Peking University, Beijing 100871
[4]Also: Institute of Physics, Zagreb & CEA-DSM-IRAMIS,Gif-sur-Yvette

Ce séminaire sera suivi d'une pause-café

Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi SOLEIL du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).

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Secrétariat Division Expériences : sandrine.vasseur@synchrotron-soleil.fr