tion of the doping level.

At terahertz frequencies, we performed measurements in high magnetic fields to suppress superconductivity below Tc. From the conductivity spectra we extract the quasiparticle scattering rate as a function of temperature, and compare its behavior in the superconducting and normal states below T_c. We find a small but measurable optical magnetoresistance at all doping levels, and no signatures for the pseudogap. We also discuss the applicability of "universal scaling laws"to our data on conductivity and penetration depth.

15 min. break

TT 10.8 Tue 11:30 H18

Charge modulation driven Fermi surface of Pb-Bi2201 — •Lenart Dudy, Beate Müller, Alica Krapf, Helmut Dwelk, Ralf-Peter Blum, Christoph Janowitz, and Recardo Manzke — Institut f. Physik, Humboldt-Universität zu Berlin, Newtonstr. 15, 12489 Berlin

Due to doping with lead it is well known that the about (1x5) superstructure of Bi cuprate superconductors will be suppressed. Nevertheless, a Fermi surface map of $Bi_{2-y}Pb_ySr_{2-x}La_xCuO_{6+\delta}$ with x = 0.4 and y = 0.4 determined by angular resolved photoemission (ARPES) revealed additional Fermi surface (FS) features. Here a La content of x = 0.4 means optimum hole doping for a maximum value of Tc and for a Pb amount of y = 0.4 one commonly expect complete suppression of the superstructure. Low energy electron diffraction of these samples showed no sign of a superstructure. Scanning tunnelling microscopy, on the other hand, revealed directly two modulations of the electron density of much weaker amplitude, one long-range modulation of about (1x32) periodicity and a second of about (12x12). By taking into account the wave vectors and intensities of these two modulations the corresponding Fermi surface has been simulated, which agrees strikingly good with the experimental one. The occurrence of modulations in these high-Tc superconductors will be further discussed.

TT 10.9 Tue 11:45 H18

Energy dependence of excitations near the Fermi surface in Bi(Pb)-2212 and Bi(Pb)-2201 — •B. Müller, L. Dudy, H. Dwelk, A. Krapf, C. Janowitz, and R. Manzke — Humboldt Universität Berlin, Institut für Physik, Newtonstr. 15, 12489 Berlin

In Bi derived HT$_c$-cuprates the question of how many excitations occur near the Fermi surface is not yet completely answered. There are hints that more than the two peaks derived from bilayer-splitting are hidden in the well-known peak-dip-hump structure [1,2]. In our group it was previously argued that an additional polarisation dependent double-peak structure arises in the one- and two-layer Bi-cuprate [2]. In Bi(Pb)-2201 this can be traced unequivocally since there are no superstructure or bilayer effects possibly concealing this excitation. In Bi(Pb)-2212 the intensity ratio of the peak-dip-hump structure is energy dependent which could be a tool to uncover split excitations [1]. In this contribution the photon energy dependence of the excitations near the Fermi energy of Bi(Pb)-2212 and Bi(Pb)-2201 is studied.

[1] A.A. Kordyuk, S.V. Borisenko, T.K. Kim, K.A. Nenkov, M. Knupfer, J. Fink, M.S. Golden, H. Berger, R. Follath, Phys. Rev. Lett. 89 (2002) 077003

[2] R. Manzke, R. Müller, C. Janowitz, C. Ast, H. Höchst, Phys. Rev. B 63 (2001)R 100504; C. Janowitz, R. Müller, L. Dudy, A. Krapf, R. Manzke, C. Ast, H. Höchst, Europhys. Lett. 60 (2002) 615

TT 10.10 Tue 12:00 H18

STM local strucuture analysis of Pb-Bi2201 depending on the lead content — •Olaf Lübben, Ralf-Peter Blum, Lenart Dudy, Alica Krapf, Helmut Dwelk, Christoph Janowitz, and Recardo Manzke — Institut f. Physik, Humboldt-Universität zu Berlin, Newtonstr. 15, 12489 Berlin

With scanning tunneling microscopy (STM) we have performed a detailed and systematic structural analysis of optimally lanthanum doped single-layered bismuth cuprates, $Bi_{2-y}Pb_ySr_{2-x}La_xCuO_{6+\delta}$ ($x = 0.4$), as a function of the Pb content. As expected, the periodicity of the well-known (5×1) superstructure varies with increasing the amount of Pb. For about $y = 0.4$ the superstructure is almost suppressed but, unexpectedly, new modulations occur in the electron density which might influence the electronic properties of these cuprates. In addition, this could affect the charge transfer between the carrier reservoir (BiO-SrO) and the CuO_2 plane as suggested for Pb-Bi2212 by Shi et al.[1].

[1] L. Shi et al., J. Phys.: Condens. Matter 13, 5195 (2001)

TT 10.11 Tue 12:15 H18

Magnetic field dependence of the superconducting gap node topology in non-centrosymmetric $CePt_3Si$ — •Ilya Eremin[1,2] and James Annett[3] — [1]Max-Planck-Institut für Physik Komplexer Systeme,D-01187, Dresden, Germany — [2]Institute für Mathematische und Theoretische Physik, Technische Universität Carlo-Wilhelmina zu Braunschweig, 38106 Braunschweig, Germany — [3]H.H. Wills Physics Laboratory, University of Bristol, Tyndall

Non-centrosymmetric superconductors, such as $CePt_3Si$ and Li_2PtB_2, are believed to have a line node in the energy gap arising from coexistence of s-wave and p-wave pairing. Using as an example $CePt_3Si$ we show that a weak c-axis magnetic field will remove this line node, since it has no topological stability against time-reversal symmetry breaking perturbations. Conversely a field in the $a-b$ plane is shown to remove the line node on some regions of the Fermi surface, while bifurcating the line node in other directions, resulting in two 'boomerang'-like shapes. These line node topological changes are predicted to be observable experimentally in the low temperature heat capacity.

TT 10.12 Tue 12:30 H18

Thermodynamic and Transport Properties of the Noncentrosymmetric Superconductor LaBiPt — •Gernot Goll[1], Michael Marz[1], Andreas Hamann[1], Tihomir Tomanic[1], Kai Grube[2], T. Yoshino[3], and T. Takabatake[3] — [1]Physikalisches Institut, Universität Karlsruhe, 76128 Karlsruhe — [2]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, 76021 Karlsruhe — [3]Hiroshima University, Higashi-Hiroshima, Japan

Noncentrosymmetric superconductors have attracted considerable interest in recent years. The lack of an inversion center of the crystal lattice makes unconventional pairing symmetries feasible. Even mixed superconducting states consisting of singlet and triplet states are possible. We report on the observation of superconductivity in the half-Heusler compound LaBiPt which crystallizes in the noncentrosymmetric cubic space group $F\bar{4}3m$. The crystal structure is composed of three fcc sublattices for Pt, Bi, and La with the relative atomic coordinates (0,0,0), (1/4,1/4,1/4), and (3/4,3/4,3/4), respectively. LaBiPt becomes superconducting below $T_c \approx 0.9\,\mathrm{K}$ as evidenced from measurements of the resistivity, magnetisation and specific heat. In view of a simplified BCS model $T_c \sim T_\mathrm{D} \exp\left(-(N(0)V)^{-1}\right)$ where $N(0) \sim m^* n^{1/3}$ is the electronic density of states at the E_F, T_D is the Debye temperature, and V is the effective, attractive potential, is surprisingly high because LaBiPt is a semimetal with very low charge-carrier concentrations $n = 6 \cdot 10^{18}\,\mathrm{cm}^{-3}$. The carrier concentration is still 1-2 orders of magnitude lower than in the classical low-carrier-density superconductors GeTe and SnTe and comparable to that found in $SrTiO_3$.

TT 10.13 Tue 12:45 H18

Ginzburg-Landau theory of superconducting surfaces under electric fields — Pavel Lipavsky[1], •Klaus Morawetz[2,3], Jan Kolacek[4], Ernst Helmut Brandt[5], and Tzong Jer Yang[6] — [1]Faculty of Mathematics and Physics, Charles University, Ke Karlovu 3, 12116 Prague 2, Czech Republic — [2]Institute of Physics, Chemnitz University of Technology, 09107 Chemnitz, Germany — [3]Max Planck Institute for the Physics of Complex Systems, Noethnitzer Str. 38, 01187 Dresden, Germany — [4]Institute of Physics, Academy of Sciences, Cukrovarnická 10, 16253 Prague 6, Czech Republic — [5]Max Planck Institute for Metals Research, D-70506 Stuttgart, Germany — [6]Department of Electrophysics, National Chiao-Tung University, Hsinchu 300, Taiwan

A boundary condition for the Ginzburg-Landau wave function at surfaces biased by a strong electric field is derived within the de Gennes approach. This condition provides a simple theory of the field effect on the critical temperature of superconducting layers. [Phys. Rev. B 73 (2006) 052505-1-5]