HIGH T UPDATE

VOL. 12, NO. 21
NOV. 1, 1998

DMS/BES/DOE
ARPA

NOTA BENE: ***If you have not renewed your subscription to High-T_c Update this will be your last issue! It is still not too late–just follow the renewal procedure described in the last two issues.***

Bi-2212

New tunneling data are reported by N. Miyakawa (Argonne) et al. in underdoped *$Bi_2Sr_2CaCu_2O_{8+\delta}$ (Bi-2212)* using superconductor-insulator-superconductor break junctions. Energy gaps Δ of 51±2, 54±2, and 57±3 meV were observed for three crystals with T_c = 77, 74, and 70 K, respectively. These energy gaps are nearly three times larger than for overdoped crystals with similar T_c. Detailed examination of tunneling spectra over a wide doping range from underdoped to overdoped, including the Josephson I_cR_n product, indicate that these energy gaps are predominantly of superconducting origin. While $\Delta(T)$ does not close at T_c, there is nevertheless a significant decrease in its magnitude that is seen even in the raw data. This argues against a picture of tightly bound pre-formed bosons below T*, which would be expected to have a T-independent gap near T_c. Rather, the data are more consistent with intermediate coupling regime scenarios for the pairing fluctuations which persist up to T*.

A related preprint by L. Ozyuzer (Argonne and Izmir) et al. reports tunneling measurements for superconductor-insulator-superconductor (SIS) break junctions on underdoped, optimally doped, and overdoped single crystals of *Bi-2212*. The junction I-V characteristics exhibit well-defined quasiparticle current jumps at eV = 2Δ as well as hysteretic Josephson currents. The authors analyzed the quasiparticle branch in the framework of $d_{x^2-y^2}$ (d-wave) superconductivity and found that there is preferential tunneling along the lobe directions of the d-wave gap. For overdoped *Bi-2212* with T_c = 62 K, the Josephson current was measured as a function of the junction resistance R_n, which varied by two orders of magnitude (1 kΩ to 100 kΩ). The I_cR_n product was found to be proportional to the 0.47 power of I_c and to display a maximum of 7.0 mV. When the hole doping was decreased from overdoped to the underdoped regime (70 K), both the average I_cR_n product and the quasiparticle gap were found to increase. The maximum I_cR_n was found to be about 40% of the Δ/e at each doping level, with a value as high as 25 mV in underdoped *Bi-2212.*

The dynamics of the optical response of *Bi-2212* single crystals has been measured by P. Gay (Oxford) et al. at 1.5 eV using femtosecond spectroscopy. The temperature dependence of the response shows three distinct regimes: (a) $T < T_c$: with increasing temperature, the differential reflectance $\Delta R/R > 0$ and it decreases to zero at T_c, similar to the behavior of the BCS gap function, and the relaxation rate increases linearly with temperature; (b) $T_c < T < T^*$ ($T^* - T_c \sim 35$ K): $\Delta R/R < 0$; and (c) $T > T^*$: a weak, positive $\Delta R/R$ response is measured in the metallic phase. The intermediate regime (b) observed here coincides with the pseudogap phase detected in ARPES measurements.

Coherent time-domain spectroscopy has been used by J. Corson (UC-Berkeley and LBNL) et al. to measure the screening and dissipation of high-frequency electromagnetic fields in a set of underdoped *$Bi_2Sr_2CaCu_2O_{8+\delta}$* thin films. The measurements provide direct evidence for a phase-fluctuation-driven transition from the superconductor to the normal state, with dynamics described well by the Berezinskii-Kosterlitz-Thouless theory of vortex-pair unbinding.

Static and dynamic c-axis transport measurements on stacks of intrinsic Josephson junctions on *$Bi_2Sr_2CaCu_2O_{8+\delta}$ (Bi-2212)* single crystals near optimal doping have been carried out by I.F.G. Parker (Birmingham) et al. The zero-bias minimum in the dynamic conductance is consistent with a normal-state pseudogap. At T_c, a critical current develops along with new features consistent with a gap in the superconducting density of states at an already well-established energy. Because of the small scale of the features and the lack of thermal broadening, the authors conclude that there must be a high degree of coherent interlayer tunneling in both the superconducting and normal states.

More Bi Cuprates

Irradiation of *Ag*-clad *Bi-2212* tapes with energetic protons (~0.8 GeV) causes *Bi* nuclei to fission; the fission fragments generate permanent, highly splayed columnar defects that efficiently trap vortices and stabilize the magnetic flux inside the superconductor. J. G. Ossandon (Talca) et al. report such experiments and note that with increasing crystalline disorder, T_c decreases at the rate of ~1 K per 10^{16} p/cm^2. For practical working temperatures of ~20 K and magnetic fields of ~1 T, the optimal proton fluence lies near (5-10) $\times 10^{16}$ p/cm^2. At this level, J_c is enhanced (and the logarithmic decay rate S is diminished) by an order of magnitude or more relative to the unirradiated virgin tapes.

The effects of the starting particle size in *Bi-Sr-Ca-Cu-O* powders upon the properties of *Ag*-sheathed *Bi-2212* wires are described by S. Sengupta (Superconductive Components) et al. Significant sausaging was observed for wires processed from powders with larger particle size, while good filament uniformity was observed for wires produced from finer powders.

The microstructure of *$(Bi,Pb)_2Sr_2Ca_2Cu_3O_{10+\delta}$ [(Bi,Pb)-2223]* ceramic has been studied by P. Diko (Kosice) and F. Hanic (Bratislava) using polarized light microscopy and the etch-pits technique. The high-angle twist grain boundaries in the platelet colonies were confirmed to be [001] coincidence-type twisted boundaries or rotation twin boundaries with the (001) twinning plane.

Positron annihilation lifetimes in the high-T_c superconductor *$(Bi_{0.92}Pb_{0.17})_2Sr_{1.91}Ca_{2.03}Cu_{3.06}O_{10+\delta}$ [(Bi,Pb)-2223]* have been measured by D. Sanyal (Calcutta) et al. over the temperature range 30-300 K. The authors report a reduction of lifetime components near T_c (104 K). A related paper by U. De (Calcutta) et al. reports structure in the shape parameter S determined from Doppler broadening of positron annihilation lineshapes vs temperature near T_c in *(Bi,Pb)-2223* pellets, *Y-123* single crystals, and *Bi-2212*.

The zero-field intersample variability of the superconducting transition temperature for commercially supplied *Ag*-clad *$Bi_2Sr_2Ca_2Cu_3O_{10+\delta}$ (Bi-2223)* 37-filament tapes, one 103 m and the other 193 m long, has been measured by B. de Mayo (West Georgia). The author reports hysteresis and time-dependent effects.

$RBa_2Cu_3O_{7-\delta}$

Using seeding techniques to control the orientation of grains, M. B. Field et al. (Argonne) have been able to create a wide variety of *$YBa_2Cu_3O_{7-\delta}$ (YBCO)* grain boundaries. The authors can produce five-domain samples with 90°[100] twist and tilt grain boundaries, but they also can produce grain boundaries in the same sample that have the misorientations θ[001] tilt, θ[100] tilt, and 90°-θ[100], where the misorientation angle θ is fully controllable.

Two experiments relating to the properties of *YBCO* are reported by T. Venkatesan et al. (Maryland). The first, involving femtosecond laser pulses and the fast optical response from Cooper pair breaking in *YBCO* films, revealed a sharp, resonant photon energy dependence around 1.5 eV in the pair-breaking rate, suggesting that an intermediate excitation may be playing an important role in the depairing process. The second, involving ion-channeling investigations in *$YBa_2Cu_3O_{7-\delta}$* (δ = 0.05 to 0.8) crystals, showed an evolution of the lattice from that of a Debye solid for δ = 0.8 to one exhibiting lattice coherence even at much higher temperatures than T_c, with discontinuities that track T_c.

Two preprints by M. Muralidhar and M. Murakami (SRL-ISTEC) report work aimed at optimizing T_c and J_c in melt-processed *$(Nd,Eu,Gd)Ba_2Cu_3O_{7-\delta}$ (NEG-123).* One of these reports precursor preparation methods that suppress the formation of *R*-rich *$R_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$*, thus resulting in a sharp superconducting transition with an onset T_c exceeding 94.5 K. The other reports investigations of the effects of *Gd_2BaCuO_5 (Gd-211)* additions on the microstructure and J_c vs B properties. An *NEG-123* sample with 30 mol% of finely dispersed *Gd-211* showed J_c of 7.2 $\times$ 10^4 A/cm^2 in zero field and 5.2 $\times 10^4$ A/cm^2 in a magnetic field of 2.6 T along the c axis.

As noted in a preprint by W. C. Wu (National Taiwan Normal) and J. P. Carbotte (McMaster), there exists significant in-plane ab-anisotropy for various properties [magnetic penetration depth λ, normal-state resistivity ρ, and optical conductivity $\sigma_S(\omega)$] in *YBCO*. However, recent unpublished thermal conductivity measurements by Chiao et al., confirming previous microwave conductivity results by K. Zhang et al., *Phys. Rev. Lett.* **73**, 2484 (1994), show no obvious anisotropy in the context of universal transport. Wu and Carbotte give a possible explanation of why the anisotropy is seen in most properties but is not seen in the universal transport.

Other Cuprates

The temperature dependence of the relaxation rate of crystal-field excitations in the slightly underdoped high-temperature superconductors *$HoBa_2Cu_4O_8$* and *$Er_2Ba_4Cu_7O_{14.92}$* has been investigated by J. Mesot (ETH-Zürich and PSI) et al. using neutron-scattering measurements. The data show evidence for the opening of an electronic gap in the normal state at T* ≈ 200 K, far above T_c. From the relaxation behavior at two different energies, the authors conclude that the gap function is highly anisotropic. The main features can be qualitatively

reproduced by considering an anisotropic gap of predominant d character with a small s component.

A study of the chemical and physical compatibility of *MgO* with $LaBaCaCu_3O_{7-\delta}$ *(LBCCO)* high-T_c superconductors has been carried out by D. A. Landinez Tellez et al. (Recife). The authors conclude that *MgO* is chemically and physically compatible with *LBCCO* superconductors and that *MgO* substrates could be used for the fabrication of high-T_c *LBCCO* superconducting films.

Using angle-resolved photoemission spectroscopy (ARPES), A. Ino (Tokyo) et al. have observed the band structure, Fermi surface, and their doping dependencies in $La_{2-x}Sr_xCuO_4$. The results reveal that the Fermi surface undergoes a dramatic change: It is holelike and centered at **k** = (π,π) in underdoped (x = 0.1) and optimally doped (x = 0.15) samples, as in other cuprates, while it is electron-like and centered at (0,0) in heavily overdoped (x = 0.3) samples. The peak in the ARPES spectra near (π/2,π/2) is broad and weak, unlike the behavior in other cuprates. In the underdoped and optimally doped samples, a superconducting gap (Δ = 10-15 meV) is observed on the Fermi surface near (π,0).

A preprint by C. Kim and Z.-X. Shen (Stanford) reports that detailed temperature- and doping-dependent lineshape studies on $Sr_2CuO_2Cl_2$ and $Bi_2Sr_2CaCu_2O_{8+\delta}$ call for a new interpretation of the photoemission data. The broad structure that has been interpreted as short lifetime is now interpreted as a collection of states. The low-energy part of this structure is involved in condensation and, contrary to the conventional superconductors, it occurs not only near the so-called Fermi surface but also away from it. The authors assert that this new interpretation is a departure from conventional thinking based on band theory and will likely affect the understanding of correlated systems.

The use of 0.8 GeV protons to induce fission of *Bi, Tl,* and *Hg,* whose fission fragments generate isotropically distributed columnar defects that pin vortices in *Bi-, Tl-,* and *Hg*-based cuprate superconductors, is described in a preprint by J. R. Thompson (ORNL and Tennessee) et al. The authors present data showing enhancements of the critical current densities and pinning energies due to irradiation.

Results of experiments by C. Acha et al. [*Phys. Rev. B* **57**, R5630 (1998)] on the pressure dependence of the critical temperature of $Hg_{1-x}Au_xBa_2Ca_2Cu_3O_{8+\delta}$ for different *Au* doping levels x have been analyzed by L. Jansen (ETH-Zürich) and R. Block (Amsterdam) in the framework of indirect-exchange Cooper pair formation via diamagnetic oxygen anions. The authors report that all experimental results can be quantitatively explained, including the fact that the values of dT_c/dP at P = 0 are positive, even though the samples were all hole-overdoped.

The c-axis response of $Tl_2Ba_2CuO_{6+\delta}$ *(Tl-2201)* has been studied by A. A. Tsvetkov (Groningen and Lebedev Institute) et al. using grazing-angle reflectivity measurements. In the superconducting state, the Josephson plasma oscillation was observed at 27.8 cm^{-1}. The corresponding Josephson energy is found to contribute no more than 0.24% to the condensation energy of the superconducting state, contradicting the predictions of the interlayer tunneling model, where the superconductivity is the result of Josephson interlayer coupling.

Magnetic measurements in fields up to 12 T on single crystals of $Tl_{0.6}Pb_{0.4}Sr_{1.7}Ba_{0.3}CaCu_2O_y$ *(Tl-1212)* have been carried out by S. Kokkaliaris (Southampton) et al. to investigate the effect of high-pressure annealing in a N_2 atmosphere on the peak effect of the magnetic hysteresis curves. After annealing, x-ray diffraction revealed a reduction of the distance between the superconducting CuO_2 planes, which the authors relate to a decrease of the anisotropy parameter γ. As a consequence, the authors observe a shift of both the magnetization peak and irreversibility lines towards higher fields.

Borocarbides

The equilibrium magnetization M of a superconducting YNi_2B_2C single crystal has been studied by K. J. Song (Tennessee) et al. with the magnetic field **H** parallel to the c axis. The material was clean, with low electrical resistivity and weak magnetic hysteresis (for H = 10 kOe, the critical current density was less than 10^{-6} of the depairing current density). The magnetization M(H) was found to deviate from conventional London predictions but to agree well with recent nonlocal London theory by V. G. Kogan et al. [*Phys. Rev. B* **54**, 12386 (1996)] with well-behaved superconducting parameters. The authors also deduced the temperature dependence of the London penetration depth λ(T) and other parameters.

Vortices

Two preprints by A. Pautrat (Caen) et al. describe transport experiments in a tilted magnetic field in which the direction of the electric field generated by the motion of vortices is measured as a function of temperature and current. One of the papers describes experiments using a twinned *YBCO* crystal, while the other describes the behavior of a slightly overdoped untwinned $YBa_2Cu_3O_{6.95}$ crystal. The experiments give evidence of uncut vortex lines above the first-order melting transition, indicating that the first-order transition does not correspond to decoupling of the vortex lines. The gradual loss of line correlation appears close to T_{c2} with a temperature width characteristic of critical fluctuations. The authors also observe a nonzero transverse voltage

below the critical current, which the authors explain in terms of nondissipative surface currents.

Using numerical results obtained within two models describing vortex matter [interacting elastic lines (Bose model) and the uniformly frustrated XY model], A. E. Koshelev and H. Nordborg (Argonne) establish universal properties of the melting transition within the linelike regime. These properties include the scaling of the melting temperature with anisotropy and magnetic field, the effective line tension of vortices in the liquid regime, the latent heat, the entropy jump per entanglement length, and the ratio of the jump of Josephson energy at the transition to the latent heat.

Starting from the microscopic theory, G. Blatter (ETH-Zürich) et al. derive the semi-classical equation of motion of a moving vortex and identify the Magnus, Hall, and dissipative forces on the vortex. To accomplish this, the authors demonstrate that a description of the vortex dynamics in superfluid Fermi systems based on the kinetic equations for the quasiclassical Green functions of the microscopic nonstationary theory is equivalent to the concept of semi-classical particles localized in the vortex core, with a distribution function governed by the kinetic Boltzmann equation in its canonical form. The expressions for the force and torque acting on a moving vortex can be represented in terms of momentum transfer to the vortex from the localized particles.

Two preprints by S. Hébert et al. (Caen) report on the effectiveness of heavy-ion-irradiation-induced columnar defects on flux pinning in *Bi-2212* single crystals. One of these focuses on the influence of different splay distributions, and reports that the differences in pinning show up only in a high-temperature regime. The other reports that columnar defects produced by tilting the crystal during irradiation, which results in amorphous regions of elliptical cross section in the CuO_2 planes, are more effective in pinning pancake vortices than smaller-area defects of circular cross section, produced by irradiation parallel to the c axis.

Vortices in a high-T_c superconductor with strongly correlated pinning centers have been studied numerically by H. D. Chen et al. (Peking) using the mapping to charged bosons in two dimensions and the Monte Carlo algorithm. The authors derive a nonlinear voltage response function to account for viscous dissipation.

A second-peak effect in a *(Tl,Bi)-1212* single crystal has been observed by T. Aouaroun and Ch. Simon (Caen) using ac susceptibility measurements. An analysis of the frequency dependence of the second-peak position leads to the conclusion that plasticity governs the vortex dynamics on both sides of the peak. The authors thus propose that the second peak is due to the temperature-activated form of the characteristic relaxation times and the fact that the characteristic activation energy U_c and the critical current density J_c have opposite variations with magnetic field.

An extensive small-angle-neutron-scattering (SANS) study of the vortex lattice in twinned *YBCO* crystals has been carried out by M. P. Delamare (Caen) et al. as a function of the angle θ_B between the magnetic field and the c axis of the crystal. Two different magnetic diffraction patterns were observed at 5 K and B = 0.5 T, one along the c axis of the crystal and the other along the applied field. The patterns are interpreted in terms of an accommodation model, in which vortices zigzag from twin planes to the crystalline ab planes in order to minimize their energy.

A model to calculate the temperature and magnetic-field dependence of the scattering time $\tau_V(H,T)$ of quasiparticles by bound electron states in a vortex in high-temperature superconductors has been proposed by A. E. Khalil (Bahrain).

Microwave Response

Measurements of the excess conductivity above T_c due to renormalized order-parameter fluctuations in *YBCO* at microwave frequencies have been carried out by D. Neri et al. (Roma), who also present related theoretical calculations including the effects of uniaxial anisotropy. The theory fully accounts for the onset of the superconducting transition and the deviation from a linear temperature dependence above T_c. The authors also extract consistent values of the critical temperature, coherence length, penetration depth, and anisotropy parameter γ.

Unusual features in the nonlinear microwave (8.0 GHz) surface impedance $Z_S = R_S + jX_S$ of high-quality *YBCO* thin films with comparable low-power characteristics [R_{res} ~ 35-60 $\mu\Omega$ and λ_L(15 K) ~ 130-260 nm] are reported by A. P. Kharel (Birmingham) et al. The surface resistance R_S is found to increase, decrease, or remain independent of the microwave field H_{rf} (up to 60 mT) at different temperatures and for different samples. However, the surface reactance X_S always follows the same functional form.

The nonlinear dependence on applied ac field b_ω or current i_ω of the microwave impedance $R_\omega + iX_\omega$ of both short and long Josephson junctions has been calculated by Z. Zhai et al. (Northeastern) under a variety of experimental conditions. The authors study the dependence on the junction width for both field-symmetric (current-antisymmetric) and field-antisymmetric (current-symmetric) excitation conditions. The resistance shows step-like features every time a fluxon (soliton) enters a long junction, with a corresponding phase slip seen in the reactance.

A preprint by A. V. Velichko (Birmingham and IRE-Ukraine) and A. Porch (Birmingham) reports numerical simulations

using the resistively shunted junction (RSJ) model to compute the nonlinear response of a short Josephson junction irradiated simultaneously with two high-frequency signals. One of the signals (the probe signal), of frequency f_{pr} and small amplitude I_{pr}, is used to monitor the response of the junction to a high-power (pump) signal of frequency f_{pm} and amplitude I_{pm}.

Thin Films

A preprint by H. Koinuma (Tokyo Tech and CREST) et al. reports on studies of the nucleation and growth control of oxide thin films using laser molecular beam epitaxy (MBE) and pulsed laser deposition (PLD). By using appropriate thin-film-growth and buffer-layer techniques, carefully adjusting deposition conditions, and choosing suitable insulating layers, the authors believe that both atomic-scale growth and orientation control can be achieved not only to realize Josephson tunnel junctions but also to open a new field of oxide-based electronics.

Measurements of voltage instability at high flux-flow velocities in *Bi-2212* superconducting films are reported by Z. L. Xiao (Mainz and Rutgers) et al. The authors measured current-voltage (I-V) characteristics as a function of temperature, magnetic field, and angle between the field and the c axis of the sample. Voltage jumps were observed in the I-V characteristics taken in all magnetic-field directions and over extended temperature and field ranges. An analysis of the experimental data, based on a theory for viscous flux-flow instability with a finite heat-removal rate from the sample, yielded the inelastic scattering rate and the quasiparticle diffusion length.

A preprint by A. M. Cucolo (Salerno) reports comparisons of the tunneling behavior of artificial *Y(Ho)-Ba-Cu-O*-based HTS-I-HTS trilayers with previous data in *YBCO/Pb* junctions with natural barriers. For $YBa_2Cu_3O_{7-\delta}/PrBa_2Cu_3O_{7-\delta}/HoBa_2Cu_3O_{7-\delta}$ junctions, the author found quasi-ideal conductance characteristics with maxima at V = ±40 mV. These values relate well to the structures at ±20 mV measured in the *YBCO/Pb* junctions.

The deposition and characterization of thin $(Hg,Pb)Ba_2Ca-Cu_2O_{6+\delta}$ films on *MgO* (100) are reported by G. Plesch (Bratislava) et al. The 0.2 μm films were prepared from thermally evaporated precursors by post-annealing in a *Hg* atmosphere. Zero-resistance transition temperatures of 105-117 K were measured.

Applications

As noted in a preprint by P. M. Grant and T. P. Sheahen (EPRI), it is generally argued that for high-temperature superconductors (HTS) to be cost-competitive in power applications, the wire will have to sell for about $10/kA-m for operation at 77 K. (*NbTi* costs are $1/kA-m and Nb_3Sn around $8/kA-m, each operating at 4.2 K.) Given what is already known about the critical-current performance of *Pb*-stabilized *Bi-2223,* the authors stress that this cost target may be extremely difficult to realistically achieve for silver-sheathed *Bi-2223* produced by the oxide-powder-in-tube (OPIT) method. The authors examine the cost of component materials, add reasonable estimates for labor and related costs, and arrive at a likely cost/performance (C/P) figure. They also estimate the capital cost of a factory to produce *YBCO* conductor by a particular coated-conductor method, calculate the necessary production output and performance parameters to manufacture 10 km/yr of wire, and estimate its associated C/P. The authors' results indicate that the real C/P seen by the customer will remain substantially above the $10/kA-m target for some time to come.

Magnetic separation is used widely in the mineral processing industry to concentrate and recover valuable minerals. A preprint by J.H.P. Watson and I. Younas (Southampton) discusses several systems involving melt-textured high-temperature superconducting disks or tubes that have potential for magnetic-separation applications.

By numerically implementing the critical state model, G. Barnes et al. (Oxford) have simulated the performance of hysteresis machines consisting of bulk cylinders of *YBCO* for the rotor. The authors find that the asynchronous torque is independent of frequency and that for a given applied field there is an optimum critical current density for the material that optimizes this torque.

The vertical and horizontal forces and associated stiffnesses on a permanent magnet above a high-temperature superconductor have been measured by J. R. Hull and A. Cansiz (Argonne) during vertical and horizontal traverses in zero-field cooling (ZFC) and field cooling (FC).

Femtosecond time-resolved measurements on the photo-response of an epitaxial *YBCO* thin-film photodetector, patterned into a microbridge geometry, are reported by M. Lindgren (Rochester) et al. By varying the current-voltage biasing conditions between the superconducting and resistive (hot spot) states, the authors observed transients corresponding to either the nonequilibrium kinetic inductance or the nonequilibrium electron-heating response mechanisms. The authors used the two-temperature model and the Rothwarf-Taylor theory to simulate the measured waveforms and extract the temporal parameters. The electron thermalization time and the electron-phonon energy relaxation time were determined by the electron temperature rise and decay times, which were found to be 0.56 ps and 1.1 ps, respectively, in the resistive state.

The pulse-tube refrigerator (PTR), which has no moving parts in the cold stage, is a promising device for applications with high-temperature superconducting SQUID magnetometers. A preprint by C. Dolabdjian (Caen and Air Liquide) et al. reports on the design and performance of a hand-portable PTR operating close to 77 K. The authors also report noise characteristics of a *YBCO* dc SQUID mounted on the cold head of the PTR.

Theory

A preprint by M. J. Graf (Los Alamos) reports an investigation of the electronic transport coefficients in unconventional superconductors at low temperatures, where charge and heat transport are dominated by electron scattering from random lattice defects. The author discusses the features of the pairing symmetry, Fermi surface, and excitation spectrum that are reflected in the low-temperature heat transport. For temperatures $k_BT \leq \gamma << \Delta_0$, where γ is the bandwidth of impurity-induced Andreev states, certain eigenvalues become universal, i.e., independent of the impurity concentration and phase shift. Deep in the superconducting phase ($k_BT \leq \gamma$), the Wiedemann-Franz law, with Sommerfeld's value of the Lorenz number, is recovered.

The density of states of quasiparticles in a $d_{x^2-y^2} + id_{xy}$ superconductor has been calculated by W. Mao (Boston College) and A. V. Balatsky (Los Alamos). The authors show that in the mixed state the quasiparticle spectrum remains gapless because of the Doppler shift by superflow. The authors also found that if the d_{xy} gap obeys $\Delta_1 \propto H^{1/2}$, as suggested by experiment, then the thermal conductivity should obey $\kappa \propto H^{1/2}$, in accord with experimental data at the lowest temperatures.

A preprint by E. Z. Kuchinskii and M. V. Sadovskii (Ekaterinburg) analyzes a number of nearly exactly soluble models of the electronic spectra of two-dimensional systems with well-developed fluctuations of short-range order of dielectric (e.g., antiferromagnetic) or superconducting type, which lead to the formation of an anisotropic pseudogap state on certain parts of the Fermi surface. The authors formulate a recurrence procedure to calculate the one-electron Green's function, taking into account all Feynman diagrams in perturbation series, and they present detailed results for spectral densities and the density of states.

The concept of Berry's geometrical phase for quasicyclic Hamiltonians has been generalized by A. A. Aligia (Bariloche) to the case for which the ground state evolves adiabatically to an excited state after one cycle, but returns to the ground state after an integer number of cycles. The author shows the ability of two Berry phases, and the topological quantum numbers derived from them, to detect phase transitions, particularly in strongly correlated systems with noninteger number of particles per site.

The tendencies to phase separation and stripe formation of the t-J model on planes and four-leg ladders have been reexamined by T. Tohyama (Tohoku) et al. including hole-hopping terms t' and t" beyond nearest-neighbor sites. The motivation for this study is the growing evidence that such terms are needed for a quantitative description of the cuprates. Using a variety of computational techniques, the authors conclude that the stripe tendencies considerably weaken when experimentally realistic t' < 0 and t" > 0 for hole-doped cuprates are considered. However, a small t' > 0 actually enhances the stripe formation.

A preprint by F. Lema and A. A. Aligia (Bariloche) extends to the spectral function an approach which allowed the authors to calculate the quasiparticle weight for the destruction of a real electron in a generalized t-J model using the self-consistent Born approximation. The authors discuss the effect of hopping beyond nearest neighbors and the effect of the three-site term.

The effective interaction W_{eff} between two holes added to the ground state of the repulsive three-band Hubbard model has been calculated by M. Cini et al. (Roma). To make contact with Cooper theory and earlier Hubbard-model cluster studies, the authors first use a perturbative canonical transformation to generate a two-body Hamiltonian and then extend the results to all orders. The authors present numerical estimates of the binding energy $|\Delta|$ of two-hole pairs, which are in the physically interesting range of tens of meV if unscreened on-site repulsion parameters are used.

Strongly correlated electrons in copper-oxide planes are modeled by D. K. Sunko (Zagreb) using a random tiling of CuO_4 molecules at finite temperatures. The model permits thermodynamic functions to be computed at any temperature and doping level.

Other Activities

Using a magneto-optical technique, L. A. Dorosinskii (Gebze-Kocaeli) has made local ac susceptibility measurements in *YBCO* and *Bi-2212* single crystals at frequencies ranging from 50 Hz to 4 MHz. In the 90 K *YBCO* samples, the onset of the ac transition was frequency independent, and the transition width decreased with increasing frequency, behavior that can be explained well in the framework of the flux-creep model. On the other hand, in the 60 K *YBCO* and *Bi-2212* samples, the transition onset shifted to higher temperatures as the frequency of the ac field increased. The author proposes an explanation of the observed effect in terms of phase fluctuations of the superconducting order parameter.

Overviews

A review of solitons (magnetic flux quanta or fluxons) in Josephson junctions has been prepared by A. V. Ustinov (Erlangen). The author reviews recent experiments and modeling of fluxon dynamics in Josephson junction circuits, including quasi-one-dimensional junctions, stacked junctions (Josephson superlattices), and discrete Josephson transmission lines. The author also discusses applications of fluxon devices, such as high-frequency oscillators and digital circuits (112 refs.).

The magnetic response of the *Hg*-based high-T_c cuprate superconductors is surveyed in a book chapter by J. R. Thompson (ORNL and Tennessee). The author notes that quasi-static magnetic studies yield information about characteristic length scales (λ and ξ), the anisotropy parameter γ, vortex-fluctuation effects, granularity, surface barriers, and flux pinning by internal defects (75 refs.).

An overview of studies of the nonequilibrium photoresponse of current-biased *YBCO* microbridges, fabricated from high-quality epitaxial *YBCO* films and exposed to femtosecond optical perturbations, has been prepared by R. Sobolewski (Rochester). The author notes that *YBCO* photodetectors can operate in digital applications requiring data rates far exceeding 100 Gbit/s, while mixers can reach an IF bandwidth greater than 100 GHz (24 refs.).

Ph.D. Theses

The properties of type-II superconductors in high magnetic fields are considered theoretically in the Oxford Ph.D. thesis of G. M. Bruun (NIST-Gaithersburg). The author considered several effects originating from the interplay between the Landau-level structure of the normal-state quasiparticle spectrum, and the tendency of the quasiparticles to form Cooper pairs below the critical temperature. The author predicts oscillations as a function of magnetic field, similar to those in the de Haas-van Alphen effect, in the attenuation of a longitudinal sound wave in the mixed state (116 refs.).

Fermion pseudogap behavior, observed in cuprate superconductors and Peierls chains, has been studied in the Columbia Ph.D. thesis of O. V. Tchernyshyov (Princeton), using various phenomenological approaches dating from 1970 to 1998. The author addresses the pseudogap in one dimension (Peierls-Kohn phonons), near two dimensions (Cooper pairs), and in n + 1 dimensions (magnons) (58 refs.).

Contributed by John R. Clem

Contents:

High-T_c Update **is available without charge to interested persons. Recipients are expected to participate in this information exchange by sending us preprints, reprints, meeting news, research news, etc. Contributions to defray the cost of newsletter printing and mailing are welcome.**

TECHNOLOGY NEWS

(Also see Applications section of Nota Bene.)

This section describes progress in manufacturing, product development, and technology transfer in the high-T_c superconductivity field. Please send your contributions (product development information, news regarding technology transfer efforts, or any information you would like to share about your corporation or laboratory) to the editor.

In a collaboration between Oxford Magnet Technology, Oxford Instruments Research Instruments, and Siemens Corporate Technology, a prototype MRI magnet with high-temperature superconductors has been built and successfully operated at 0.2 T field (in the patient gap, 1 T at the windings). This is the first application of HTS technology to a whole-body MRI magnet. The system consists of a C-shaped iron yoke which is energized by two coils mounted next to the pole shoes below and above the patient gap. The coils were separately manufactured at Siemens in Erlangen, Germany, and in Oxford, UK, using *BSCCO-2223* tapes provided by Vacuumschmelze and Nordic Superconductor Technologies as a stack of pancake coils respectively 1.7 km and 2.8 km in length with an inner diameter of 0.8 m. The operating temperature of 18 K was maintained at each coil by a single-stage Gifford McMahon cooler in a cryogen-free vacuum vessel. In a 1 T local field, the engineering current density was approximately 50 A/mm^2. For more information, contact Florian Steinmeyer, Siemens, ZT EN4, Box 3220, D-91050 Erlangen, Germany; telephone +49 9131 7 32684; telefax +49 9131 7 21339; e-mail florian.steinmeyer@erls.siemens.de.

A $5.5 million contract to install the first high-temperature superconductor (HTS) power cable system in an electric utility network was announced recently by the U.S. Department of Energy. The cable will be manufactured and installed by Pirelli Cables and Systems using HTS

wire produced by American Superconductor Corporation. Lotepro Corporation, a wholly-owned subsidiary of Linde AG, will develop the cooling system for the cable. EPRI will partially fund and help manage the cable project. The HTS cable is expected to triple the power throughput of the copper cables they will replace in the Detroit Edison's Frisbie Station to support a major urban redevelopment project in downtown Detroit. About 250 pounds of HTS wire will be needed to replace more than 18,000 pounds of copper wire currently in use at the Frisbie Station. For more information, contact John Howe, Vice President, Electric Industry Affairs, American Superconductor Corporation, Two Technology Drive, Westborough, MA 01581; telephone (508) 836-4200, ext. 307; telefax (508) 836-4248.

Contributed by Sreeparna Mitra

PREPRINTS

To obtain a particular preprint, contact the first author at the address given at the end of the citation. Help us expand this list by sending us your complete preprint. **Please specify where and when your paper was submitted.** An * next to an entry indicates it is a correction or revision of a previous entry. PACS codes and/or key words are given at the end of the citation.

Roman Adam, Marc Currie, Roman Sobolewski, Oliver Harnack, and Marian Darula, "Picosecond Response of Optically Driven *Y-Ba-Cu-O* Microbridge and Josephson-Junction Integrated Structures." Submitted to IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Department of Electrical Engineering and Laboratory for Laser Energetics, University of Rochester, Rochester, NY 14627-0231; e-mail adam@ece.rochester.edu.

J. Albino Aguiar, C.L.S. Lima, A.R.L.C. Lobo, D.A.L. Tellez, Y. P. Yadava, and J. M. Ferreira, "*CuS* Doped $Bi_{2+y}Sr_{3-y-n}Ca_nCu_2O_{6+\delta}$ Superconductors." Submitted to Appl. Phys. A. Departamento de Física, Universidade Federal de Pernambuco, 50670-901 Recife-PE, BRAZIL; telefax +55 81 271 0359; e-mail albino@npd.ufpe.br.

A. A. Aligia, "Berry Phases in Superconducting Transitions." Submitted to Europhys. Lett. Centro Atómico Bariloche and Instituto Balseiro, Comisión Nacional de Energía Atómica, 8400 S.C. de Bariloche, ARGENTINA; phone +54 944 45170; fax +54 944 45299; e-mail aligia@cab.cnea.edu.ar.

T. Aouaroun and Ch. Simon, "Second-Peak Effect in a Superconducting *(Tl,Bi)-1212* Single Crystal by ac Susceptibility: Evidence for Vortex Plastic Behavior." To be published in Phys. Rev. B (in press). Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 3145 2686; e-mail physol@crismat.ismra.fr. 74.60.Ge; 74.25.Ha; 74.72.Fq.

Tahar Aouaroun and Charles Simon, "Vortex Plastic Creep in a Superconducting Crystal of *Tl-2223.*" To be published in Physica C. Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 3145 2686; e-mail physol@crismat.ismra.fr. Key words: plastic creep, superconducting crystal, *Tl-2223*.

T. Aytug, B. W. Kang, S. L. Yan, Y. Y. Xie, and J. Z. Wu, "Stability of *Hg*-Based High-T_c Superconducting Films." To be published in Physica C (in press). Department of Physics and Astronomy, University of Kansas, Lawrence, KS 66045; phone (913) 864-4030; fax (913) 864-5262; e-mail aytug@eagle.cc.ukans.edu. Key words: high-temperature superconductivity, *Hg-1212, Hg-1223,* stability. 74.72.Gr; 74.76.Bz.

Gary Barnes, Malcolm McCulloch, and David Dew-Hughes, "A Computer Simulation of the Performance of Hysteresis Machines with Bulk High Temperature Superconducting Rotors." Submitted to IEEE Trans. Appl. Supercond. Department of Engineering Science, University of Oxford, Parks Road, Oxford OX1 3PJ, UNITED KINGDOM; telephone +44 1865 273000.

G. Blatter, V. B. Geshkenbein, and N. B. Kopnin, "From Microscopic Theory to Boltzmann Kinetic Equation: Application to Vortex Dynamics." Theoretische Physik, ETH-Hönggerberg, CH-8093 Zürich, SWITZERLAND; e-mail blatterj@itp.phys.ethz.ch. 67.57.Fg; 72.10.-d; 74.60.-w; 74.60.Ge.

Todor L. Boyadjiev and Nora V. Alexeeva, "Josephson Lattices of the Optimal Size." Report #SU-FMI-TLB: 1/98. Faculty of Mathematics and Computer Science, University of Sofia, No. 5, James Bourchier Blvd., 1164 Sofia, BULGARIA; telephone +359 2 62 56 568; e-mail todorlb@fmi.uni-sofia.bg; preprint also available at cond-mat@xxx.lanl.gov (#9806147).

Georg Morten Bruun, "Type-II Superconductors in High Magnetic Fields." Submitted as a Ph.D. thesis (University of Oxford). National Institute of Standards and Technology, Rt. 270 & Quince Orchard Road, Bldg. 245, Room B102, Gaithersburg, MD 20899; e-mail in Oxford, UNITED KINGDOM g.bruun1@physics.ox.ac.uk.

H. D. Chen, W. P. Bai, D. L. Yin, Y. L. Zhu, G. Li, and C. Y. Li, "Boson Mapping and Nonlinear Response of Type-II Superconductors." Department of Physics, Room 3054, Bldg. 47, Peking University, Beijing 100871, PEOPLE'S REPUBLIC OF CHINA; phone +86 10 6275 1752; e-mail chhd@spark.phy.pku.edu.cn; preprint also available at

cond-mat@xxx.lanl. gov (#9809283). Key words: high-T_c superconductor, current-voltage characteristics, flux pinning.

Mahn-Soo Choi, "Quantum Phase Transitions in Capacitively Coupled Two-Dimensional Josephson-Junction Arrays." To be published in J. Phys. Cond. Mat. Department of Physics, Seoul National University, Seoul 151-742, KOREA; telephone +82 2 880 8535; telefax +82 2 884 7167; e-mail choims@ctp.snu.ac.kr; preprint also available at cond-mat@xxx.lanl.gov (#9809157). 74.50.+r; 67.40.Db; 73.23.Hk.

Mahn-Soo Choi, M. Y. Choi, Taeseung Choi, and Sung-Ik Lee, "Cotunneling Transport and Quantum Phase Transitions in Coupled Josephson-Junction Chains with Charge Frustration." To be published in Phys. Rev. Lett. Department of Physics, Seoul National University, Seoul 151-742, KOREA; phone +82 2 880 8535; fax +82 2 884 7167; e-mail choims@ctp.snu.ac.kr; preprint also available at cond-mat@xxx.lanl.gov (#9806365). 74.50.+r; 67.40.Db; 73.23.Hk.

Michele Cini, Gianluca Stefanucci, and Adalberto Balzarotti, "Theory of Pairing in the *Cu-O* Plane: Three-Band Hubbard Model and Beyond." Preprint #Rom2F/98/36. Dipartimento di Fisica, Istituto Nazionale di Fisica della Materia, Università di Roma "Tor Vergata," Via della Ricerca Scientifica, I-00133 Rome, ITALY; e-mail michele.cini@roma2.infn.it; preprint also available at cond-mat@xxx.lanl.gov (#9809278).

J. Corson, R. Mallozzi, J. Orenstein, J. N. Eckstein, and I. Bozovic, "Vanishing of Phase Coherence in Underdoped $Bi_2Sr_2CaCu_2O_{8-\delta}$." Department of Physics, University of California at Berkeley and Lawrence Berkeley National Laboratory, Berkeley, CA 94720.

A. M. Cucolo, "Different Tunnel Barriers for c-Axis Oriented *Y(Ho)BaCuO*-Based Trilayer Heterostructures." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Dipartimento di Fisica e Unitá INFM, Università di Salerno, Via S. Allende, I-84081 Baronissi (Salerno), ITALY; telephone +39 89 965258; telefax +39 89 722582.

Udayan De, D. Sanyal, S. Chaudhuri, P.M.G. Nambissan, Th. Wölf, and H. Wühl, "Positron Probing of Electron Momentum Redistribution Due to Superconducting Transition in Single Crystalline and Granular High T_c Samples." Submitted to Phs. Rev. Lett. Variable Energy Cyclotron Centre, 1/AF Bidhannagar, Calcutta 700064, INDIA; e-mail ude@veccal.ernet.in. 74.72.Bk; 78.70.Bj; 74.40.+k.

Ben de Mayo, "Variability of Superconducting Transition Temperatures of *Ag*-Clad *Bi(2223)* Tapes." Presented at the First Int. Conf. on New Theories, Discoveries, and Applications of Superconductors and Related Materials (New3SC-1), Baton Rouge, La., Feb. 19-24, 1998; to be published in Int. J. Mod. Phys. B. Department of Mathematics and Physics, State University of West Georgia, Carrollton, GA 30118; telephone (770) 836-4317; telefax (770) 836-4695; e-mail bdemayo@westga.edu. Key words: *Bi(2223), Ag* tapes, transition temperatures. 74.62.-c; 74.72.Hs.

M. P. Delamare, G. Poullain, Ch. Simon, S. Sanfilippo, X. Chaud, and A. Brûlet, "Vortex Lattice Accommodation on Twin Boundaries in $YBa_2Cu_3O_7$ Studied by Neutron Diffraction." To be published in Eur. Phys. J. B. Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; Ch. Simon's telephone +33 2 3145 2686; telefax +33 2 3195 1600; e-mail simon@crismat.ismra.fr. 74.72.Bk; 74.60.Ge.

P. Diko and F. Hanic, "High Angle [001] Twist Boundaries in Platelet Colonies of *BiSrCaCuO (2223)* Superconductor." To be published in J. Microscopy. Institute of Experimental Physics, Slovak Academy of Sciences, Watsonova 47, 04353 Kosice, SLOVAKIA. Key words: ceramics, grain boundaries, polarized light microscopy, superconductors.

T. Di Matteo, A. Tuohimaa, J. Paasi, and R. De Luca, "Characteristic Low-Field Magnetic Response of Granular Superconductors." To be published in Physica C (in press). Laboratory of Electricity and Magnetism, Tampere University of Technology, P.O. Box 692, FIN-33101 Tampere, FINLAND; telefax +358 3365 2160. Key words: granular superconductivity, magnetic properties, Josephson effects. 74.80.Bj; 74.25.Ha; 74.50.+r.

C. Dolabdjian, S. Saez, D. Bloyet, M. David, and J. C. Maréchal, "Progress Towards a Hand Portable Pulse Tube Refrigerator for High T_c dc SQUID Operation." To be published in Appl. Supercond. (in press). GREYC - CNRS UPRES A-6072, ISMRA et Université de CAEN, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE.

L. A. Dorosinskii, "Magnetooptic Measurements of the Local ac Susceptibilty in High-Temperature Superconductors in a Wide Frequency Range." Presented at the NATO Adv. Study Inst. – Phys. and Mater. Sci. of the Vortex States, Flux Pinning, and Dynamics, Kusadasi, Turkey, July 26-Aug. 8, 1998. National Metrology Institute, P.K. 21, 41470 Gebze-Kocaeli, TURKEY; e-mail dorosins@ume1.mam.gov.tr.

G. Els, P. Lemmens, P.H.M. van Loosdrecht, G. Güntherodt, H. P. Lang, V. Thommen-Geiser, H.-J. Güntherodt, "Determination of the Superconducting Energy Gap of Rb_3C_{60} by Electronic Raman Scattering." To be published in Physica C (in press). Physikalisches Institut, RWTH Aachen, D-52065 Aachen, GERMANY; telephone +49 241 807058; telefax +49 241 8888306; e-mail gerd.els@physik.rwth-aachen.de. Key words:

superconductivity, fullerides, Raman scattering, energy gap. 74.70.Wz; 74.25.Gz; 78.30.-j.

M. V. Eremin and I. A. Larionov, "d-Wave Pairing Pecularities in Bilayered Cuprates with Peierls Instability of the Normal State." To be published in JETP Lett. Department of Quantum Electronics & Radiospectroscopy, Kazan State University, 420008 Kazan, RUSSIA; e-mail mikhail.eremin@ksu.ru. 74.25.-q; 74.20.-z.

C. Falcony, M. Jergel, A. Morales, M. García, R. T. Hernández, A. De Ita, J. G. Cabañas-Moreno, J. Palacios G., and R. Martínez, "*Tl*-Based Films Grown on Silver Tape Substrates." Presented at the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Departamento de Física and PMCATA, Centro de Investigación y de Estudios Avanzados del I.P.N., Apdo. Postal 14-740, C.P. 07300 México D.F., MEXICO; phone +52 5 747-7000 or -7001; fax +52 5 747-7002; e-mail cfalcony@fis.cinvestav.mx.

Michael B. Field, Tiffany A. Byrne, and Dean J. Miller, "The Use of Cubic *Nd-Ba-Cu-O* Seeds to Create θ[100], 90°-θ[100], and θ[001] Tilt *Y-Ba-Cu-O* Grain Boundaries." Submitted to IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Contact Janice Coble, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; telephone (630) 252-5497; telefax (630) 252-9595; e-mail coble@anl.gov.

P. Gay, C. J. Stevens, D. C. Smith, J. F. Ryan, G. Yang, and J. S. Abell, "Time-Resolved Optical Response in *BSCCO-2212*." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Clarendon Laboratory, Oxford University, Parks Road, Oxford OX1 3PU, UNITED KINGDOM.

Matthias J. Graf, "Electronic Transport in Unconventional Superconductors." Preprint #LA-UR-98-4082; to be published in the Proc. of the 1st Int. Conf. on Quasiclassical Methods in Supercond., Verditz, Austria, 1998, edited by D. Rainer and J. A. Sauls. Center for Materials Science, Mail Stop K765, Los Alamos National Laboratory, Los Alamos, NM 87545; telephone (505) 665-3035; telefax (708) 665-2992; e-mail graf@lanl.gov; preprint also available at cond-mat@xxx.lanl.gov (#9810023).

Paul M. Grant and Thomas P. Sheahen, "Cost Projections for High Temperature Superconductors." Paper available from Web site www.epri.com/pgrant/ASC98Paper/asc98.html [the authors would appreciate a brief e-mail notification (to pgrant@epri.com) that a copy was obtained].

S. Hébert, V. Hardy, M. Hervieu, G. Villard, Ch. Simon, and J. Provost, "Improvement of the Vortex Pinning Properties by Increasing the Size of Columnar Defects." To be published in Nucl. Instr. and Methods in Phys. Res. B. Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 3145 2916; telefax +33 2 3195 1600; e-mail shebert@crismat.ismra.fr. Key words: *Bi*-based superconductors, heavy ions irradiation, columnar defects, critical current densities. 74.60.Ge; 74.72.Hs; 61.80.Jh.

S. Hébert, V. Hardy, G. Villard, Ch. Simon, and J. Provost, "Influence of Splayed Distributions of Columnar Defects on the Pinning Properties of *Bi-2212* Single Crystals." To be published in Nucl. Instr. and Methods in Phys. Res. B. Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 3145 2916; telefax +33 2 3195 1600; e-mail shebert@crismat.ismra.fr. Key words: *Bi*-based superconductors, heavy ions irradiation, columnar defects, critical current densities. 74.60.Ge; 74.72.Hs; 61.80.Jh.

John R. Hull and Ahmet Cansiz, "Vertical and Lateral Forces Between a Permanent Magnet and a High-Temperature Superconductor." Submitted to J. Appl. Phys. Energy Technology Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; Ahmet Cansiz's e-mail cansahm@iit.edu.

A. Ino, C. Kim, T. Mizokawa, Z.-X. Shen, A. Fujimori, M. Takaba, K. Tamasaku, H. Eisaki, and S. Uchida, "Fermi Surface and Band Dispersion in $La_{2-x}Sr_xCuO_4$." Submitted to Phys. Rev. Lett. Dept. of Physics, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, JAPAN; e-mail ino@wyvern.phys.s.u-tokyo.ac.jp; preprint also available at cond-mat@xxx.lanl.gov (#9809311). 74.25.Jb; 71.18.+y; 74.72.Dn; 79.60.Bm.

L. Jansen, and R. Block, "Indirect-Exchange Coupling and High-T_c Superconductivity: Analysis of T_c as a Function of Pressure in $Hg_{1-x}Au_xBa_2Ca_2Cu_3O_y$ – Comparison with Other *Hg* Cuprates." To be published in Physica A. Institut für Theoretische Physik, ETH-Hönggerberg, CH-8093 Zürich, SWITZERLAND; telefax +41 1 633 1115; e-mail jansen@itp.phys.ethz.ch.

J. B. Ketterson, P. R. Auvil, D. J. Morgan, S. Maglic, C. Thomas, and I. P. Nevirkovets, "Periodic and Aperiodic Superconducting Miocrostructures." To be published in Superconducting Superlattices II: Native and Artificial, edited by I. Bozovic and D. Pavuna, SPIE Proc. 3480 (SPIE, Bellingham, 1998). Department of Physics and Astronomy, Northwestern University, Evanston, IL 60208.

Ali E. Khalil, "High Temperature Superconductivity in the Mixed State and the Dynamics of Charge Carriers." To be

published in Physica C. Department of Physics, University of Bahrain, P.O. Box 32038, Isa Town, BAHRAIN; telephone +973 681234.

A. P. Kharel, A. V. Velichko, J. R. Powell, A. Porch, M. J. Lancaster, and R. G. Humphreys, "Unusual Features in the Nonlinear Microwave Surface Impedance of *Y-Ba-Cu-O* Thin Films." To be published in Phys. Rev. B. Contact A. V. Velichko, School of Electronic and Electrical Engineering, University of Birmingham, Edgbaston, Birmingham B15 2TT, UNITED KINGDOM; phone +44 121 414 4348; fax +44 121 414 4291; e-mail velichko@ee-wp.bham.ac.uk; Web site http://www.bham.ac.uk/. 74.25.Nf; 74.60.Ec; 74.60.Ge; 74.76.Bz.

C. Kim and Z.-X. Shen, "New Interpretation of the Doping and Temperature Dependence of Photoemission Lineshape and Its Implication to the High T_c Superconductivity." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Stanford Synchrotron Radiation Lab, P.O. Box 4349, Stanford University, Stanford, CA 94309; e-mail kim@ssrl.slac.stanford.edu. Key words: photoemission, ARPES, lineshape, HTSC.

Jin-Tae Kim, Y. K. Park, J.-C. Park, W. N. Kang, C. W. Chu, H. R. Lim, D. H. Kim, J. U. Lee, and K. E. Gray, "Pinning Effect on Critical Dynamics in $Tl_2Ba_2CaCu_2O_8$ Films Before and After Introducing Columnar Defects." Submitted to IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Superconductivity Group, Korea Research Institute of Standards and Science, P.O. Box 102, Yusong, Taejon, 305-600, KOREA; preprint also available from Janice Coble, Argonne National Lab., 9700 South Cass Avenue, Argonne, IL 60439; fax (708) 252-9595; e-mail janice_coble@qmgate.anl.gov.

H. Koinuma, M. Kawasaki, S. Ohashi, M. Lippmaa, N. Nakagawa, M. Iwasaki, and X. G. Qiu, "Nucleation and Growth Control in Pulsed Laser Epitaxy of Oxide Thin Films." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Ceramics Materials and Structures Laboratory, Tokyo Institute of Technology, 4259 Nagatsuta, Midori, Yokohama 226, JAPAN. Key words: thin films, epitaxial growth, perovskite structure, superconductivity, $YBa_2Cu_3O_{7-\delta}$, Josephson junction, Josephson plasma.

S. Kokkaliaris, S. N. Gordeev, P.A.J. de Groot, X. M. Yang, and M. T. Weller, "Magnetization Studies of $Tl_{0.6}Pb_{0.4}Sr_{1.7}Ba_{0.3}CaCu_2O_y$ Single Crystals." To be published in Physica C. Department of Physics and Astronomy, U. of Southampton, Highfield, Southampton SO17 1BJ, UNITED KINGDOM; telephone +44 1703 592058; telefax +44 1703 593910; e-mail sk@phys.soton.ac.uk. 74.60.Ge; 74.72.Fq.

A. E. Koshelev and H. Nordborg, "Universal Properties for Linelike Melting of the Vortex Lattice." Submitted to Physica B. Contact Janice Coble, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; telephone (630) 252-5497; telefax (630) 252-9595; e-mail coble@anl.gov; preprint also available at cond-mat@xxx.lanl.gov (#9810063).

Yu. Koval, A. Wallraff, M. Fistul, N. Thyssen, H. Kohlstedt, and A. V. Ustinov, "Narrow Long Josephson Junctions." To be published in IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Institute of Microelectronics Technology, Russian Academy of Sciences, 142432 Chernogolovka, Moscow Region, RUSSIA; A. Wallraff's telephone in Erlangen, Germany +49 9131 857120; telefax +49 9131 15249; e-mail wallraff@physik.uni-erlangen.de.

E. Z. Kuchinskii and M. V. Sadovskii, "Models of the Pseudogap State of Two-Dimensional Systems." Preprint #IEF-LTF 98-02. Institute for Electrophysics, Ural Branch of the Russian Academy of Sciences, 620049 Ekaterinburg, RUSSIA; e-mail kuchinsk@ief.uran.ru; preprint also available at cond-mat@xxx.lanl.gov (#9808321). 74.20.Mn; 74.72.-h; 74.25.-q; 74.25.Jb.

F. Lema and A. A. Aligia, "Spectral Function and Quasiparticle Weight in the Generalized t-J Model." To be published in Physica C (in press). Contact A. A. Aligia, Centro Atómico Bariloche and Instituto Balseiro, Comisión Nacional de Energía Atómica, 8400 Bariloche, ARGENTINA; phone +54 944 45170; fax +54 944 45299; e-mail aligia@cab.cnea.edu.ar. Key words: spectral density, *Cu-O* planes, holons, spin fluctuations, self-consistent Born approximation.

M. Lindgren, M. Currie, C. Williams, T. Y. Hsiang, P. M. Fauchet, Roman Sobolewski, S. H. Moffat, R. A. Hughes, J. S. Preston, and F. A. Hegmann, "Intrinsic Picosecond Response Times of *Y-Ba-Cu-O* Superconducting Photodetectors." Submitted to Appl. Phys. Lett. Department of Electrical Engineering and Laboratory for Laser Energetics, U. of Rochester, Rochester, NY 14627-0231. 74.25.Nf; 74.72.Bk; 74.76.Bz; 85.25.Pb.

W. Mao and A. V. Balatsky, "Finite Density of States in a Mixed State of $d_{x^2-y^2} + id_{xy}$ Superconductor." Department of Physics, Boston College, Chestnut Hill, MA 02167; A. V. Balatsky's e-mail at Los Alamos National Laboratory avb@viking.lanl.gov; preprint also available at cond-mat@xxx.lanl.gov (#9809095).

J. Mesot, G. Böttger, H. Mutka, and A. Furrer, "Pseudogap and Order-Parameter Summetry in the Underdoped High-T_c Compounds $HoBa_2Cu_4O_8$ and $Er_2Ba_4Cu_7O_{14.92}$: A Neutron Crystal-Field Study." To be published in Europhys. Lett. Contact A. Furrer, Laboratory for Neutron Scattering,

ETH Zürich and Paul Scherrer Institute, CH-5232 Villigen PSI, SWITZERLAND; e-mail albert.furrer@psi.ch. 74.25.-q; 74.72.Bk; 76.20.+q.

Dean J. Miller, Kenneth E. Gray, Michael B. Field, and Dong Ho Kim, "The Influence of Vortex Pinning and Grain Boundary Structure on Critical Currents Across Grain Boundaries in $YBa_2Cu_3O_x$." Submitted to IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Contact Janice Coble, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; phone (630) 252-5497; fax (630) 252-9595; e-mail coble@anl.gov.

O. V. Misochko, M. Tani, K. Sakai, K. Kisoda, S. Nakashima, V. N. Andreev, and F. A. Chudnovsky, "Optical Study of the Mott Transition in V_2O_3: Comparison of Time- and Frequency-Domain Results." To be published in Phys. Rev. B (in press). Communications Research Laboratory, Kansai Advanced Research Ctr., 588-2 Iwaoka, Kobe-shi, Hyogo 651-2401, JAPAN; telephone +81 78 969 2197; telefax +81 78 969 2154; e-mail misochko@crl.go.jp. 78.30.-j; 78.47.+p; 71.30.+h.

N. Miyakawa, J. F. Zasadzinski, L. Ozyuzer, P. Guptasarma, D. G. Hinks, C. Kendziora, and K. E. Gray, "Predominantly Superconducting Origin of Large Energy Gaps in Underdoped $Bi_2Sr_2CaCu_2O_{8-\delta}$ from Tunneling Spectroscopy." Submitted to Phys. Rev. Lett. Contact Janice Coble, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; phone (630) 252-5497; fax (630) 252-9595; e-mail coble@anl.gov; preprint also available at cond-mat@xxx.lanl.gov (#9809398). 74.50.+r; 74.72.Hs; 74.25.Dw;74.62.Dh.

M. Muralidhar and M. Murakami, "Effects of Gd_2BaCuO_5 Addition on Critical Current Characteristics in Melt-Processed *(Nd,Eu,Gd)-Ba-Cu-O.*" To be published in Physica C. Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 3-35-2 Iioka-Shinden, Morioka, Iwate 020-0852, JAPAN; telephone +81 19 635-9015 or -9016; telefax +81 19 635-9017; e-mail miryala@istec.or.jp. Key words: melt processing, *(Nd,Eu,Gd)123, Gd211, Pt* addition, microstructure, critical current density.

M. Muralidhar and M. Murakami, "Improvement of the Superconducting Properties in *(Nd,Sm,Eu)-Ba-Cu-O* Using Melt-Quenched Precursors." To be published in Physica C. Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 3-35-2 Iioka-Shinden, Morioka, Iwate 020-0852, JAPAN; telephone +81 19 635-9015 or -9016; telefax +81 19 635-9017; e-mail miryala@istec.or.jp. Key words: *(Nd,Sm,Eu)-Ba-Cu-O,* melt quenching, melt process, critical temperature, peak effect, critical current density.

M. Nagase, J. Lindén, H. Suematsu, M. Karppinen, and H. Yamauchi, "Layered *(Cu,Fe)* Oxides of Double Perovskite Structure II: Extension of Solid-Solubility of Copper in $(Ba,La)Y(Cu_{0.5+x}Fe_{0.5-x})_2O_{5+\delta}$ via High-Pressure Heat Treatment." To be published in Phys. Rev. B. Contact H. Yamauchi, Materials & Structures Laboratory, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku, Yokohama 227, JAPAN; phone +81 45 924-5315; fax +81 45 924-5365 or -5360; e-mail yamauchi@materia.titech.ac.jp. 74.25.Fy; 74.25.Ha; 74.60.Jg; 74.62.Dh.

Y. Nakamura, K. Tachibana, and H. Fujimoto, "Dispersion of Silver in the Melt Grown $YBa_2Cu_3O_{6+x}$ Crystal." To be published in Physica C (in press). Railway Technical Research Inst., 2-8-38 Hikari-cho, Kokubunji-shi, Tokyo 185-8540, JAPAN; phone +81 42 573 7297; fax +81 42 573 7360; e-mail yuichi_n@rtri.or.jp. Key words: melt processing, *YBCO, Ag* addition, *Ag* dispersion, phase relation.

D. Neri, E. Silva, S. Sarti, R. Marcon, M. Giura, R. Fastampa, and N. Sparvieri, "Anisotropic Renormalized Fluctuations in the Microwave Resistivity in $YBa_2Cu_3O_{7-\delta}$." To be published in Phys. Rev. B. Dipartimento di Fisica 'E. Amaldi', Università degli Studi 'Roma Tre', via della Vasca Navale 84, I-00146 Roma, ITALY; fax +39 6 5579303; e-mail d_neri@fis.uniroma3.it; preprint also available at cond-mat@xxx.lanl.gov (#9810183). 74.40.+k; 74.76.-w; 78.70.Gq.

J. G. Ossandon, J. R. Thompson, L. Krusin-Elbaum, K. J. Song, D. K. Christen, and J. L. Ullmann, "Stabilization of Magnetic Flux in *BSCCO-2212/Ag* Tapes Subjected to 0.8 GeV Proton Irradiation." Presented at the 9th World Ceramic Congress and Forum on New Mater. (CIMTEC'98), Florence, Italy, June 14-19, 1998. Facultad de Ingeniería, Universidad de Talca, Curicó, CHILE; J. R. Thompson's telephone at Oak Ridge National Laboratory (423) 574-0412; telefax (423) 574-6263; e-mail jrt@utk.edu.

L. Ozyuzer, N. Miyakawa, J. F. Zasadzinski, Z. Yusof, P. Romano, C. Kendziora, P. Guptasarma, D. G. Hinks, and K. E. Gray, "Simultaneous Quasiparticle and Josephson Tunneling in *BSCCO-2212* Break Junctions." Submitted to IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Contact Janice Coble, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; telephone (630) 252-5497; telefax (630) 252-9595; e-mail coble@anl.gov.

I.F.G. Parker, M. Endres, P. J. Thomas, G. Yang, A. Yurgens, and C. E. Gough, "Emergence of Superconducting Gap Features in $Bi_2Sr_2CaCu_2O_{8+\delta}$ Single Crystals from Intrinsic c-Axis Interlayer Tunneling." Superconductivity Research Group, University of Birmingham, Edgbaston, Birmingham B15 2TT, UNITED KINGDOM; telephone +44 121 414 3344; telefax +44 121 414 4577; e-mail ifp574@

sun1.bham.ac.uk; preprint also available at cond-mat@xxx.lanl.gov (#9809328). 74.50.+r; 74.80.Dm; 74.72.Hs.

Alain Pautrat, Charles Simon, Alexandre I. Rykov, and Setsuko Tajima, "Experimental Evidence for Vortex Lines in the Vortex Liquid Phase of *YBaCuO* in a Geometry of Tilted Vortices." To be published in Phys. Rev. B. Contact Ch. Simon, Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 3145 2686; telefax +33 2 3195 1600; e-mail simon@crismat.ismra.fr. 74.60.Ge; 74.62.Dh.

Alain Pautrat, Franck Warmont, Charles Simon, Xavier Chaud, and Stéphane Sanfilippo, "Experimental Evidence for a Loss of Correlation of Vortex Lines in *YBCO:* Electric Field Direction in a Geometry of Tilted Vortices." To be published in Physica C. Contact Ch. Simon, Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et U. de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 3145 2686; telefax +33 2 3195 1600; e-mail simon@crismat.ismra.fr. Key words: vortex line correlation, $YBa_2Cu_3O_7$, superconductivity.

J. Pitel and H. Jones, "New Design Concept of the Magnet System Generating the High Pulsed Field in Combination with the Bias Field of the Superconducting Magnet." To be published in Appl. Supercond. (in press). Institute of Electrical Engineering, Slovak Academy of Sciences, Dúbravská cesta 9, 84239 Bratislava, SLOVAKIA; telefax +421 7 375 816; e-mail elekpit@savba.sk.

G. Plesch, S. Chromik, V. Strbík, M. Mair, G. Gritzner, S. Benacka, I. Sargánková, and A. Buckuliaková, "Thin $(Hg,Pb)Ba_2CaCu_2O_y$ Films Prepared from Thermally Evaporated Precursors by Post Annealing in *Hg*-Atmosphere." To be published in Physica C. Dept. of Inorganic Chemistry, Faculty of Natural Sciences, Comenius University, 842 15 Bratislava, SLOVAKIA; telephone +421 7 60296 326; telefax +421 7 60296 273; e-mail plesch@fns.uniba.sk. Key words: thermally deposited *(Pb)-Ba-Ca-Cu* precursors, thin $(Hg,Pb)Ba_2CaCu_2O_y$ films, *MgO* substrate, surface morphology. 74.72.Gr; 74.76.Bz; 68.55.-a.

H. G. Salunke, V. C. Sahni, P. Raj, K. Shashikala, A. Sathyamoorthy, S. Ramakrishnan, and S. K. Dhar, "Superconducting State Parameters of C-16 Structured Zr_2Rh." To be published in Physica C (in press). Technical Physics and Prototype Engineering Division, Bhabha Atomic Research Center, Mumbai 400 085, INDIA; telefax +91 22 556 0750; e-mail asctpped@magnum.barc.ernet.in. 74.25.Bt; 74.20.De; 74.25.Ha; 74.60.Ec.

D. Sanyal, D. Banerjee, and Udayan De, "Probing $(Bi_{0.92}$-$Pb_{0.17})_2Sr_{1.91}Ca_{2.03}Cu_{3.06}O_{10+\delta}$ Superconductors from 30 to 300 K by Positron Lifetime Measurements." To be published in Phys. Rev. B. Contact Udayan De, Variable Energy Cyclotron Ctr., 1/AF Bidhannagar, Calcutta 700064, INDIA; e-mail ude@veccal.ernet.in. 74.72.Hs; 78.70.Bj.

S. Sengupta, E. Caprino, K. Card, J. R. Gaines, Jr., L. R. Motowidlo, R. S. Sokolowski, R. R. Garcia, and S. M. Mukhopadyay, "Synthesis of Bismuth-Strontium-Calcium-Copper-Oxide Powders for Silver Composite Wires with Uniform Micron Sized Filaments." Submitted to the Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Superconductive Components, Inc., 1145 Chesapeake Avenue, Columbus, OH 43212; telephone (614) 486-0261; telefax (614) 486-0912; e-mail ssengupta@aol.com; Web site http://www.superconductivecomp.com.

A. Sobha, R. P. Aloysius, P. Guruswamy, K.G.K. Warrier, and U. Syamaprasad, "Phase Evolution in *Ag,* Ag_2O and $AgNO_3$ Added *(Bi,Pb)-2223* Superconductor." To be published in Physica C (in press). Contact U. Syamaprasad, Regional Research Lab. (CSIR), Trivandrum 695 019, INDIA; phone +91 471 490674; fax +91 471 491712; e-mail smail@csrrltrd.ren.nic.in. Key words: *Bi(Pb)-Sr-Ca-Cu-O (BPSCCO)* superconductor, phase evolution, *Ag* addition.

Roman Sobolewski, "Ultrafast Dynamics of Nonequilibrium Quasiparticles in High-Temperature Superconductors." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Dept. of Electrical and Computer Engineering and Laboratory for Laser Energetics, U. of Rochester, Rochester, NY 14627-0231.

K. J. Song, J. R. Thompson, M. Yethiraj, D. K. Christen, C. V. Tomy, and D. McK. Paul, "Non-Local Current-Field Relation and the Vortex-State Magnetic Properties of YNi_2B_2C." Submitted to Phys. Rev. B. Department of Physics, University of Tennessee, Knoxville, TN 37996-1200; J. R. Thompson's telephone at Oak Ridge National Laboratory (423) 574-0412; telefax (423) 574-6263; e-mail jrt@utk.edu. 74.25.Bt; 74.25.Ha; 74.72.Ny.

Svetlomir Stavrev, Bertrand Dutoit, Nadia Nibbio, and Luc Le Lay, "Eddy Current Self-Field Loss in *Bi-2223* Tapes with ac Transport Current." To be published in Physica C (in press). Swiss Federal Institute of Technology, CIRC-DE-EPFL, CH-1015 Lausanne, SWITZERLAND; telefax +41 21 693 6700; e-mail svetlomir.stavrev@epfl.ch. Key words: eddy current loss, self-field ac losses, ac loss dissociation. 74.62.Yb; 74.90.+n.

D. K. Sunko, "Thermodynamics of Strongly Correlated Electrons in a Three-Band Model." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Dept. of Physics, Faculty of Science, University of Zagreb, Zagreb, CROATIA;

e-mail dks@phy.hr. Key words: strong correlations, Mott-Hubbard transition, annealed disorder, confinement.

Oleg V. Tchernyshyov, "Fermion Pseudogap from Fluctuations of an Order Parameter." Submitted as a Ph.D. thesis (Columbia University). School of Natural Sciences, Institute for Advanced Study, Olden Lane, Princeton, NJ 08540; e-mail oleg@sns.ias.edu.

D. A. Landinez Tellez, Y. P. Yadava, J. M. Ferreira, and J. Albino Aguiar, "Chemical and Physical Stability of *MgO* with $LaBaCaCu_3O_{7-\delta}$ Superconductors." Submitted to Supercond. Sci. & Technol. Contact J. Albino Aguiar, Departamento de Física, Universidade Federal de Pernambuco, 50670-901 Recife-PE, BRAZIL; telefax +55 81 271 0359; e-mail albino@npd.ufpe.br.

James R. Thompson, "Mercury Cuprate High-T_c Superconductors: What Do Their Magnetic Properties Reveal?" To be published in Studies of High Temp. Supercond., Vol. 26-27, edited by A. Narlikar (Nova Science Publishers, New York, 1998). Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-6061; telephone (423) 574-0412; telefax (423) 574-6263; e-mail jrt@utk.edu.

J. R. Thompson, J. G. Ossandón, L. Krusin-Elbaum, K. J. Song, D. K. Christen, M. Paranthaman, J. Z. Wu, and J. L. Ullmann, "J_c and Vortex Pinning Enhancements in *Bi-, Tl-,* and *Hg*-Based Cuprate Superconductors Via GeV Proton Irradiation." Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-6061; telephone (423) 574-0412; telefax (423) 574-6263; e-mail jrt@utk.edu.

M. D. Todorov and T. L. Boyadjiev, "Numerical Investigation of a Bifurcation Problem with Free Boundaries Arising from the Physics of Josephson Junctions." Report #SU-FMI-TLB: 2/98. Contact T. L. Boyadjiev, Faculty of Mathematics and Computer Science, University of Sofia, No. 5, James Bourchier Blvd., 1164 Sofia, BULGARIA; telephone +359 2 6256 568; e-mail todorlb@fmi.uni-sofia.bg; preprint also available at cond-mat@xxx.lanl.gov (#9809297).

T. Tohyama, C. Gazza, C. T. Shih, Y. C. Chen, T. K. Lee, S. Maekawa, and E. Dagotto, "Stripe Stability in the Extended t-J Model on Planes and Four-Leg Ladders." Submitted to Phys. Rev. B. Institute for Materials Research, Tohoku University, Sendai 980-8577, JAPAN; e-mail tohyama@imr.tohoku.ac.jp; preprint also available at cond-mat@xxx.lanl.gov (#9809411). 74.20.-z; 74.20.Mn; 74.25.Dw.

A. A. Tsvetkov, D. van der Marel, D. Dulic, H. J. Molegraaf, N. N. Kolesnikov, B. Willemsen, and Z. F. Ren, "Interlayer Tunnelling Mechanism: Experimental Test of Single Layer Compounds." To be published in Superconducting Superlattices II: Native and Artificial, edited by I. Bozovic and D. Pavuna, SPIE Proc. 3480 (SPIE, Bellingham, 1998). Materials Science Center, Laboratory of Solid State Physics, University of Groningen, Nijenborgh 4, 9747 AG Groningen, THE NETHERLANDS; e-mail tsvetkov@phys.rug.nl. Key words: Josephson plasmon, interlayer, tunnelling model.

A. V. Ustinov, "Solitons in Josephson Junctions." To be published in Physica D. Physikalisches Institut III, Universität Erlangen-Nürnberg, D-91054 Erlangen, GERMANY; phone +49 9131 857268; e-mail ustinov@physik.uni-erlangen.de.

Anton V. Velichko and Adrian Porch, "Nonlinear High-Frequency Response of a Short Josephson Junction under Two-Frequency Irradiation." School of Electronic and Electrical Engineering, University of Birmingham, Edgbaston, Birmingham B15 2TT, UNITED KINGDOM; phone +44 121 414 4348; fax +44 121 414 4291; e-mail velichko@ee-wp.bham.ac.uk; Web site http://www.bham.ac.uk/.

T. Venkatesan, R. P. Sharma, R. Ramesh, Y. G. Zhao, Insik Jin, S. B. Ogale, M. Rajeswari, C. H. Lee, W. L. Cao, and J. J. Li, "Femto-Second Photoimpedance Response and Dynamic Structural Distortions in *YBCO* Samples." To be published in Superconducting and Related Oxides: Physics and Nanoengineering III, edited by D. Pavuna and I. Bozovic, SPIE Proc. 3481 (SPIE, Bellingham, 1998). Center for Superconductivity Research, Department of Physics, University of Maryland, College Park, MD 20742.

J.H.P. Watson and I. Younas, "Permanent Magnet Superconducting Tubes for Use in Magnetic Separation." Presented at the 9th World Ceramic Congress and Forum on New Mater. (CIMTEC'98), Florence, Italy, June 14-19, 1998. Magnetic Applications Group, Dept. of Physics, University of Southampton, Southampton SO17 1BJ, UNITED KINGDOM.

W. C. Wu and J. P. Carbotte, "Absence of Anisotropic Universal Transport in *YBCO*." Department of Physics, National Taiwan Normal University, Taipei 11718, Taiwan, REPUBLIC OF CHINA; e-mail wu@proton.phy.ntnu.edu.tw; preprint also available at cond-mat@xxx.lanl.gov (#9809341). 78.30.-j; 74.62.Dh; 74.25.Gz.

Z. L. Xiao, P. Voss-de Haan, G. Jakob, Th. Kluge, P. Haibach, H. Adrian, and E. Y. Andrei, "Flux-Flow Instability and Its Anisotropy in $Bi_2Sr_2CaCu_2O_{8+\delta}$ Superconducting Films." To be published in Phys. Rev. B. Dept. of Physics, Rutgers University, 136 Frelinghuysen Road, Piscataway, NJ 08855; phone (732) 445-5936; fax (732) 445-4343; e-mail zlxiao@physics.rutgers.edu. 74.25.Fy; 74.60.Ge; 74.76.Bz.

Z. Zhai, Patanjali V. Parimi, and S. Sridhar, "Non-Linear Microwave Impedance of Short and Long Josephson Junctions." Submitted to Phys. Rev. B. Department of Physics, Northeastern University, 360 Huntington Avenue, Boston,

MA 02115; telephone (617) 373-2948; telefax (617) 373-2823; e-mail srinivas@neu.edu.

COMING EVENTS

*(An * indicates a previously listed event.)*

Nov. 12 - 13, 1998:

International Symposium on Electric Power Applications of Superconducting Technologies – Development Strategies and Present R&D Status in Electric Power Sector, The Westin Osaka, Osaka, Japan. Sponsored by the New Energy and Industrial Technology Development Organization (NEDO). Presentations include in-depth reports on the development strategies and present R&D status in electric power sectors in Germany and other European countries, Japan, the U.S., Russia, and recent R&D status on the 70 MW-class superconducting generators in the Super-GM project. Technical tour to Super-GM test site on Friday. No registration fee. For information, contact the Secretariat, Engineering Research Association for Superconductive Generation Equipment and Materials (Super-GM), telephone +81 6 361 1141, telefax +81 6 361 1437.

Dec. 16 - 19, 1998:

The 5th CTP Workshop on Statistical Physics – Quantum Coherence in Mesoscopic and Macroscopic Systems, Sangsan Mathematical Science Building, Seoul National University, Seoul, Korea. Workshop consists of invited lectures, contributed talks, and poster sessions. For information, contact M. Y. Choi, Department of Physics, Seoul National University, Seoul 151-742, Korea; telephone +82 2 880 6615; telefax +82 2 884 7167; e-mail mychoi@snu.ac.kr; Web site http://ctp.snu.ac.kr/conference/ctpwork.html.

*Jan. 7 - 13, 1999:

1999 University of Miami Conference on High Temperature Superconductivity (HTS99), Miami, Fla. Third in the series. Goal of this conference is to provide a forum for engaging researchers in a focused dialog directed at exploring and distilling the latest experimental and theoretical results in the field likely to have significant influence on the understanding of the normal-state properties and origin of superconductivity in this class of materials. The format will involve a relatively small number (150) of researchers assembled in common sessions. The conference, in addition to addressing physical properties, microscopic theory, and mechanisms for high-temperature superconductivity, will include other related topics (e.g. ladders, manganites, and nickelates). Partial list of topics for which abstracts are solicited includes: pseudogap, stripes/AF correlations, gap symmetry/tunneling, vortex properties, electronic structure, photoemission, non-Fermi liquids, mechanisms, new materials, other oxides (*Mn, Ni,* etc.), and ladder compounds. **Abstract deadline, November 6, 1998.** Contributed presentations will primarily be in the form of posters, although a small number may be selected for oral presentation. For information contact HTS99@physics.miami.edu. Further details available at the Web site http://phyvax.ir.miami.edu:8001/hts99/. ***Note extended abstract deadline.**

Feb. 7 - 9, 1999:

Third Biennial Industrial Energy Efficiency Symposium and Exposition "Turning Industry Visions into Reality," Renaissance Hotel, Washington, DC. Will highlight leading-edge thinking and advanced technologies to meet existing and emerging energy, environmental, and market demands and will address far-reaching national and global challenges in energy efficiency, waste and pollution, production costs, productivity, energy, environmental, and market demands. For information, contact OIT Third Expo Office, Meeting Management Services, 46 South Glebe Road - Suite 202, Arlington, VA 22204; telephone (877) 648-7967; e-mail oit@meetingmgmt.com; Web site http://www.oit.doe.gov.

March 20 - 26, 1999:

APS Centennial Meeting, Georgia World Congress Center, Atlanta, Georgia. Centennial Meeting will present the largest technical meeting program ever for the APS. Will include special Centennial events, and will combine the traditional APS March and AAPT April meetings of the Society, with all APS units participating in the scientific program. About 7,000-8,000 attendees from around the world are expected to attend, including approximately forty Nobel Laureates. **Abstract deadline, Nov. 13, 1998.** Abstracts can be submitted through the APS e-mail template or mailed as hard-copy (see http://abstract.aps.org). For information, contact APS Meetings Department, One Physics Ellipse, College Park, MD 20740; telephone (301) 209-3286; telefax (301) 209-0866; e-mail meetings@aps.org.

Sept. 5 - 7, 1999:

International Conference on Solid State Spectroscopy (ICSSS), Schwäbisch Gmünd, Germany. Will be held in honor of the scientific achievements of Prof. Manuel Cardona. Will consist of oral presentations of 30-45 given by invited speakers. Participants are expected to contribute posters which will be on display throughout the meeting. Ample time will be reserved for casual discussions and the exchange of ideas. No parallel sessions. Conference language is English. Proceedings will be published in a special issue of Phys. Stat. Solidi (b). Participation is limited to 160 participants. Reduced fees will be available for young scientists, who are encouraged to participate. Topics are: Methods – optical spectroscopy, Raman spectroscopy, electron spectroscopy, x-ray and neutron scattering, and nanoprobes; Materials – semiconductors, surfaces, heterostructures, interfaces, and low-dimensional systems, high-temperature superconductors, and magnetic oxides. **Abstract deadline, January 15, 1999.** For information, contact Sabine Birtel, telefax +49 711 689 1712, e-mail icsss@cardix.mpi-stuttgart.mpg.de, Web site http://cardix.mpi-stuttgart.mpg.de/icsss/.

AMES LABORATORY

Dr. Sreeparna Mitra
A219 Physics
Ames Laboratory
Iowa State University
Ames, Iowa 50011-3020

ADDRESS CORRECTION REQUESTED

High-T_c Update is published for the Office of Basic Energy Sciences, U.S. Department of Energy, under Contract W-7405-eng-82 with the Ames Laboratory, Iowa State University. Support is also provided by organizations listed on the masthead and by other donors. Please direct all inquiries to:

Dr. Sreeparna Mitra
A219 Physics
Ames Laboratory
Iowa State University
Ames, Iowa 50011-3020
Telephone: (515) 294-3877
Telefax: (515) 294-1134
E-mail: MITRA@AMESLAB.GOV
MITRA@IASTATE.EDU

Project Director and Editor: Sreeparna Mitra
Science Editor: John R. Clem
ISSN 1048-1141
Homepage: http://www.iitap.iastate.edu/htcu/htcu.html

High-T_c Update is the high-T_c superconductivity information exchange newsletter. It is available twice-monthly as hard copy and as electronic mail. Please send: 1) preprints, reprints, and other T_c-related reports or publications; 2) descriptions of on-going work; 3) meeting news; and 4) etc. Information in *High-T_c Update* is intended for limited distribution. Readers are expected to respect the rights of authors.