HIGH T_c UPDATE

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$RBa_2Cu_3O_{7-\delta}$

A preprint by C. P. Bidinosti et al. (UBC) presents measurements of the magnetic field dependence of the penetration depth $\lambda(H)$ in an untwinned $YBa_2Cu_3O_{6.95}$ single crystal for temperatures from 1.2 to 7 K in parallel dc fields **H** up to 177 G and at directions 0°, ±45°, and 90° relative to the crystal's b axis. At the lowest temperature, $\Delta\lambda(H)$ in the a and b directions could be interpreted as agreeing with the Yip and Sauls prediction for the nonlinear Meissner effect in a d-wave superconductor. However, the systematics versus temperature and orientation, a key aspect of the theory, do not agree. The authors thus conclude that the nonlinear Meissner effect is suppressed by a factor of order 10 or larger.

A new approach to the analysis of the normal-state in-plane (σ_{ab}) and out-of-plane (σ_c) conductivities of anisotropic layered crystals such as oxygen-deficient $YBa_2Cu_3O_{7-\delta}$ is proposed in a preprint by C. C. Almasan (Kent State) et al. The authors show that the resistive anisotropy is determined by the ratio of the phase coherence lengths in the respective directions; i.e., $\sigma_{ab}/\sigma_c = \ell_{ab}^2/\ell_c^2$. From the idea that at all doping levels and temperatures the out-of-plane transport in these crystals is incoherent, it follows that ℓ_c is T-independent and equal to the spacing ℓ_0 between neighboring bilayers. Thus, the T dependence of ℓ_{ab} is given by the measured anisotropy, and the dependence of $\sigma_{ab}(\ell_{ab})$ can be obtained by plotting σ_{ab} vs $\ell = (\sigma_{ab}/\sigma_c)^{1/2}\ell_0$. The analysis of several single crystals of $YBa_2Cu_3O_x$ ($6.35 < x < 6.93$) reveals a universal dependence of $\sigma_{ab}(\ell)$.

Ellipsometric measurements of the far-infrared c-axis dielectric response of underdoped $YBa_2Cu_3O_{7-\delta}$ single crystals have been carried out by C. Bernhard (MPI-Stuttgart) et al. The authors report a detailed analysis of the temperature-dependent renormalization of the oxygen-bending phonon mode at 320 cm^{-1} and the formation of the additional absorption peak around 400-500 cm^{-1}. The data are consistent with a model where the bilayer cuprate compounds are treated as a superlattice of intra- and inter-bilayer Josephson junctions.

Infrared-quenched persistent photoconductivity (PPC) has been studied by D. M. Bubb (New Jersey Institute of Technology) et al. as a function of wavelength and photon dose in order to investigate a defect structure that may be responsible for PPC in $YBa_2Cu_3O_{7-\delta}$. The authors found that the magnitude of IR quenching saturates quickly as a function of visible photon dose, long before the PPC effect saturates. The photon dose dependence of IR quenching indicates behavior that cannot be explained using a purely oxygen-ordering model for PPC.

The in-plane normal-state resistivity ρ_{ab} of *Zn*-doped $YBa_2Cu_3O_{7-\delta}$ and heavily underdoped pure *YBCO* single crystals has been measured by K. Segawa and Y. Ando (CRIEPI) at temperatures T down to 0.2 K in magnetic fields up to 18 T. The authors found that ρ_{ab} does not obey log(1/T) nor does it diverge in the low-temperature limit, suggesting that the ground state of the *YBCO* normal state is metallic.

As reported by F. J. Owens (Army Armament Research and Hunter College), the electron paramagnetic resonance spectrum of Co^{2+} doped into $YBa_2Cu_3O_{7-\delta}$ for the Cu^{2+} ion shows a pronounced decrease in the intensity as the temperature is lowered to 150 K, where it almost completely disappears, characteristic of opening of a spin gap. In the same temperature range, there is a marked nonlinear increase in the g_{yy} of the Co^{2+} spectrum, which is indicative of the onset of antiferromagnetic spin ordering, consistent with formation of a singlet ground state. From the data, the author estimates a spin gap for the *Co-Cu* singlet of 24.0 meV.

Plate-like $Y_{1-z}Nd_zBa_2Cu_3O_{7-\delta}$ single crystals of size up to $7.2 \times 5.8 \times 1.28$ mm^3 exhibiting superconductivity at 93 K have been grown by D. K. Aswal et al. (Shizuoka) using self-flux $Ba_3Cu_{10}O_{13}$ in alumina crucibles under a horizontal temperature gradient.

Microstructural and magnetization investigations of $NdBa_2Cu_3O_{7-\delta}$ *(Nd-123)* prepared by the oxygen-controlled

melt-growth (OCMG) process are reported by S. Neeleshwar (Osmania) et al. Ultrasonic velocity measurements revealed that the elastic anomalies usually observed in the *R-123* materials, especially in the temperature range 100-250 K, were totally absent in the *Nd-123* sample studied here.

The preparation of *Nd-Ba-Cu-O* precursor powder by spray drying and subsequent calcination for the growth of large *Nd-123* grains using a seeded peritectic solidification technique is described in a paper by W. Lo et al. (IRC-Cambridge). A related paper reports studies of the nucleation and growth of *Nd-123/Nd-422 ($Nd_4Ba_2Cu_2O_{10}$)* single-grain composites in a controlled 1% O_2 in N_2 atmosphere as a function of solidification temperature and *Nd-422* phase content using a top-seeded melt-growth technique.

Bi Cuprates

The c-axis resistivity of *$Bi_2Sr_2CaCu_2O_{8+\delta}$ (Bi-2212)* crystals has been measured by G. Yang et al. (Birmingham) as a function of thermal cycling in the temperature range 70-856 K in flowing oxygen and nitrogen. Hysteresis in the temperature-dependent c-axis resistivity provides evidence of thermally activated oxygen diffusion in and out of the crystal with two different activation energies. Oxygen diffusion into the crystals becomes significant above about 595 K and out of the crystal above 750 K. The authors discuss the implications for stoichiometric control, superconductivity, and the intrinsic temperature dependence of the resistivity of *Bi-2212* crystals.

The spatial dependence of the critical current density J_c and the engineering critical current density J_e along the tape-width direction in *Bi-2223* multifilamentary tapes has been studied by W. G. Wang (Nordic Superconductor Technologies) et al. using a cutting technique. The authors generally found an increase of J_c towards the center of the tape, and they attribute this to the stress-strain history of the tape during the rolling process. Low values of J_c near the edges are attributed to a porous microstructure and the presence of secondary phases. Near the center of the tape, the authors measured a (self-field, 77 K) J_e of more than 20 kA/cm^2 and a J_c of more than 70 kA/cm^2.

Other Cuprates

Measurements of the resistively determined upper critical field $H_{c2}^{\rho}(T)$ and irreversibility line $H_{irr}^{\rho}(T)$ of various high-T_c cuprates, deduced from measurements in 61 T pulsed magnetic fields applied parallel to the c axis, are reported by Y. Ando (Bell Labs and CRIEPI) et al. The authors found that the shapes of both $H_{c2}^{\rho}(T)$ and $H_{irr}^{\rho}(T)$ vs T depended monotonically on the material's anisotropy and that none of the samples exhibited a saturation of $H_{c2}^{\rho}(T)$ at low temperature. The anomalous positive curvature, $d^2H_{c2}^{\rho}(T)/dT^2 > 0$, was found to be the strongest in the materials with the largest normal-state anisotropy.

Detailed results of electronic Raman-scattering experiments in differently doped single crystals of *$YBa_2Cu_3O_{7-\delta}$* and *$Bi_2Sr_2(Ca_xY_{1-x})Cu_2O_{8+\delta}$* are reported by M. Opel (WMI-Garching) et al. In samples of greatest anisotropy, there was a loss of spectral weight in B_{2g} symmetry in the temperature range $T_c < T < T^*$, where T^* was of the order of room temperature, in agreement with the pseudogap temperature found in other experiments. The integrated spectral loss was found to be approximately 25% in underdoped samples but much less in samples with higher carrier concentration. In underdoped samples, superconductivity-related features in the spectra could be observed only in B_{2g} symmetry.

Comprehensive inelastic neutron-scattering measurements have been performed by H. Kimura (Tohoku and CREST) et al. to study the soft optical phonons in *$La_{2-x}Sr_xCuO_4$* at x = 0.10, 0.12, and 0.18. The authors found at x = 0.18 that the softening of the Z-point phonon with decreasing temperature, suggesting an incipient structural transition from the low-temperature orthorhombic (LTO) phase to the low-temperature tetragonal (LTT) phase, breaks (stops) at T_c, which is consistent with a previous report by Lee et al. for an optimally doped x = 0.15 sample. For the x = 0.10 and 0.12 samples, however, the softening was found to continue even below T_c.

A preprint by D. Haskel (Washington) et al. reports studies of the local structure of *$La_{2-x}Ba_xCuO_4$* with x = 0.125 and 0.15 with the help of angular-dependent XAFS (x-ray absorption fine structure) measurements at all *La, Ba,* and *Cu* K-edges. The authors found that *Ba* doping induces local distortions that extend as far as 5 Å from its lattice site, thus affecting a significant fraction of the lattice (the fractional volume affected by the *Ba* distortions is at least 18%). The random *Ba* substitution causes considerable random disorder in the magnitude of the LTT tilt angle of *CuO_6* octahedra. This intrinsic disorder, combined with the results of LDA calculations on this system, gives support for a mobility gap contributing to T_c suppression at x = 0.125. The authors also discuss implications of their findings for the correlation lengths of postulated charge and spin stripes in this material.

The results of an extensive elastic neutron-scattering study of the incommensurate static spin correlations in *$La_{1.95}Sr_{0.05}CuO_4$,* which is an insulating spin glass at low temperatures, are reported in a preprint by S. Wakimoto (MIT) et al. The results demonstrate that *$La_{1.95}Sr_{0.05}CuO_4$* has a one-dimensional static diagonal spin modulation at low temperatures, consistent with certain stripe models.

The spin correlations are predominantly two-dimensional. These results demonstrate that the insulator-to-superconductor transition in the underdoped regime ($0.05 \le x \le 0.06$) in $La_{2-x}Sr_xCuO_4$ is coincident with a transition from diagonal to collinear static stripes at low temperatures, thereby manifesting an intimate coupling between one-dimensional spin-density modulation and superconductivity.

Room-temperature values of the Ettingshausen (P_E), Hall (R_H), and Seebeck (S) coefficients and the electrical conductivity (σ) have been measured by T. Plackowski and M. Matusiak (ILTSR-Wroclaw) in $La_{2-x}Sr_xCuO_4$ for x = 0.03 to 0.35. The authors found throughout the entire composition range that the magnitude of P_E is of the order of 10^{-7} m^3K/J, characteristic of typical metals, and that P_E is positive for $x \le 0.07$ and negative for $x > 0.07$. The authors propose an explanation for the sign change in P_E.

A preprint by Y. Ando (CRIEPI and Science University of Tokyo) et al. reports measurements of ρ_{ab}, R_H, and cot θ_H vs T in single crystals of $Bi_2Sr_{2-x}La_xCuO_6$ (x = 0.24, 0.30, 0.44, 0.57, 0.66, and 0.74) in which increasing the value of x brings the system from the overdoped region to the underdoped region. The authors report behavior that is common among the cuprates. For example, the most underdoped samples exhibit features indicative of a pseudogap with T* near room temperature.

Vortices

A preprint by M. P. Raphael (Catholic University of America) et al. reports measurements of the irreversibility line (from the onset of the third harmonic of the ac susceptibility) as a function of pressure in a diamond anvil cell up to 2.5 GPa in $Bi_2Sr_2CaCu_2O_{8+\delta}$ *(Bi-2212).* The results show the relationship between lattice spacing, effective-mass anisotropy γ, and the irreversibility line. The results demonstrate that application of a pressure of 2.5 GPa causes a dramatic increase in interplanar coupling and a corresponding decrease in the value of γ. The authors also discuss the role of surface barriers to flux penetration in *Bi-2212.*

The angular dependence of the irreversible magnetization and its time relaxation in $YBa_2Cu_3O_{7-\delta}$ single crystals with one or two families of columnar defects inclined with respect to the c axis have been studied by A. Silhanek (Bariloche) et al. At high magnetic fields, the magnetization shows the usual maximum centered at the mean tracks' orientation and an associated minimum in the normalized relaxation rate. At low fields, however, the authors observe an anomalous local minimum in the magnetization and a maximum in the relaxation rate. The authors present a model to explain this anomaly based on the slowdown of the creep processes arising from the increase of the vortex-vortex interactions as the applied field is tilted away from the mean tracks' direction.

Magnetic measurements have been performed by S. Kokkaliaris (Southampton) et al. on pure detwinned $YBa_2Cu_3O_{7-\delta}$ single crystals to investigate the influence of variations in the oxygen stoichiometry on the out-of-plane anisotropy $\gamma_{ck} = (m_c/m_k)^{1/2}$ (k = a or b) in the region close to optimal doping ($6.90 < 7-\delta < 6.98$). The authors estimated the anisotropy using the anisotropic London model and the period of the commensurability oscillations of the hysteretic magnetization for fields applied parallel to the ab planes. For variation in the oxygen deficiency by as much as 300%, the authors found that γ_{ck} decreases only slightly (less than 12%) with decreasing oxygen deficiency.

A twinned $YBa_2Cu_3O_{7-\delta}$ single crystal has been investigated by Yu. Eltsev and Ö. Rapp (KTH-Stockholm) by c-axis transport measurements with eight contacts and **B** parallel to the ab planes. This experimental geometry allows studies of the vortex velocity correlations both parallel and perpendicular to the applied magnetic field. The authors found that a vortex lattice parallel to the ab planes melts into a disentangled vortex liquid, and for $B \le 2$ T, this melting occurs in a moving vortex lattice above the irreversibility line. The authors also infer a nonlocal contribution to the transport properties.

A preprint by K. Nakao et al. (SRL-ISTEC) reports that multiterminal measurements were performed on a *Bi-2212* single crystal in magnetic fields along the c axis and the applicability of the Montgomery analysis was systematically tested. The Montgomery analysis was found to be applicable in the normal state but not just below T_c. However, it seems to be applicable again at lower temperatures in low magnetic fields. The authors discuss the origin of the breakdown of the Montgomery analysis.

Transport measurements in clean, untwinned *YBCO* single crystals where the spatial gradient of the Lorentz driving force is controlled are described in a preprint by G. W. Crabtree (Argonne) et al. The vortex velocity profiles induced by the Lorentz force gradient in the driven liquid and lattice vortex phases are characteristic of hydrodynamic, plastic, and elastic motion.

The driven vortex lattice in untwinned, clean *YBCO* single crystals showing the first-order vortex-lattice melting transition at T_m has been studied by A. Rydh et al. (KTH-Stockholm). At high enough driving currents ($J \sim 10^3$ A/cm^2, $J \ge J_c$) and temperatures $T < T_m$, the authors found a clear distinction between two different behaviors of the moving vortex lattice by plotting the resistivity at fixed J as a function of temperature T. The onset of dissipation is characterized by noisy flux creep with a temperature-independent activation energy U(J). At higher temperatures, the creep regime crosses over into a flux-flow regime with linear resistivity. For still higher temperatures, apart from the dip at T_m, which is associated with the peak effect and usually attributed to softening of the shear modulus, the resistivity remains in the

flux-flow regime, which extends continuously into the vortex liquid.

Observations of unusual features in the minor hysteresis loops in a clean crystal of 2H-$NbSe_2$ that displays a peak effect are reported in a preprint by G. Ravikumar (BARC-Mumbai) et al. The authors explain the observed behavior in terms of supercooling of the disordered vortex phase while cooling the superconductor in a field.

A preprint by A. E. Khalil (Bahrain) proposes a model to explain the B dependence of the critical velocity v* at which voltage jumps occur in *Bi-2212* thin films.

The properties of a vortex in a chiral p-wave superconductor which has a $p_x + ip_y$-wave pairing state and simultaneously breaks U(1), parity, and time-reversal symmetry have been studied by J. Goryo (Hokkaido). The author finds that such a vortex has fractional charge and fractional angular momentum, suggesting that the vortex could obey fractional statistics. The author notes that it would be interesting to see if these properties could be observed experimentally in Sr_2RuO_4, which is thought to be a p-wave superconductor.

Films

A recent paper by B. Dam et al. [Nature **399**, 499 (1999)] showed that natural linear defects (dislocations) are the origin of the high critical current densities in laser-ablated $YBa_2Cu_3O_{7-\delta}$ films. Combining wet-chemical etching and atomic force microscopy (AFM), J. M. Huijbregtse et al. (Amsterdam) have found that these dislocations are created by island coalescence during growth. Consequently, the defect density can be reproducibly varied by manipulating the density of growth islands, which in turn depends on the substrate temperature. The radial defect distribution function approaches zero at small distances, indicating short-range order. The authors thus stress that they are now able to study vortex matter in films with a tailored nonrandom distribution of natural, strong pinning centers.

A related paper by J. M. Huijbregtse et al. (Amsterdam) reports studies of the fluence dependence of the composition of pulsed-laser-deposited $YBa_2Cu_3O_{7-\delta}$ films. The authors determine and model the conditions by which stoichiometric transfer can be achieved at large ablation rates, resulting in precipitate-free films. The authors find, however, that slightly off-stoichiometric films, deposited in the diffusion-assisted preferential ablation regime, exhibit the best superconducting properties (T_c = 91.0 K, ΔT_c = 0.4 K) and can be produced with a remarkably high reproducibility.

A temperature-dependent strong-to-weak Josephson coupling transition near 75 K has been observed by R. D. Redwing et al. (Wisconsin-Madison) for 10° misorientation *YBCO* grain boundaries. The current-voltage characteristics show strongly coupled flux-flow behavior below 75 K and weakly coupled Josephson-like behavior above 75 K. The data are consistent with a network of microbridges at the grain boundary defined by dislocation strain fields.

Infrared (20-120 cm^{-1} and 900-1100 cm^{-1}) Faraday rotation and circular dichroism have been measured by J. Cerne (Maryland) et al. in high-T_c superconductors using sensitive polarization modulation techniques. The authors studied optimally doped $YBa_2Cu_3O_{7-\delta}$ thin films at temperatures down to 15 K in magnetic fields up to 8 T. The authors assert that their experimental results put severe constraints on theories of transport in the normal state of high-T_c superconductors.

High-resolution polarized x-ray absorption spectra at the *O* K-edge and *Cu* L-edge have been investigated by J. M. Chen (SRRC-Hsinchu) et al. for c-axis-oriented $La_2CuO_4F_x$ thin films using a bulk-sensitive x-ray-fluorescence-yield detection method. The authors found that *F* ions present in $La_2CuO_4F_x$ induce hole states in the CuO_2 planes near the Fermi level, which in turn play an important role in enhancing superconductivity in this compound. Thus the *F* ions may be regarded as electronic dopants that induce superconductivity.

Applications

About 50 pairs of 5 to 6 kA conventional current leads are used to provide current to the superconducting magnets in Fermilab's Tevatron. According to three preprints by G. Citver et al. (FNAL), Fermilab is investigating the feasibility of replacing some of these conventional leads with high-temperature-superconducting (HTS) leads. The basic idea is to use leads with two sections: (a) an HTS section from 4 to 80 K cooled with helium liquid and vapor, and (b) a copper section from 80 to 300 K cooled with liquid nitrogen, nitrogen vapor, and helium vapor. Both American Superconductor Corporation (ASC) and Intermagnetics General Corporation (IGC) have developed R&D HTS current leads for Fermilab, and these have been tested at the rated current of 5 kA. The three preprints by G. Citver et al. cover various aspects of testing and mathematical modeling of the current leads.

A preprint by H. W. Weijers (NHML-Tallahassee) et al. describes the development and testing of a 3 T class *Bi-2212* insert magnet. The magnet consists of three sections, each built by stacking double pancakes using powder-in-tube conductor and the wind-and-react approach. Conductor with a pure *Ag* matrix was used for the inner section, and conductor with a mixed *Ag* and *AgMg* matrix was used for the outer two sections. Elements of the design, conductor properties, construction, and testing are presented. The authors report the successful generation of 3 T at 4.2 K in a 19 T background magnetic field.

The development of a magnetic Troxel system containing superconducting *Bi-2223/Ag* tape-based windings is described in a preprint by N. T. Cherpak (Kharkov) et al. The superconducting windings are in the form of elongated narrow twins in a ferromagnetic shield. The authors conclude from their studies that an HTS-based magnetic system with nonaxial symmetry and high field uniformity should be possible in the near future. The authors note, however, that a number of improvements will be necessary for the development of a complete system analogous to existing LTS-based magnetic systems.

A paper by V. Polushkin et al. (Oxford Instruments) presents the underlying theory and experimental data for a comparative study of a dc SQUID with voltage and current bias. Although the model has been tested for LTS SQUIDs, the results also are relevant for HTS SQUIDs.

Theory

A strategy to enhance d-wave superconducting correlations is proposed by H. Tsunetsugu (Tsukuba) and M. Imada (Tokyo) based on their numerical studies of correlated electron models for high-T_c cuprates. The authors observe that the pairing is enhanced when the single-electron level around $(\pi,0)$ is close to the Fermi level, while the d-wave pairing interaction itself contains elements to disfavor the pairing because it shifts the $(\pi,0)$ level downward. The authors suggest that the high-T_c cuprates are not yet optimized with regard to the position of the $(\pi,0)$ level, and they propose that there is still a chance to achieve higher transition temperatures by careful tuning of this level.

The effect of impurities upon the electrical, thermal, and spin conductivity in d-wave superconductors has been studied by A. C. Durst and P. A. Lee (MIT). Upon including the effects of vertex corrections and Fermi-liquid corrections, the authors found that both the electrical and spin conductivity are renormalized and that only the thermal conductivity maintains its universal value, independent of impurity scattering or Fermi-liquid interactions. The authors thus stress that low-temperature thermal conductivity measurements provide the most direct means of obtaining the velocity anisotropy v_F/v_2 for high-T_c cuprate superconductors [v_F = Fermi velocity and v_2 = gap velocity (slope)].

Models for superconductivity with two interactions, $V^>$ due to antiferromagnetic fluctuations and $V^<$ due to phonons, were considered by I. Chang (Pusan) et al. The authors numerically found that (a) a weak BCS attraction can produce a high T_c if a Van Hove singularity is at work, (b) $V^>$ is important to give d-wave superconductivity, (c) the gap parameter $\Delta(\mathbf{k})$ is constant (s-wave) for the extremely overdoped region but changes to anisotropic s-wave as the doping is reduced, and (d) there exists a first-order phase transition between d-wave and anisotropic s-wave gaps.

A preprint by J. E. Hirsch (UCSD) and F. Marsiglio (Alberta) proposes that the condensation energy of *$Tl_2Ba_2CuO_{6+\delta}$ (Tl-2201)* arises chiefly from the reduction in effective mass and consequent lowering of kinetic energy that occurs upon pairing. The authors also predict an in-plane kinetic energy gain of 1-3 meV per planar oxygen in the optimally doped material when it goes superconducting. The authors suggest that this effect may be most easily detected by optical absorption measurements in underdoped dirty samples.

A fundamental connection between superconductivity and quantum spin fluctuations in underdoped cuprates is pointed out in a preprint by M. Havilio and A. Auerbach (Technion). A variational calculation shows that Cooper pair hopping strongly reduces the local magnetization m_0. This effect pertains to recent neutron-scattering and muon spin-rotation measurements in which m_0 varies weakly with hole doping in the poorly conducting regime, but drops precipitously above the onset of superconductivity.

Accurate orthogonal tight-binding Hamiltonians have been constructed by I. I. Mazin et al. (NRL) for ferromagnetic *$SrRuO_3$* and the layered perovskite superconductor *Sr_2RuO_4* by fitting to all-electron full-potential local density band structures obtained by the linearized augmented plane-wave method. The authors stress that these Hamiltonians allow the band structure to be computed on very fine meshes in the Brillouin zone at low cost, and that they also have analytic band velocities while retaining the accuracy of full-potential electronic structure calculations. This greatly facilitates the calculation of transport and superconducting parameters related to the fermiology. The authors have exploited these features to calculate the Hall coefficient and vortex-lattice geometry for *Sr_2RuO_4* with fine integration meshes.

A preprint by G. Litak (Lublin) and B. L. Györffy (Bristol) considers the case of superconductors whose electrons attract each other only if they are near certain centers and ask the question, “How many such centers are needed to make the ground state superconducting?” The authors make use of a random-U Hubbard model and the coherent potential approximation (CPA). The authors argue that for this model there is a critical concentration c_0 below which the system is not a superconductor.

On the basis of a simple model, G. Litak (Lublin) et al. analyze the influence of disorder on the critical temperature T_c in p-wave superconductors. The disorder is treated by means of the coherent potential approximation (CPA), and the authors’ attention is focused on the effect of a Van Hove singularity near the Fermi energy E_F. The model reproduces the experimentally observed behavior of T_c vs disorder in *Sr_2RuO_4*.

The pair-breaking effect caused by localized magnetic moments and its impact on the properties of the borocarbides have been studied by Yu. N. Ovchinnikov and V. Z. Kresin (LBL). The authors focused on the behavior of the upper and lower critical fields H_{c2} and H_{c1}, and several other quantities. The authors applied their theory to the borocarbide $LuNi_2B_2C$ and found good agreement with experiment.

Other Activities

The Meissner-state response of an infinitely long superconducting strip to a normally incident magnetic field has been calculated by D. Agassi and J. R. Cullen (Naval Surface Warfare Center) using the London equations. The authors derive nondivergent expressions for the screening current and magnetic field for a strip of arbitrary width w and thickness d. For a strip with high aspect ratio (w/d), the calculated spatial distributions of the surface induction and screening currents compare well with the corresponding commonly employed (canonical) expressions, provided the evaluation point is not too close to the strip edges, where the canonical expressions diverge. The new expression predicts for the total screening current a value that exceeds that obtained from the canonical expression by a factor of 5 to 8 and is tightly peaked at the strip edges.

A detailed investigation of harmonic generation at microwave frequencies in $Ba_{0.6}K_{0.4}BiO_3$ *(BKBO)* crystals is reported by A. Agliolo Gallitto et al. (Palermo). The authors investigate second- and third-harmonic signals as a function of temperature, external magnetic field, and input power level at temperatures close to T_c. The data are discussed in terms of a phenomenological theory, based on the two-fluid model, which assumes that the microwave and static fields, penetrating the sample within the penetration depth, perturb the normal-fluid and superfluid densities. To account for the experimental data in *BKBO,* the authors find that it is necessary to involve a distribution of T_c over the crystal.

Overviews

The current status of different types of nonhysteretic Josephson junctions, with an emphasis on double-barrier structures, has been reviewed by M. Yu. Kupriyanov (Moscow State) et al. The authors present the results of theoretical work on double-barrier SIS'IS Josephson junctions (S = superconductor with transition temperature T_c, I = tunnel barrier, S' = thin film with $T_c' < T_c$); their model describes the crossover from direct Josephson coupling of the two S electrodes to the regime of two series-connected SIS' junctions. The authors calculate the I_cR_n product as a function of the T_c'/T_c ratio, the interlayer (S') thickness, and the barrier strengths, and they compare the theory with experimental data for $Nb/AlO_x/Al/AlO_x/Nb$ junctions. The authors argue that these junctions are promising in rapid single-flux-quantum (RSFQ) devices and programmable voltage-standard applications, since they are intrinsically shunted and have controllable interfaces (109 refs.).

A preprint by J. W. Lynn (NIST-Gaithersburg) et al. reviews magnetic neutron-scattering measurements for $PrBa_2Cu_3O_{6+x}$ and compares the results with those in related materials containing *Pr.* The observed inelastic scattering indicates that there is strong hybridization of the *Pr* 4f levels; the authors stress that this is the correct explanation for the absence of superconductivity in $PrBa_2Cu_3O_{6+x}$ (44 refs.).

A brief overview of the thermodynamics, processing, and properties control in bulk $RBa_2Cu_3O_{7-\delta}$ *(R = Y, Nd,* and *Sm)* has been prepared by G. Krabbes et al. (Dresden). The authors discuss the influence on the critical current density J_c, remanent magnetic flux B_0, and levitation force (16 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 recent announcement, Intermagnetics General Corporation (IGC) announced that it will supply more than $1 million in superconducting wire to Fermi National Accelerator Laboratory for a detector magnet to be manufactured for the Large Hadron Collider (LHC) program in Europe. The order also includes an option for up to $272,000 in additional

wire shipments. Deliveries are scheduled to begin in the fall of 1999 and end in the summer of 2000. The latest contract award is in addition to an earlier award of $16.4 million in *NbTi* wire that the company's wire manufacturing division will supply directly to CERN. Intermagnetics is a developer and manufacturer of superconducting materials, magnets, and devices utilizing LTS and HTS wire, cable, and tape, related refrigeration equipment, and radio-frequency coils. The company's current revenues consist primarily of applications within magnetic resonance imaging for medical diagnostics and cryogenic vacuum and related processes. Through its own research and development programs and in conjunction with industry partners, Intermagnetics is committed to further commercialization of applied superconductivity and refrigeration systems, particularly for the electric utility industry. For information, contact Intermagnetics General Corporation, P.O. Box 566, Guilderland, NY 12084; Web site: http://www.igc.com.

A leader in the development of wireless communications filter products utilizing superconducting materials and cryogenic technologies, Superconductor Technologies, Inc. (STI) recently announced that it has signed a five-year agreement with United States Cellular Corporation, under the terms of which U.S. Cellular will purchase a minimum of 100 STI SuperFilter® systems over the next year, and anticipates purchasing a minimum of an additional 400 systems over the following four years. As part of the agreement, STI will issue U.S. Cellular a warrant, providing for the purchase of up to one million shares of STI common stock at a price of $4.00 per share. The agreement will also accelerate testing of additional STI products in U.S. Cellular's expanding network and in urban/suburban applications. Executives at STI state that the SuperFilter® systems have consistently demonstrated the ability to enhance network coverage, call quality, and overall performance. Based in Chicago, United States Cellular Corporation, one of the nation's ten largest cellular service providers, manages and invests in cellular systems throughout the United States. For further information, contact Laura S. Kirkley, Superconductor Technologies, Inc., 460 Ward Drive, Suite F, Santa Barbara, CA 93111-2310; telephone (805) 683-7646; telefax (805) 683-8527; Web site http://www.suptech.com.

Contributed by Sreeparna Mitra

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D. Agassi and J. R. Cullen, "Superconductor Strip Response to a Normally Incident Magnetic Field." To be published in Physica C (in press). Code 682, Carderock Division, Naval Surface Warfare Center, 9500 MacArthur Boulevard, West Bethesda, MD 20817-5000; phone (301) 227-5658; fax (301) 227-4733; e-mail agassi@dt.navy.mil. Key words: superconductor strip, normally incident, magnetic field.

C. C. Almasan, E. Cimpoiasu, G. A. Levin, H. Zheng, A. P. Paulikas, and B. W. Veal, "Is There a Unified Description of Conductivity of Layered Cuprates?" To be published in J. Low Temp. Phys. Department of Physics, Kent State University, Kent, OH 44242; G. A. Levin's e-mail levin@physics.kent.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908233. 74.25.Fy; 72.15.Eb; 72.10.Bg; 74.80.Dm.

Yoichi Ando, G. S. Boebinger, A. Passner, L. F. Schneemeyer, T. Kimura, M. Okuya, S. Watauchi, J. Shimoyama, K. Kishio, K. Tamasaku, N. Ichikawa, and S. Uchida, "Resistive Upper Critical Fields and Irreversibility Lines of Optimally Doped High-T_C Cuprates." To be published in Phys. Rev. B. Central Research Institute of Electric Power Industry (CRIEPI), Komae, Tokyo 201-8511, JAPAN; e-mail ando@criepi.denken.or.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908190. 74.60.Ec; 74.40.+k; 74.25.Fy.

Yoichi Ando, T. Murayama, and S. Ono, "Systematic Evolution of the Magnetotransport Properties of $Bi_2Sr_{2-x}La_xCuO_6$ with Carrier Concentration." To be published in J. Low Temp. Phys.: Proc. of the Int. Conf. on Phys. and Chem. of Molecular and Oxide Supercond. (MOS'99), Stockholm, Sweden, July 28-Aug. 2, 1999. Central Research Institute of Electric Power Industry (CRIEPI), Komae, Tokyo 201-8511, JAPAN; e-mail ando@criepi.denken.or.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9906268. 74.25.Fy; 74.62.Dh; 74.72.Hs.

D. K. Aswal, T. Mori, Y. Hayakawa, and M. Kumagawa, "Growth of $Y_{1-z}Nd_zBa_2Cu_3O_X$ Single Crystals." Submitted to J. Crystal Growth. Research Institute of Electronics, Shizuoka University, 3-5-1 Johoku, Hamamatsu 432-8011, JAPAN; telephone and telefax +81 53 478 1338; e-mail roaswal@eng.shizuoka.ac.jp. Key words: flux growth, phase diagram, high-temperature optical microscopy, $Y_{0.5}Nd_{0.5}Ba_2Cu_3O_X$. 81.10.Fq; 81.30.Bx; 74.72.Bk.

N. Hari Babu, W. Lo, D. A. Cardwell, and Y. Shi, "The Effect of Undercooling and *Nd422* Phase Content on the Nucleation of Large *NdBCO* Grains Fabricated by Top Seeded Melt Processing." To be published in J. Mat. Res. Interdisciplinary Research Centre in Superconductivity, University of Cambridge, Madingley Road, Cambridge CB3 0HE, UNITED KINGDOM; D. A. Cardwell's telephone +44 1223-

337050 or -337076; telefax +44 1223-337074; e-mail dc135@hermes.cam.ac.uk.

J.J.A. Baselmans, B. J. van Wees, and T. M. Klapwijk, "Probing the Electron-Electron Interaction in a Diffusive Gold Wire Using a Controllable Josephson Junction." Submitted to Phys. Rev. Lett. Department of Applied Physics and Materials Science Center, University of Groningen, Nijenborg 4, 9747 AG Groningen, THE NETHERLANDS; phone +31 50 363 4919; e-mail j.j.a.baselmans@phys.rug.nl; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907146. 73.23.-b; 74.50.+r; 85.25.Cp; 85.25.Am.

C. Bernhard, D. Munzar, A. Golnik, C. T. Lin, A. Wittlin, J. Humlícek, and M. Cardona, "The Anomaly of the Oxygen Bond-Bending Mode at 320 cm^{-1} and the Additional Absorption Peak in the c-Axis Infrared Conductivity of Underdoped $YBa_2Cu_3O_{7-\delta}$ Single Crystals Revisited by Ellipsometric Measurements." Submitted to Phys. Rev. B. Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, D-70569 Stuttgart, GERMANY; phone +49 711 689 1733; fax +49 711 689 1010; e-mail bernhard@cardix.mpi-stuttgart.mpg.de; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908047. 74.25.Gz; 74.25.Kc; 74.50.+r; 74.72.Bk.

C. P. Bidinosti, W. N. Hardy, D. A. Bonn, and Ruixing Liang, "Magnetic Field Dependence of λ in $YBa_2Cu_3O_{6.95}$: Results as a Function of Temperature and Field Orientation." To be published in Phys. Rev. Lett. Department of Physics and Astronomy, University of British Columbia, Vancouver, BC, CANADA V6T 1Z1; paper also available at Web site http://www.physics.ubc.ca/~supercon/paper.html. 74.25.Nf; 74.25.Ha; 74.72.Bk.

Daniel M. Bubb, J. F. Federici, S. C. Tidrow, W. Wilber, J. Kim, and A. Piqué, "Wavelength and Photon Dose Dependence of Infrared Quenched Persistent Photoconductivity in $YBa_2Cu_3O_{6+x}$." To be published in Phys. Rev. B. Department of Physics, New Jersey Institute of Technology, Newark, NJ 07102; e-mail dmb8027@megahertz.njit.edu or bubb-danny@home.com.

J. Cerne, M. Grayson, D. C. Schmadel, G. S. Jenkins, H. D. Drew, R. Hughes, J. S. Preston, and P.-J. Kung, "Infrared Hall Effect in High T_c Superconductors: Evidence for Non-Fermi Liquid Hall Scattering." Center for Superconductivity Research and Department of Physics, University of Maryland, College Park, MD 20741; e-mail jacerne@physics.umd.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908033.

Iksoo Chang, Jacques Friedel, and Mahito Kohmoto, "Phase Transition Between d-Wave and Anisotropic s-Wave Gaps in High Temperature Oxide Superconductors." Department of Physics, Pusan National University, Pusan 609-735, SOUTH KOREA; e-mail chang@random.phys.pusan.ac.kr; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908214. 74.20.-z; 74.20.Fg.

J. M. Chen, P. Nachimuthu, R. S. Liu, S. T. Lees, K. E. Gibbons, I. Gameson, M. O. Jones, and P. P. Edwards, "Hole States in Fluorine-Doped La_2CuO_4 Thin Films Probed by Polarized X-ray Absorption Spectroscopy." To be published in Phys. Rev. B. Synchrotron Radiation Research Center, 8th Fl., No. 6, Roosevelt Road, Sec. 1, 10757 Taipei, Taiwan, REPUBLIC OF CHINA; telefax +886 3 5789 816; e-mail jmchen@srrc.gov.tw.

N. T. Cherpak, A. A. Lavrinovich, T. A. Smirnova, P. Haldar, and D. Hazelton, "HTS *Bi-2223/Ag* Tape-Based Troxel Magnetic System." To be published in Cryogenics. Usikov Institute of Radiophysics and Electronics, National Academy of Sciences, 12 Acad. Proskura Str., 310085 Kharkov, UKRAINE; phone +380 572 448 363; fax +380 572 441 105; e-mail cherpak@ire.kharkov.ua. Key words: high-uniformity magnetic field, ferromagnetic shield, HTS *Bi-2223/Ag* tape.

Jin-Ho Choy, Woo Lee, and Seong-Ju Hwang, "Evolution of Crystal and Electronic Structures of Sr_2CuO_3 Upon Fluorination Reaction." To be published in Physica C (in press). Department of Chemistry, Center for Molecular Catalysis, College of Natural Sciences, Seoul National University, Seoul 151-742, SOUTH KOREA; phone +82 2 880 6658; fax +82 2 872 9864; e-mail jhchoy@plaza.snu.ac.kr. Key words: x-ray absorption spectroscopy, fluorination, structural modification. 78.70.Dm; 61.10.Ht; 74.62.Bf.

G. Citver, E. Barzi, A. Burov, S. Feher, P. J. Limon, and T. Peterson, "Steady State and Transient Current Lead Analysis." Submitted to the Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Fermi National Accelerator Laboratory, P.O. Box 500, Batavia, IL 60510; S. Feher's e-mail fehers@fnal.gov.

G. Citver, S. Feher, P. J. Limon, D. Orris, T. Peterson, C. Sylvester, M. A. Tartaglia, and J. C. Tompkins, "HTS Power Lead Test Results." Submitted to the Proc. of PAC'99, New York City, NY, 1999. Fermi National Accelerator Laboratory, P.O. Box 500, Batavia, IL 60510; S. Feher's e-mail fehers@fnal.gov.

G. Citver, S. Feher, T. J. Peterson, and C. D. Sylvester, "Thermal Tests of 6 KA HTS Current Leads for the Tevatron." Submitted to the Proc. of the Int. Cryogenic Eng. Conf. (CEC'99), Montréal, Quebec, Canada, July 12-16, 1999. Fermi National Accelerator Laboratory, P.O. Box 500, Batavia, IL 60510; S. Feher's e-mail fehers@fnal.gov.

G. W. Crabtree, D. Lopez, W. K. Kwok, H. Safar, and L. M. Paulius, "Dynamic Correlation in Driven Vortex Phases." To be published in J. Low Temp. Phys.: Proc. of the Int. Conf.

on Phys. and Chem. of Molecular and Oxide Supercond. (MOS'99), Stockholm, Sweden, July 28-Aug. 2, 1999. 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. 74.60.Ge; 74.72.-h.

J. P. da Silva Fo, J. Schaf, P. Pureur, and S. Reich, "Josephson Flux Dynamics from the Initial Depinning up to Complete Grain Decoupling at the Irreversibility Line in $YBa_2Cu_3O_7/Ag$ Nonrandom Composites." To be published in Physica C (in press). Contact J. Schaf, Instituto de Física, Universidade Federal do Rio Grande do Sul, Av. Bento Goncalves 9500, P.O. Box 15051, 91501-970 Porto Alegre RS, BRAZIL; phone +55 51 316 6451; fax +55 51 319 1762. Key words: superconductivity, high-T_c superconductors, magnetic properties.

M. P. Delamare, H. Walter, B. Bringmann, A. Leenders, and H. C. Freyhardt, "Macrosegregation of Y_2BaCuO_5 Particles in Top-Seeded Melt Textured Monoliths." To be published in Physica C (in press). Contact A. Leenders, Institut für Materialphysik, Universität Göttingen, Windausweg 2, D-37073 Göttingen, GERMANY; phone +49 551 50717 30; fax +49 551 50717 50; e-mail leenders@umpsun1.gwdg.de. Key words: melt-textured superconductors, *Y*-based cuprates, pushing/trapping, macrosegregation. 81.10.Aj; 74.72.Bk; 61.72.Ss.

Adam C. Durst and Patrick A. Lee, "Impurity-Induced Quasiparticle Transport and Universal Limit Wiedemann-Franz Violation in d-Wave Superconductors." Submitted to Phys. Rev. B. Department of Physics, Massachusetts Institute of Technology, Cambridge, MA 02139; e-mail acdurst@mit.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908182. 74.25.Fy; 74.72.-h; 71.55.-i.

Yu. Eltsev and Ö. Rapp, "Flux Lattice Melting and Nonlocal Electrodynamics in $YBa_2Cu_3O_{7-\delta}$ Single Crystal in Magnetic Field Parallel to CuO_2 Layers." To be published in Phys. Rev. B. Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135, JAPAN; telephone +81 3 3536 5707; telefax +81 3 3536 5717; e-mail yuri@istec.or.jp. 74.60.Ge; 74.72.Bk.

A. Ferraz, T. Saikawa, and Z. Y. Weng, "Marginal Fermi Liquid with a Two-Dimensional Patched Fermi Surface." Laboratorio de Supercondutividade, Centro Internacional de Fisica da Materia Condensada, Universidade de Brasilia, 70919-970 Brasilia-DF, BRAZIL; phone +55 61 348 2572; fax +55 61 273 3884; e-mail ferraz@solids.iccmp.br; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908111.

A. Agliolo Gallitto, M. Guccione, and M. Li Vigni, "Nonlinear Microwave Emission in $Ba_{0.6}K_{0.4}BiO_3$ Crystals Near T_c." Submitted to Physica C. Contact M. Li Vigni, Dipartimento di Scienze Fisiche e Astronomiche, Via Archirafi 36, I-90123 Palermo, Italy; phone +39 091 6234207; fax +39 091 6162461; e-mail livigni@fisica.unipa.it. Key words: high-temperature superconductors, electromagnetic field response, nonlinear effects. 74.25.Nf; 74.20.De.

J. Goryo, "Vortex with Fractional Quantum Numbers in Chiral p-Wave Superconductor." Department of Physics, Hokkaido University, Sapporo 060-0810, JAPAN; e-mail goryo@particle.sci.hokudai.ac.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908113.

Govind, A. Pratap, Ajay, and R. S. Tripathi, "Thermodynamic Properties of Bilayer Cuprate Superconductors." To be published in Physica C (in press). Contact R. S. Tripathi, Department of Physics, G. B. Plant University of Agriculture and Technology, Pantnagar 263145, INDIA. Key words: bilayer cuprate superconductors, interlayer interactions, thermodynamic properties, doping density. 74.25.Bt; 74.62.-c; 74.72.Bk; 74.80.Dm.

D. Haskel, E. A. Stern, F. Dogan, and A. R. Moodenbaugh, "Nature of Structural Disorder in the LTT Ground State of $La_{2-x}Ba_xCuO_4$." To be published in Phys. Rev. B. Advanced Photon Source, Bldg. 401, Argonne National Lab., 9700 South Cass Avenue, Argonne, IL 60439; phone (630) 252-7758; fax (630) 252-9303; e-mail haskel@aps.anl.gov.

Moshe Havilio and Assa Auerbach, "Superconductivity and Quantum Spin Disorder in Cuprates." Department of Physics, Technion Israel Institute of Technology, Haifa 32000, ISRAEL; e-mail havilio@pharaoh.technion.ac.il; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907382. 74.20.Mn; 75.10.Jm; 71.10.Fd.

J.-K. Heinsohn, R. H. Hadfield, and R. Dittmann, "Effects of Process Parameters on the Fabrication of Edge-Type *YBCO* Josephson Junctions by Interface Treatments." To be published in Physica C (in press). Institut für Schicht- und Ionentechnik, Forschungszentrum Jülich, D-52425 Jülich, GERMANY; telephone +49 2461 612 367; telefax +49 2461 612 940; e-mail j.-k.heinsohn@fz-juelich.de. Key words: Josephson junctions, interface-engineered, experimental design, statistical methods, multiple regression. 74.76.Bz; 74.80.Dm; 81.65.Cf; 85.25.Cp.

H. Hilgenkamp, C. W. Schneider, R. R. Schulz, B. Goetz, A. Schmehl, H. Bielefeldt, and J. Mannhart, "Modifying Electronic Properties of Interfaces in High-T_c Superconductors by Doping." To be published in Physica C (in press). Experimentalphysik VI, Center for Electronic Correlations and Magnetism, Institute of Physics, University of Augsburg, Universitätsstr. 1, D-86135 Augsburg, GERMANY. Key words: interfaces, grain boundaries, doping, critical current density.

J. E. Hirsch and F. Marsiglio, "Where is 99% of the Condensation Energy of $Tl_2Ba_2CuO_y$ Coming from?" Department of Physics, University of California at San Diego, La Jolla, CA 92093-0319; e-mail jhirsch@ucsd.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908322.

M. Q. Huang, Z. G. Ivanov, P. V. Komissinski, and T. Claeson, "Fabrication and Properties of High-T_c Ramp Junctions with Manganite Barriers." To be published in Physica C (in press). Department of Microelectronics and Nanoscience, Chalmers University of Technology and Göteborg University, S-41296 Göteborg, SWEDEN; telefax +46 31 772 3224; e-mail huang@fy.chalmers.se. Key words: *YBCO* ramp junction, manganite, multilayer.

J. M. Huijbregtse, B. Dam, J. H. Rector, and R. Griessen, "High Quality Off-Stoichiometric $YBa_2Cu_3O_{7-\delta}$ Films Produced by Diffusion Assisted Preferential Laser Ablation." Submitted to J. Appl. Phys. Solid State Physics, Vrije Universiteit, De Boelelaan 1081, NL-1081 HV Amsterdam, THE NETHERLANDS; telephone +31 20 444 7924; telefax +31 20 444 7991; e-mail huijbreg@nat.vu.nl.

J. M. Huijbregtse, F. C. Klaassen, R.C.F. van der Geest, B. Dam, and R. Griessen, "Growth-Induced Strong Pinning Sites in Laser Ablated $YBa_2Cu_3O_{7-\delta}$ Films with a Non-Random Distribution." To be published in J. Low Temp. Phys. Solid State Physics, Vrije Universiteit, De Boelelaan 1081, NL-1081 HV Amsterdam, THE NETHERLANDS; telephone +31 20 444 7924; telefax +31 20 444 7991; e-mail huijbreg@nat.vu.nl. 74.76.Bz; 61.72.Ff; 68.55.Ln; 74.60.Ge.

A. N. Iyer, W. Lu, M. K. Mironova, C. Vipulanandan, U. Balachandran, and K. Salama, "Current Transport and Microstructural Development in *BSCCO* Tapes and Joints Fabricated by Groove Rolling." Preprint #99:064; submitted to Supercond. Sci. & Technol. Texas Center for Superconductivity, University of Houston, Houston, TX 77204-5932; telephone (713) 743-8200; telefax (713) 743-8201; e-mail preprints@www.tcs.uh.edu. Key words: powder-in-tube, groove rolling, *BSCCO,* current transport properties, superconducting joint, lap joint, butt joint.

S. Jandl, T. Strach, T. Ruf, M. Cardona, V. Nekvasil, D. I. Zhigunov, S. N. Barilo, and S. V. Shiryaev, "Raman Study of Crystal-Field Excitations in $Pr_{2-x}Ce_xCuO_4$." To be published in Physica C (in press). Centre de Recherche en Physique du Solide, Département de Physique, Université de Sherbrooke, 2500 Boulevard Université, Sherbrooke, Québec, CANADA J1K 2R1; telephone (819) 821-8000, ext. 2909; telefax (819) 821-8046; e-mail sjand@physique.usherb.ca. Key words: Raman, crystal field, $Pr_{2-x}Ce_xCuO_4$.

A.B.M. Jansman, M. Izquierdo, J. Flokstra, and H. Rogalla, "Directly Coupled Slotted High-T_c dc SQUIDS." To be published in Physica C (in press). Low Temperature Division, Department of Applied Physics, University of Twente, P.O. Box 217, 7500 AE Enschede, THE NETHERLANDS; phone +31 53 489 3142; fax +31 53 489 1099; e-mail a.b.m.jansman@tn.utwente.nl. Key words: SQUID, thin films, London penetration depth. 85.25.Dq; 74.76.Bz; 74.72.Bk.

E. Kandyel, X.-J. Wu, S. Adachi, and S. Tajima, "Synthesis of Superconducting $(Hg_{0.7}Cr_{0.3})Sr_2Ca_{n-1}Cu_nO_y$ (n=2-5) Using High-Pressure Technique." To be published in Physica C (in press). Chemical Department, Faculty of Science, Tanta University, Tanta, EGYPT. Key words: high-T_c superconductors, *(Hg,Cr)-12(n-1)n,* high-pressure synthesis, HRTEM, magnetic susceptibility.

Takeo Kato and Masatoshi Imada, "Quantum Effects of Resistance-Shunted Josephson Junctions." Institute for Solid State Physics, University of Tokyo, 7-22-1 Roppongi, Minato-ku, Tokyo 106-8666, JAPAN; e-mail kato@ginnan.issp.u-tokyo.ac.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908192. Key words: Josephson junctions, dissipation, Coulomb blockade, macroscopic quantum effects, superconductor-insulator transition.

Ali E. Khalil, "Charge Carrier Dynamics and the Critical Vortex Velocity in High-T_c Superconductors." To be published in Phil. Mag. B. Department of Physics, Xavier University, 3800 Victory Parkway, Cincinnati, OH 45207-4511.

H. Kimura, K. Hirota, C. H. Lee, K. Yamada, and G. Shirane, "Structural Instability Associated with the Tilting of CuO_6 Octahedra in $La_{2-x}Sr_xCuO_4$." Submitted to J. Phys. Soc. Jpn. Research Institute of Scientific Measurements, Tohoku University, Aoba-ku, Sendai 980-8577, JAPAN; e-mail kimurah@rism.tohoku.ac.jp. preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908217. 74.72.Dn; 74.25.Kc; 75.50.Ee.

S. Kokkaliaris, K. Deligiannis, M. Oussena, A. A. Zhukov, P.A.J. de Groot, R. Gagnon, and L. Taillefer, "Effect of Oxygen Stoichiometry on the Out-of-Plane Anisotropy of $YBa_2Cu_3O_{7-\delta}$ Single Crystals Near Optimal Doping." To be published in Supercond. Sci. & Technol. Department of Physics and Astronomy, University of Southampton, Highfield, Southampton SO17 1BJ, UNITED KINGDOM; phone +44 1703 592058; fax +44 1703 593910; e-mail sk@phys.soton.ac.uk. 74.60.Ge; 74.60.Jg; 74.72.Bk.

Gernot Krabbes, Wolfgang Bieger, Peter Schätzle, Günter Fuchs, and Jürgen Thomas, "*RE-Ba-Cu-O* Bulk Materials: Thermodynamics, Processing, Properties Control." To be published in Adv. Solid State Phys., Vol. 39. Institut für Festkörper- und Werkstofforschung Dresden, Postfach 270016, D-01171 Dresden, GERMANY; telephone +49 351 4659 410; telefax +49 351 4659 480; e-mail g.krabbes@ifw-dresden.de.

M. Yu. Kupriyanov, A. Brinkman, A. A. Golubov, M. Siegel, and H. Rogalla, "Double-Barrier Josephson Structures as the Novel Elements for Superconducting Large-Scale Integrated Circuits." To be published in Physica C (in press). Contact A. A. Golubov, Department of Applied Physics, University of Twente, P.O. Box 217, 7500 AE Enschede, THE NETHERLANDS; telephone +31 53 489 3122; telefax +31 53 489 1099; e-mail a.golubov@tn.utwente.nl. Key words: double barrier, Josephson structures, integrated circuits.

Z. D. Kvon, T. I. Baturina, R. A. Donaton, M. R. Baklanov, K. Maex, E. B. Olshanetsky, A. E. Plotnikov, and J. C. Portal, "Proximity Effects and Andreev Reflection in Mesoscopic SNS Junction with Perfect NS Interfaces." Institute of Semiconductor Physics, 630090 Novosibirsk, RUSSIA; T. I. Baturina's e-mail tatbat@isp.nsc.ru; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907247. 74.76.-w; 74.80.Fp; 74.50.+r.

J. B. Langhorn and P. J. McGinn, "Nucleation and Growth of $YBa_2Cu_3O_{7-x}$ Thick Films Processed on *YSV,* Al_2O_3*,* *MgO* and $BaZrO_3$ Substrates." To be published in Physica C (in press). Department of Chemical Engineering, University of Notre Dame, Notre Dame, IN 46656; telephone (219) 631-5692; telefax (219) 631-8366; e-mail jlanghor@nd.edu. Key words: *YBCO,* thick films, nucleation and growth, yttria-stabilized zirconia.

G. Litak, J. F. Annett, and B. L. Györffy, "Van Hove Singularity and Superconductivity in Disordered Sr_2RuO_4." To be published in Acta Phys. Pol. A. Department of Mechanics, Technical University of Lublin, Nadbystrzycka 36, PL-20618 Lublin, POLAND; telefax +48 81 525 0808; e-mail litak@archimedes.pol.lublin.pl; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9906372. 74.62.Dh; 74.25.Dw; 74.25.Fy.

G. Litak and G. L. Györffy, "Percolation of Superconductivity." Department of Mechanics, Technical University of Lublin, Nadbystrzycka 36, PL-20618 Lublin, POLAND; fax +48 81 525 0808; e-mail litak@archimedes.pol.lublin.pl; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9906254. 74.20.-z; 74.25.-q; 74.40.+k.

Wai Lo, D. A. Cardwell, and Y. H. Shi, "Spray Dried *Pt*-Doped *Nd-Ba-Cu-O* Precursor Powder for Seeded Peritectic Processing of Large Superconducting Grains." To be published in J. Mat. Sci. Eng. B. Interdisciplinary Research Centre in Superconductivity, University of Cambridge, Madingley Road, Cambridge CB3 0HE, UNITED KINGDOM; D. A. Cardwell's phone +44 1223-337050 or -337076; fax +44 1223-337074; e-mail dc135@hermes.cam.ac.uk.

Jian Lu and C. K. Ong, "Characterize the R_S-J_S Dependence of HTS Films." To be published in Physica C (in press). BLK 409, #08-64, Pandan Gardens, Singapore 600 409, SINGAPORE; e-mail ljian@dso.org.sg. Key words: high-temperature superconductor, surface resistance, surface current, non-linearity.

B. Lundqvist, Ö. Rapp, L.-G. Johansson, H. Q. Chen, Z. G. Ivanov, and M. Andersson, "Vortex Dynamics in a Thin Film of $Tl_2Ba_2CuO_6$." To be published in J. Low Temp. Phys.: Proc. of the Int. Conf. on Phys. and Chem. of Molecular and Oxide Supercond. (MOS'99), Stockholm, Sweden, July 28-Aug. 2, 1999. Department of Solid State Physics, Royal Institute of Technology, Teknikringen 14, 5 tr., SE-100 44 Stockholm, SWEDEN; telephone +46 8 790 7024; telefax +46 8 790 6952; e-mail bjorn@ftf.kth.se. 74.60.Ge; 74.72.Fq; 74.25.Fy.

J. W. Lynn, N. Rosov, S. N. Barilo, L. Kurnevitch, and A. Zhokhov, "*Pr* Magnetic Order and Spin Dynamics in the Cuprates." Presented at the 1999 Taiwan Int. Conf. on Supercond. (TICS'99), Kenting, Taiwan, REPUBLIC OF CHINA, Aug. 17-20, 1999; to be published in Chinese J. Phys. NIST Center for Neutron Research, Bldg. 235, National Institute of Standards and Technology, Gaithersburg, MD 20899-8562; telephone (301) 975-6246; telefax (301) 921-9847; e-mail jeff.lynn@nist.gov.

J. Maeda, Y. Nakamura, T. Izumi, and Y. Shiohara, "Unidirectional-Solidification of *Y-Ba-Cu-O/Ag* Superconducting Rods." To be published in Physica C (in press). Superconductivity Research Laboratory, Division 4, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135-0062, JAPAN; telephone +81 3 3536 5711; telefax +81 3 3536 5705; e-mail maeda@istec.or.jp. Key words: interface morphological stability, silver addition, unidirectional solidification, single domain, *Y-Ba-Cu-O.*

A. S. Mahmoud and G. J. Russell, "The Effect of Dopants on Melt-Processed $Y_{0.5}/Nd_{0.5}(123)$." To be published in Physica C (in press). Contact G. J. Russell, Advanced Electronic Materials Group, Rm. 67, Old Main Bld., Gate 14, School of Physics, University of New South Wales, Bruker Street, Sydney 2052, AUSTRALIA; phone +61 2 9385 4542; fax +61 2 9385 6060; e-mail g.russell@unsw.edu.au. Key words: dopants, melt-processed, $Y_{0.5}/Nd_{0.5}(123)$.

M. Matsuda, Y. S. Lee, M. Greven, M. A. Kastner, R. J. Birgeneau, K. Yamada, Y. Endoh, P. Böni, S.-H. Lee, S. Wakimoto, and G. Shirane, "Freezing of Anisotropic Spin Clusters in $La_{1.98}Sr_{0.02}CuO_4$." Submitted to Phys. Rev. B. The Institute of Physical and Chemical Research (RIKEN), Wako, Saitama 351-0198, JAPAN; e-mail mmatsuda@postman.riken.go.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907435. 74.72.Dn; 75.10.Jm; 75.50.Ee; 75.50.Lk.

T. Matsushita, E. S. Otabe, T. Nakane, M. Karppinen, and H. Yamauchi, "Evaluation of Irreversible Property in Superconducting $Cu(Ba_{0.8}Sr_{0.2})_2YbCu_2O_{6+z}$ Powder." To be published in Physica C (in press). Faculty of Computer Science and Systems Engineering, Kyushu Institute of Technology, 680-4 Kawazu, Iizuka 820-8502, JAPAN; telephone +81 948 29 7663; telefax +81 948 29 7683; e-mail matusita@cse.kyutech.ac.jp. Key words: *Yb-123* superconductor, irreversibility field, dc magnetic susceptibility, distribution of critical temperature.

I. I. Mazin, D. A. Papaconstantopoulos, and D. J. Singh, "Tight-Binding Hamiltonians for *Sr* Filled Ruthenates: Application to the Gap Anisotropy and Hall Coefficient in Sr_2RuO_4." Center for Computational Materials Science, Naval Research Laboratory, Washington, DC 20375; e-mail mazin@dave.nrl.navy.mil; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907442.

L. S. Mazov, "Normal-State Magnetotransport and Symmetry of the Order Parameter in *YBCO* System." Submitted to J. Low Temp. Phys.: Proc. of the Int. Conf. on Phys. and Chem. of Molecular and Oxide Supercond. (MOS'99), Stockholm, Sweden, July 28-Aug. 2, 1999. Institute for Physics of Microstructures, Russian Academy of Sciences, 603600 Nizhny Novgorod, RUSSIA; e-mail mazov@ipm.sci-nnov.ru. 75.40.Mg; 74.10.+v; 74.72.Bk.

V. P. Mineev, "Phase Transition into Superconducting Mixed State and de Haas-van Alphen Effect." L. D. Landau Institute for Theoretical Physics, Russian Academy of Sciences, 117940 Moscow, RUSSIA; e-mail mineev@landau.ac.ru; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907492.

K. Nakao, Yu. Eltsev, J. G. Wen, S. Shibata, and N. Koshizuka, "Applicability of the Montgomery Type Analysis to the Anisotropic Resistivity of $Bi_2Sr_2CaCu_2O_X$." To be published in Physica C (in press). Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135, JAPAN; telephone +81 3 3536 5707; telefax +81 3 3536 5705; e-mail nakao@istec.or.jp. Key words: $Bi_2Sr_2CaCu_2O_X$, anisotropic resistivity, Montgomery technique. 74.72.Hs; 74.25.Fy; 74.60.Ec.

S. Neeleshwar, P. Venugopal Reddy, M. Muralidhar, M. R. Koblischka, and M. Murakami, "Microstructural and Elastic Behavior of OCMG-Processed *NdBaCuO* Materials." To be published in Mater. Sci. Eng. B. Contact M. Muralidhar, Superconductivity Research Laboratory, Division 3, International Superconductivity Technology Center (ISTEC), 3-35-2 Iioka-Shinden, Morioka, Iwate 020-0852, JAPAN; phone +81 19 635-9015 or -9016; fax +81 19 635-9017; e-mail miryala1@istec.or.jp. Key words: melt processing, oxygen partial pressure, $Nd_{1.8}Ba_{2.4}Cu_{3.4}O_y$, critical current density, microstructure, longitudinal sound velocity, elastic anomalies.

Akihiro Oka, Satoshi Koyama, Teruo Izumi, and Yuh Shiohara, "Effect of Heat Treatment on J_C-H Curve for $YBa_2Cu_3O_{7-\delta}$ Single Crystal." To be published in Physica C (in press). Superconductivity Research Lab., Division 4, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135-0062, JAPAN; phone +81 3 3536 5711; fax +81 3 3536 5705; e-mail okaaki@istec.or.jp. Key words: $YBa_2Cu_3O_{7-\delta}$, J_C-H curve, peak effect, oxygen configuration, twin structure.

Shigeki Onoda and Masatoshi Imada, "Single-Particle Pseudogap in Two-Dimensional Electron Systems." Submitted to J. Phys. Soc. Jpn. Institute for Solid State Physics, University of Tokyo, 7-22-1 Roppongi, Minato-ku, Tokyo 106-8666, JAPAN; e-mail onoda@ginnan.issp.u-tokyo.ac.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908195. Key words: high-T_C superconductivity, pseudogap, pairing fluctuations, spin fluctuations.

M. Opel, R. Nemetschek, C. Hoffmann, R. Philipp, P. F. Müller, R. Hackl, I. Tüttö, A. Erb, B. Revaz, E. Walker, H. Berger, and L. Forró, "Carrier Relaxation, Pseudogap, and Superconducting Gap in High-T_C Cuprates: A Raman Scattering Study." Submitted to Phys. Rev. B. Walther-Meissner-Institut für Tieftemperaturforschung, Bayerischen Akademie der Wissenschaften, Walther-Meissner-Strasse 8, D-85748 Garching, GERMANY; phone +49 89 289 14237; fax +49 89 289 14206; e-mail opel@lrz.badw-muenchen.de; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908272. 74.72.-h; 78.30.Er; 78.20.Bh; 74.25.-q.

Yurii N. Ovchinnikov and Vladimir Z. Kresin, "Magnetic Scattering and Unusual Behavior of the Critical Fields and Other Parameters: Application to Borocarbides." Lawrence Berkeley National Laboratory, University of California, Berkeley, CA 94720.

Frank J. Owens, "Paramagnetic Resonance Evidence for the Opening of a Spin Gap in $YBa_2Cu_{2.7}Co_{0.3}O_{7-x}$." Submitted to Physica C. Army Armament Research, Engineering and Development Ctr., Picatinny, NJ 07806.

Stephen W. Pierson and Mark Friesen, "Dynamic Scaling of I-V Data for the Neutral 2D Coulomb Gas." To be published in Physica B: Proc. of the 22nd Int. Conf. on Low Temp. Phys. (LT22), Helsinki, Finland, Aug. 5-11, 1999. Department of Physics, Worcester Polytechnic Institute (WPI), 100 Institute Road, Worcester, MA 01609-2280; telephone (508) 831-5258; telefax (508) 831-5391 or -5886; e-mail pierson@wpi.edu; paper also available at Web site http://www.wpi.edu/~pierson/pubs.html. Key words: Kosterlitz-Thouless dynamics, dynamic scaling, I-V characteristics.

Stephen W. Pierson and Oriol T. Valls, "Flux Lattice Melting and the Onset of H_{c2} Fluctuations." To be published in Physica B: Proc. of the 22nd Int. Conf. on Low Temp. Phys. (LT22), Helsinki, Finland, Aug. 5-11, 1999. Department of Physics, Worcester Polytechnic Institute (WPI), 100 Institute Road, Worcester, MA 01609-2280; telephone (508) 831-5258; telefax (508) 831-5391 or -5886; e-mail pierson@wpi.edu; paper also available at Web site http://www.wpi.edu/~pierson/pubs.html. Key words: flux lattice melting, Hansen-Verlet freezing criterion, fluctuations.

S. Pilgram, W. Belzig, and C. Bruder, "Spectral Features of the Proximity Effect." Submitted to Physica B: Proc. of the 22nd Int. Conf. on Low Temp. Phys. (LT22), Helsinki, Finland, Aug. 5-11, 1999. Contact C. Bruder, Departement Physik und Astronomie, Universität Basel, Klingelbergstrasse 82, CH-4056 Basel, SWITZERLAND; e-mail bruder@ubaclu.unibas.ch; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907483. Key words: proximity effect, local density of states.

T. Plackowski and M. Matusiak, "Normal State Ettingshausen, Seebeck and Hall Effects in $La_{2-x}Sr_x$-CuO_4." Submitted to Phys. Rev. B. Institute of Low Temperature and Structure Research, Polish Academy of Sciences, P.O. Box 1410, 50-950 Wroclaw 2, POLAND; telephone +48 71 3435021, ext. 278; telefax +48 71 3441029; e-mail t.plackowski@int.pan.wroc.pl.

V. Polushkin, D. Glowacka, R. Hart, and J. M. Lumley, "Cross-Correlated Dynamic Resistance of a Direct Current Superconducting Quantum Interference Device." To be published in J. Low Temp. Phys. Oxford Instruments, Scientific Research Division, Newton House, Cambridge Business Park, Cowley Road, Cambridge CB4 4WZ, UNITED KINGDOM; telephone +44 1223 427400; telefax +44 1223 425050; e-mail vladimir.polushkin@oxinst.co.uk; Web site http://www.oxinst.com/.

M. P. Raphael, M. E. Reeves, E. F. Skelton, and C. Kendziora, "Pressure Dependence of the Irreversibility Line in $Bi_2Sr_2CaCu_2O_{8+\delta}$: Role of Anisotropy in Flux-Line Formation." Catholic University of America, Washington, DC 20064; M. E. Reeves' e-mail at George Washington University reevesme@gwu.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908156. 74.60.Ge; 74.62.Fj; 74.60.Ec; 74.72.Hs.

G. Ravikumar, P. K. Mishra, V. C. Sahni, S. S. Banerjee, A. K. Grover, S. Ramakrishnan, P. L. Gammel, D. J. Bishop, E. Bucher, M. J. Higgins, and S. Bhattacharya, "A Study of Supercooling of the Disordered Vortex Phase via Minor Hysteresis Loops in 2H-$NbSe_2$." Submitted to Phys. Rev. B. Technical Physics and Prototype Engineering Division, Bhabha Atomic Research Center, Mumbai 400 085, INDIA; telephone +91 22 550 5050, ext. 2264; telefax +91 22 550 5151; e-mail gurazada@apsara.barc.ernet.in; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908222. Key words: peak effect, minor hysteresis loops, order-disorder transformation, 2H-$NbSe_2$. 64.70.Dv; 74.25.Ha; 74.60.Ge; 74.60.Jg.

R. D. Redwing, B. M. Hinaus, M. S. Rzchowski, N. F. Heinig, B. A. Davidson, and J. E. Nordman, "Observation of Strong to Josephson Coupled Transition in 10° $YBa_2Cu_3O_X$ Bicrystal Junctions." Department of Physics, University of Wisconsin-Madison, Madison, WI 53706; M. S. Rzchowski's telephone (608) 263-7450; telefax (608) 265-2334; e-mail mark@cheddar.physics.wisc.edu.

D. Robbes, N. Cheenne, J. F. Hamet, and B. Mercey, "Laser Heating Experiments on Multilayered (SI)n Strips and Possible Improvements of TES-Based Bolometers." To be published in Physica C (in press). GREYC UPRESA 6072, Institut des Sciences de la Matière et du Rayonnement, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; phone +33 2 31 45 2695; fax +33 2 31 45 2698; e-mail drobbes@greyc.ismra.fr. Key words: superlattice, thermal conductance, bolometers, superconductor.

S. B. Roy, Sujeet Chaudhary, P. Chaddah, and L. F. Cohen, "Anomalous Magnetization in the Superconducting Mixed State of $CeRu_2$: A Study with Vibrating Sample Magnetometer." To be published in Physica C (in press). Low Temperature Physics Group, Centre for Advanced Technology, Indore 452 013, INDIA; telefax +91 731 481426; e-mail sbroy@cat.ernet.in. Key words: magnetic response, SQUID magnetometer, $CeRu_2$.

Andreas Rydh, Magnus Andersson, and Östen Rapp, "Thermally Assisted Flux Creep of a Driven Vortex Lattice in Untwinned $YBa_2Cu_3O_{7-\delta}$ Single Crystals." Submitted to J. Low Temp. Phys.: Proc. of the Int. Conf. on Phys. and Chem. of Molecular and Oxide Supercond. (MOS'99), Stockholm, Sweden, July 28-Aug. 2, 1999. Department of Solid State Physics, Royal Institute of Technology, Teknikringen 14, 5 tr., SE-100 44 Stockholm, SWEDEN; telephone +46 8 790 7024; teletax +46 8 790 6952; e-mail andreas@ftf.kth.se. 74.25.Fy; 74.60.Ge; 74.60.Jg.

S. Salem-Sugui, Jr. and K. C. Goretta, "Effect of Short-Time Magnetic Relaxation on Hysteresis Curves in Single-Crystal $Bi_2Sr_2CaCu_2O_X$." Submitted to J. Supercond. Instituto de Física, Universidade Federal do Rio de Janeiro, C.P. 68528, Rio de Janeiro, RJ 21945-970, BRAZIL; preprint also available from 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.

Kouji Segawa and Yoichi Ando, "Unusual Charge Localization in *Zn*-Doped and Heavily Underdoped $YBa_2Cu_3O_{7-\delta}$ at

Low Temperatures." Submitted to the Proc. of the Int. Conf. on Phys. and Chem. of Molecular and Oxide Supercond. (MOS'99), Stockholm, Sweden, July 28-Aug. 2, 1999. Central Research Institute of Electric Power Industry (CRIEPI), Komae, Tokyo 201-8511, JAPAN; e-mail segawa@criepi.denken.or.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908124. 74.25.Fy; 74.62.Dh; 74.72.Bk.

P. D. Shaju and V. C. Kuriakose, "Logic Gates Using Stacked Josephson Junctions." To be published in Physica C (in press). Contact V. C. Kuriakose, Department of Physics, Cochin University of Science and Technology, Cochin 682 022, INDIA; telephone +91 484 540404; telefax +91 484 532495; e-mail cuphys@md2.vsnl.net.in. Key words: logic gates, stacked Josephson junctions, SG equations. 74.50.+r; 74.80.Dm; 05.45.Yv.

A. Silhanek, D. Niebieskikwiat, L. Civale, M. A. Avila, O. Billoni, and D. Casa, "Anomalous Behavior of the Irreversible Magnetization and Time Relaxation in $YBa_2Cu_3O_7$ Single Crystals with Splayed Tracks." Submitted to Phys. Rev. B. Comisión Nacional de Energía Atómica, Centro Atómico Bariloche and Instituto Balseiro, 8400 Bariloche RN, ARGENTINA; e-mail silhanek@cabbat1.cnea.gov.ar; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907062.

Asle Sudbø, Anh Kiet Nguyen, and Joakim Hove, "Anomalous Scaling Dimensions and Critical Points in Type-II Superconductors." Submitted to Physica B. Department of Physics, Norwegian University of Science and Technology, N-7491 Trondheim, NORWAY; fax +47 73 59 7710; e-mail asudbo@phys.ntnu.no; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9907386.

Hirokazu Tsunetsugu and Masatoshi Imada, "Control of Superconducting Correlations in High-T_c Cuprates." Institute of Materials Science, University of Tsukuba, Tennoudai 1-1-1, Tsukuba, Ibaraki 305-8573, JAPAN; e-mail tsune@bukko.bk.tsukuba.ac.jp; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908058. Key words: high-T_c superconductivity, pairing correlations, single-electron level, angle-resolved photoemission.

G. E. Volovik, "Fermions in the Vortex Core in Chiral Superconductors." Low Temperature Laboratory, Helsinki University of Technology, P.O. Box 2200, FIN-02015 HUT, FINLAND; e-mail volovik@boojum.hut.fi; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9709159.

A. Wahl, D. Thopart, G. Villard, A. Maignan, Ch. Simon, J. C. Soret, L. Ammor, and A. Ruyter, "Magnetotransport in $Bi_2Sr_2Ca_{1-x}Y_xCu_2O_{8+\delta}$ Single Crystals: From the Underdoped to the Overdoped Regime." To be published in Phys. Rev. B. Laboratoire CRISMAT, UMR 6508, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE.

S. Wakimoto, R. J. Birgeneau, M. A. Kastner, Y. S. Lee, R. Erwin, P. M. Gehring, S. H. Lee, M. Fujita, K. Yamada, Y. Endoh, K. Hirota, and G. Shirane, "Direct Observation of a One Dimensional Static Spin Modulation in Insulating $La_{1.95}Sr_{0.05}CuO_4$." Department of Physics and Center for Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139; e-mail waki@x-ray.mit.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908115.

W. G. Wang, M. B. Jensen, B. Kindl, Y.-L. Liu, and P. Vase, "Current Distribution and Enhancement of the Engineering Critical Current Density in Multifilament *Bi-2223* Tapes." Presented at the Int. Cryogenic Mater. Conf. (ICMC'99), Montreal, Quebec, Canada, July 12-16, 1999. Nordic Superconductor Technologies A/S, Prioparken 685, DK-2605 Brøndby, DENMARK; telephone +45 4348 2506; telefax +45 4348 2501; e-mail w.wang@nst.com.

H. W. Weijers, Q. Y. Hu, Y. Viouchkov, E. Celik, Y. S. Hascicek, J. Schwartz, K. Marken, and J. Parrell, "Development and Testing of a 3 T *Bi-2212* Insert Magnet." Presented at the Int. Cryogenic Eng. Conf. (CEC'99), Montréal, Quebec, Canada, July 12-16, 1999; submitted to Adv. Cryogenic Eng. National High Magnetic Field Laboratory, Florida State University, 1800 East Paul Dirac Drive, Tallahassee, FL 32310; e-mail weijers@magnet.fsu.edu.

Z. Y. Weng, D. N. Sheng, and C. S. Ting, "Isotropic Dispersion, Line Shape, and Remnant Fermi Surface in One Hole Problem." Department of Physics and Texas Center for Superconductivity, University of Houston, Houston, TX 77204-5506; telephone (713) 743-8200; telefax (713) 743-8201; e-mail weng@mira.tcs.uh.edu; preprint also available at http://xxx.lanl.gov/abs/cond-mat/9908032. 74.20.Mn; 79.60.-i; 71.27.+a.

Yi-Yuan Xie, Judy Z. Wu, Albert A. Gapud, Yang Yu, and Yin Xin, "Synthesis of *Hg-1223* Superconductors Using a Cation-Exchange Process." To be published in Physica C (in press). Department of Physics and Astronomy, University of Kansas, 1082 Mallot Hall, Lawrence, KS 66045; e-mail yyxie@ukans.edu. Key words: HTSC, *Hg-1223,* cation exchange, *Tl-2223.* 74.72.Gr; 74.72.-h.

G. Yang, J. S. Abell, and C. E. Gough, "High Temperature c-Axis Resistivity of $Bi_2Sr_2CaCu_2O_{8+x}$ Single Crystals and Dependence on Oxygen Stoichiometry." To be published in Appl. Phys. Lett. School of Metallurgy and Materials, University of Birmingham, Edgbaston, Birmingham B15 2TT, UNITED KINGDOM; telephone +44 121 414 5249; telefax +44 121 414 5232; e-mail yanggz@novell2.bham.ac.uk.

H. Zhang, X. W. Zou, S. M. Gong, and C. B. Cai, "An Investigation on the Critical Current Density of the Melt-

Textured *YBCO* with *Sm211* Addition." To be published in Physica C (in press). Shanghai Institute of Metallurgy, Chinese Academy of Sciences, Shanghai 200050, PEOPLE'S REPUBLIC OF CHINA. Key words: melt-textured-growth *YBCO, Sm211* addition, critical current density, peak effect, post annealing. 74.72.Bk; 74.60.Jg; 74.80.Bj.

Y. Z. Zhang, Y. L. Qin, R. Deltour, H. J. Tao, L. Li, and Z. X. Zhao, "Epitaxial Growth of $Bi_2Sr_{2-x}La_xCu_1O_{6+\delta}$ Thin Films on Vicinal $SrTiO_3$ Substrates." To be published in Physica C (in press). Contact R. Deltour, Physique des Solides, Université Libre de Bruxelles, CP233, B-1050 Brussels, BELGIUM; telephone +32 2 650 5752; telefax +32 2 650 5916; e-mail rdeltour@ulb.ac.be. Key words: epitaxial growth, $Bi_2Sr_{2-x}La_xCu_1O_{6+\delta}$ thin films, $SrTiO_3$ substrates.

H. Zheng, M. Jiang, R. Nikolova, U. Welp, A. P. Paulikas, Yi Huang, G. W. Crabtree, B. W. Veal, and H. Claus, "High Critical Current 'Weld' Joints in Textured $YBa_2Cu_3O_X$." To be published in Physica C (in press). Contact B. W. Veal, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; phone (630) 252-4957; fax (630) 252-7777; e-mail veal@anl.gov. Key words: welding, T_c superconductors, $YBa_2Cu_3O_X$.

COMING EVENTS

*(An * indicates a previously listed event. Also see complete listing of upcoming conferences and workshops at our Web site http://www.iitap.iastate.edu/htcu/comevents.html.)*

*Feb. 20 - Feb. 25, 2000:

Sixth International Conference on Materials and Mechanisms of Superconductivity and High Temperature Superconductors (M^2S-HTSC-VI), George R. Brown Convention Center, Houston, Texas. Hosted by the Texas Center for Superconductivity at the University of Houston and sponsored by federal agencies and industry. Co-Chairs: C. W. Chu, W. K. Chu, and K. Salama. This series of meetings, established in 1988 two years after the discovery of high-temperature superconductors, is dedicated to superconductivity and related phenomena, and the host materials of these phenomena. The Conference will bring together members of the international low- and high-temperature superconductivity community to focus on recent insights into low- and high-temperature superconductor physics, materials, and devices. Emerging areas and future trends will also be highlighted. General conference topics include, but are not limited to, experimental and theoretical studies of superconducting materials – low temperature, high temperature, fullerite, heavy fermion, organic, new; physical properties – mechanisms, magnetic, electrical, optical, thermal, mechanical, acoustic; synthesis and processing – thin films, superlattices, thick films, bulk; and applications – small current (SQUIDs, junctions, microwave devices) and large current (cables, transformers, motors, generators, magnetic levitation devices). **Abstract deadline, September 15, 1999.** For information, contact M^2S-HTSC-VI Conference Secretariat, Texas Center for Superconductivity, University of Houston, 3201 Cullen Boulevard, Houston, TX 77204-5932; telefax (713) 743-8216; Web site http://m2s-conf.uh.edu.

*April 24 - 28, 2000:

Superconducting and Related Oxides – Physics and Nanoengineering IV, Marriott's Orlando World Center Resort and Convention Center, Orlando, Fla. Part of SPIE's 2000 AeroSense Symposium. Fourth in the series of SPIE conferences focused on basic issues in physics and materials science of high-temperature superconductors and related compounds that may be relevant for their applications in electronics, optics, and optoelectronics. Original papers are solicited on, but not limited to, the following topics: a) structural, transport, magnetic, and thermal properties of thin films of cuprates and related compounds; b) homoepitaxy, new substrate materials, epitaxial and morphological properties, interface smoothness and disorder, layer thickness fluctuations, interdiffusion, and strain; c) proximity effects, surface and interface effects, and superconductors in contact with insulators, semiconductors, normal metals, ferro- and antiferromagnets, piezoelectrics, etc.; d) search for novel high-temperature superconducting phases by atomic engineering; e) electronic structure, charge redistribution, localization, single-particle and collective excitations, and Josephson phenomena in natural and artificial superlattices; f) novel device concepts, electric field effect in heterostructures, hybrid optoelectronic devices, and cryoelectronics. **Abstract deadline, September 27, 1999** (submission via Web site strongly encouraged). Three-day exhibition. Proceedings to be published. To receive a complete call for papers by postal mail or to request an Advance Technical Program, contact SPIE, P.O. Box 10, Bellingham, WA 98227-0010; telephone (360) 676-3290; telefax (360) 647-1445; e-mail OR@spie.org; Web site http://www.spie.org/web/meetings/calls/or00/confs/OR15.html.

May 28 - June 2, 2000:

International Conference on Transport Processes in Inorganic Materials: Fundamentals to Devices, Venice (Jesolo Beach), Italy. Objective is to discuss recent developments in microscopic mechanisms of transport in different inorganic materials; assess the role of transport in materials reactivity, synthesis, and processing; explore the transport mechanisms which affect materials properties and behavior under operating conditions; and exploit the role of transport processes in a number of advanced technologies of current or emerging interest. Papers are solicited in several areas, including diffusion and transport in media of lower dimensionality, single-crystal growth, materials processing for HTS materials, and superconducting devices for high- and low-field applications. For information, contact CIMTEC-Transport Phenomena Conference, P.O. Box 174, I-48018 Faenza, Italy; telefax +39 0546 664138.

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