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NOTA BENE:

The following Nota Bene is contributed by Sreeparna Mitra, Project Director and Editor of *High-T_c Update.* Our Science Editor, John R. Clem, is currently on travel.

YBCO Films

Large enhancement of critical current density is reported by A. Schmehl et al. (Augsburg University) for 24° [001]-tilt grain boundaries in *Ca*-doped $YBa_2Cu_3O_{7-\delta}$ films. The authors report J_c values more than seven times higher than the highest values reported in the literature for the undoped material. The top values measured were as high as 6.5×10^6 A/cm^2 at 4.2 K, and average value of J_c (24°, x=0.3, T=4.2 K) was 2.5×10^6 A/cm^2. Further, the grain boundary normal-state resistivity is also seen to be strongly reduced by *Ca* doping. The authors conclude that the established upper limit to the grain-boundary critical current density for a given misorientation angle can be overcome, and that by optimizing the dopant, its concentration, and the deposition conditions, further increases in J_c can be realized.

$YBa_2Cu_3O_x$ films have been grown using the metal-organic chemical-vapor-deposition (MOCVD) technique by V. Selvamanickam (IGC) et al. on cube-textured nickel substrates with an epitaxially grown CeO_2 buffer layer. Films have also been fabricated on *Ni*-alloy substrates with a biaxially textured yttria-stabilized zirconia *(YSZ)* buffer layer. A high degree of biaxial texture has been achieved in *YBCO* films on both types of substrates, and a critical current density greater than 10^5 A/cm^2 at 77 K has been achieved in the films deposited by MOCVD on the buffered metal substrates.

YBCO

Bulk $YBa_2Cu_3O_{7-\delta}$ samples, doped with PtO_2, Ag_2O, and CeO_2 have been prepared by M. J. Qin et al. (Karlsruhe) by the top-seeded melt-texturing process. The authors report higher critical current densities and lower normalized relaxation rates as well as larger levitation forces for the doped samples. The authors also find much lower critical current densities and higher normalized relaxation rates for samples fabricated with nanosized instead of microsized Y_2O_3 starting materials.

A preprint by J.-Y. Lin (National Chiao Tung) et al. studies the impurity effects on T_c and H_{c2} in $YBa_2(Cu_{1-x}Zn_x)_3O_y$ and in electron-irradiated $YBa_2Cu_3O_y$ with in-plane oxygen defects. The authors find that the effect of similar types of defects or impurities on T_c are the same regardless of the oxygen content of the samples, and that T_c decreases more slowly in irradiated $YBa_2Cu_3O_y$ than in $YBa_2(Cu_{1-x}Zn_x)_3O_y$. The study concludes that scattering due to oxygen defects is more anisotropic than that due to *Zn* impurities.

A paper by T. Ishida (Osaka Prefecture) et al. studies the c-axis anisotropy parameter of oxygen-deficient $YBa_2Cu_3O_{6.5}$ by torque magnetometry. The torque curve was analyzed by means of the London model and yielded an anisotropy parameter $\gamma_{ca} = \sqrt{m_c/m_a} = 53$, indicating a reduced coupling between the adjacent CuO_2 layers compared to an optimum-doped crystal. In another preprint, T. Ishida et al. investigate vortex lattice melting of an untwinned $YBa_2Cu_3O_{6.93}$ single crystal by means of ac susceptibility and torque measurements. The authors note that the melting lines in $H \perp c$ are located above the irreversibility line for the intrinsic pinning and conclude that the suppression of the first-order transition in $H \perp c$ by the intrinsic pinning is not plausible in view of these experiments.

The deformation behavior of melt-textured *YBCO* prepared by the vertical-gradient-freeze (VGF) method was investigated by A. Leenders (Göttingen) et al. by high-temperature deformation experiments at temperatures ranging from 850°C to 950°C in an atmosphere of pure

oxygen under uniaxial pressure with constant strain rates in the range 1×10^{-5} s^{-1} to $5 \times 10^{-4} s^{-1}$. The experiment reveals that the predominant deformation mechanism is dislocation glide and climb controlled by climb at *Y-211* particles and that no significant grain boundary sliding occurs. The total fracture strain is seen to not depend on the temperature or the strain rate and SEM investigations of the fracture faces reveal that fracture does not occur within the *Y-123* matrix but along the platelet boundaries. The authors expect an improvement of fracture behavior by introduction of large *Y-211* particles interconnecting neighboring platelets.

The angular dependence of the nonlinear transverse magnetic moment of untwinned high-quality single crystals of $YBa_2Cu_3O_{6.95}$ has been studied by A. Bhattacharya (Minnesota) et al. at a temperature of 2.5 K using a low-frequency ac technique. The absence of any signature at an angular period $2\pi/4$ is analyzed in light of the numerical predictions of such a signal for a pure $d_{x^2-y^2}$ order parameter with line nodes. Implications of this null result for the existence of a non-zero gap at all angles on the Fermi surface are discussed.

BSCCO

In-plane complex surface impedance of a $Bi_2Sr_2CaCu_2O_y$ single crystal in the mixed state was measured by T. Hanaguri (Tokyo) et al. at 40.8 GHz. The surface reactance, which is proportional to the real part of the effective penetration depth, increased rapidly just above the first-order vortex-lattice melting transition field and the second magnetization peak field. This increase is ascribed to the decrease in the superfluid density rather than the loss of pinning. The result indicates that the vortex melting transition changes the electronic structure as well as the vortex structure, and that not only the phase but also the amplitude of the order parameter takes different values in different vortex phases. The authors speculate that this effect is related to d-wave superconductivity.

In order to improve pinning properties of bulk $Bi_2Sr_2CaCu_2O_{8+\delta}$ materials, S.-L. Huang (Norwegian University) et al. prepared samples of both pure *Bi-2212* and carbon-nanotube-embedded *Bi-2212* (CNTE *Bi-2212*) by partial-melt processing. By magneto-optical (MO) imaging, flux distributions in both types of samples were investigated up to 77 K, revealing the propagation of a flux front in both pure and CNTE *Bi-2212,* and showing strong coupling between grains which enable the flow of intergranular currents. The MO investigations also show that the carbon nanotubes are functioning like columnar defects produced by heavy-ion irradiation. Additionally, the increase of the flux penetration field is a manifestation of the increase of the transport current density in the CNTE *Bi-2212.*

The effect of *Pr* doping on the superconductivity and CuO_2 interlayer coupling of *Bi-2212* system was studied for $Bi_2Sr_2Ca_{1-x}Pr_xCu_2O_y$ (x = 0-0.78) single crystals in a paper by X. F. Sun (Hefei) et al. The authors determine that the T_c variations with *Pr* content, both for as-grown and air-annealed crystals, can be well described by a universal parabolic relation $T_c / T_{max} = 1\text{-}82.6(n\text{-}0.16)^2$. The carrier concentration n was seen to decrease linearly with x indicating that hole filling is the main reason for the suppression of T_c. The superconducting volume faction is also seen to decrease with *Pr* content and this behavior was attributed to the loss of local superconductivity and weakening of CuO_2 interlayer coupling due to *Pr* substitution. The increase of the anisotropy factor γ with x further demonstrates the destruction of CuO_2 interlayer coupling by *Pr* substitution.

Detailed magnetic field dependence of the thermal conductivity κ of $Bi_2Sr_2CaCu_2O_8$ was measured in various crystals by Y. Ando (Central Research Institute) et al. to investigate the origin of the recently discovered unusual plateau in the isothermal $\kappa(H)$ profile [K. Krishana et al., Science 277, 83 (1997)]. The sample-dependent behavior of $\kappa(T)$ and $\kappa(H)$ leads the authors to conclude that the plateau is a result of a delicate balance of quasiparticle population and the scattering lengths and therefore can easily be diminished by the presence of impurity-induced quasiparticles.

A self-field-limited current model which relates the critical current I_c and the V-I characteristics with the effective pinning mechanisms is introduced by M. Mora et al. (Zaragoza) in the analysis of the electric behavior of *Bi-2212* textured thin rods. The model generalizes previous developments on the self-field flux motion due to transport electric currents, taking into account the pinning force of planar high-J_c boundaries on highly anisotropic Josephson-type vortices. The model well describes the temperature dependence of I_c and V-I characteristics of *Bi-2212* textured thin rods in the high-temperature range (between 65 K and 77 K).

In order to synthesize monophasic superconducting oxides in the quaternary system Bi_2O_3-SrO-CaO-CuO, V. J. Styve et al. (TCSUH) experimentally investigated the melting relations of the oxides $Bi_2Sr_2CaCu_2O_8$ *(Bi-2212)* and $Bi_2Sr_2Ca_2Cu_3O_{10}$ *(Bi-2223)* at various oxygen fugacities. The authors report differences in the melting relations on *Bi-2212* and *Bi-2223* at different oxygen fugacities, providing guides to control melt texturing and phase formation.

Other Cuprates

A melt-grown *Nd-Ba-Cu-O* superconductor has been fabricated by H. S. Chauhan and M. Murakami (ISTEC) from a precursor with a composition of $NdBa_2Cu_3O_y$ +10% $Nd4Ba_2Cu_2O_{10}$ +0.5w% *Pt* +1wt% CeO_2 in a 0.1% O_2-*Ar*

environment. The authors report that the addition of *Pt* and CeO_2 results in refinement of $Nd4Ba_2Cu_2O_{10}$ *(Nd422)* particles down to submicron size as revealed by optical and transmission electron microscopic observations. The authors observe a large enhancement of critical current density reaching 10^5 A/cm^2 in a self field at 77 K.

Under high gas pressure up to 11 kbar, J. Karpinski (Zürich) et al. have fabricated single-crystal and polycrystalline samples of *Hg*-based superconductors and quasi-one-dimensional $A_{1-x}CuO_2$ *(A-Sr,Ca,Ba)* compounds, and have studied the influence of substitutions and oxygen content on the magnetic flux-pinning properties. The authors report that the irreversibility field of an almost optimally doped, unsubstituted crystal is about two to three times larger than the one for the underdoped crystal. *Re* substitution for *Hg* causes a significant improvement of the irreversibility line position at low temperatures (below 80 K). Neutron irradiation enhances the flux pinning while also leading to a decrease of the effective mass anisotropy. From susceptibility measurements, the authors find some evidence for a single ground state in the infinite-chain cuprates. Specific heat, neutron scattering of the polycrystalline materials, and magnetic torque measurements on the single crystals give evidence that the antiferromagnetic-ordered state is of long-range 3D character.

Magnetization, resistivity, and electron-spin-resonance (ESR) measurements have been performed by R. Szymczak (Polish Academy) et al. on single crystals of $A_{10}Cu_{17}O_{29}$ $(A=Ca_{5.9}, Sr_{3.5}, Bi_{0.3}, Pb_{0.1}, Y_{0.1}, Al_{0.1})$ of the S=1/2 quasi-one-dimensional system, which has both simple chains and two-leg ladders of copper ions. With substantial hole doping in the materials, superconductivity with T_c = 80 K has been achieved. The authors present estimated values for the magnetic penetration depth and the Ginzburg-Landau parameter κ which indicates that the superconductivity in these ladder materials is described as an extreme type-II limit. The authors also suggest that the superconductivity in this system is related to the two-leg ladders rather than the chains.

The magnetic and superconducting properties of the hybrid ruthenate-cuprate $RuSr_2GdCu_2O_8$ has been investigated by C. Bernhard (Max Planck) et al. by zero-field μSR and dc magnetization measurements. The magnetization data establish that the material exhibits ferromagnetic order of the *Ru* moments [$\mu(Ru) \approx 1\ \mu_B$] below T_{Curie} = 133 K and becomes superconducting at a much lower temperature of T_c = 16 K. The ZF-μSR experiments indicate that the ferromagnetic phase is homogeneous on a microscopic scale and accounts for most of the sample volume. The data also suggest that the magnetic order is not significantly modified at the onset of superconductivity.

The c-axis magnetoconductivity of $(Tl,Hg)_2Sr_2Ca_2Cu_3O_{10}$ *(Tl-2223)* and $(Hg,Cu)Ba_2CuO_{4+\delta}$ *(Hg-1201)* single crystals has been measured by A. Wahl (CRISMAT) et al. For *Tl-2223,* the observed change in magnetoconductivity is explained in terms of density-of-states (DOS) fluctuations. No such anomaly is observed in the *Hg-1201* compound and the material shows a vanishing DOS contribution preventing any change of sign in the experimental magnetoconductivity. The authors also discuss the nature of the impurity state and the pair-breaking regime.

Local Hall probe array magnetization measurements have been made by C. D. Dewhurst (Warwick) et al. on single crystals of $HoNi_2B_2C$. Measured flux profiles show that the surface barriers dominate the hysteresis below T_c (≈8.9 K) except in a narrow temperature range between 5 K and 5.75 K, where superconductivity is strongly suppressed due to the onset of an a-axis incommensurate ordering of the *Ho* moments. The data show that the magnetic order also has a profound influence on the non-equilibrium (vortex pinning) properties of the superconducting state.

The role of the layered structure in the homologous $HgBa_2Ca_{n-1}Cu_nO_{2n+2+\delta}$ was studied by A. L. Kuzemsky et al. (Dubna) using a phenomenological approach for determination of critical temperature. The authors discuss correlation between the copper valence, lattice parameters, and extra oxygen in the physical behavior and characterization of the mercurocuprates.

Josephson Junctions

To study the anisotropic coupling between *YBCO* and *PbIn,* I. Takeuchi et al. (Maryland) have fabricated $YBa_2Cu_3O_{7-x}$*/Au/Ag/PbIn* edge junctions using in-plane aligned a-axis-oriented films. Seven junctions were made in different directions spanning the bc plane of *YBCO* on each chip. Current-voltage characteristics show a systematic change as a function of the angle of the junction direction relative to the *YBCO* crystal axes. The authors analyze the results using a SIN interface model with anisotropic *YBCO/Au* interface resistance and discuss implications for measuring the out-of-CuO_2 plane order parameter of *YBCO.*

A paper by K. Verbist (Antwerp) et al. reports on a method to correlate microstructure of a single well-characterized high-T_c artificial grain boundary junction from cross-section transmission-electron-microscopy (TEM) investigations and transport properties. The authors investigated a $YBa_2Cu_3O_{7-\delta}$ 45° twist junction exhibiting the typical phenomenology of high-T_c Josephson weak links. The technique opens perspectives in the determination of the microstructural origin of variations in Josephson-junction properties such as the spread in I_c and I_cR_n values and the presence of different transport regimes in nominally identical junctions.

A paper by P. Gupta and S. Teitel (Rochester) studies the effect of positional disorder on a Josephson junction array with an applied magnetic field of f = 1/2 flux quantum per unit cell. Using simple analytical arguments and numerical simulations, the authors present evidence that the ground-state vortex lattice of the pure model becomes disordered, in the thermodynamic limit, by any finite amount of positional disorder.

Two papers by V. M. Krasnov (Chalmers) et al. study the current-voltage characteristics in the c-axis direction for small area $Bi_2Sr_2CaCu_2O_8$ mesas containing a few intrinsic stacked Josephson junctions. The authors report the observation of Fiske steps in such junctions, and cite this as direct evidence for the existence of ac Josephson effect in intrinsic high-T_c Josephson junctions. The authors also observe that when normalized to the applied magnetic field, the flux-flow branches for different H collapse into two universal curves representing two different Josephson flux-flow regimes characterized by different propagation velocities.

Vortices

The quasiparticle energy spectrum of an isolated vortex in a clean layered d-wave superconductor is calculated in a paper by I. Knezevic and Z. Radovic (Belgrade) by perturbatively solving the Bogoliubov-de-Gennes equations within the model of step-variation of the gap function. A large peak in the density of states in the pancake vortex is found, as a consequence of two-dimensionality and strong coupling.

The vortex glass transition due to line-like (columnar) disorder is studied at the Gaussian level in a paper by R. Ikeda (Kyoto), using the lowest Landau level approach to the Ginzburg-Landau model. The resulting transition field $B_{cvg}(T)$ is linear in the temperature if it lies above the melting line in the clean limit, in agreement with experimental data for *YBCO.* The author examined the critical behaviors of the tilt modulus and conductivity and notes that the results of the tilt modulus for the 3D classical glass transition imply a finite but nonuniversal critical conductance at the field-tuned superconductor-insulator transition at T=0 in disordered thin films.

Theory

A paper by A. Lopatin and G. Kotliar (Rutgers) investigates the influence of the order-parameter fluctuations on the transition between normal and superconducting states at low temperatures. The authors show that in the case of clean quasi-two-dimensional superconductors, the transition can be described by a functional of the Ginzburg-Landau type, and they consider a large N generalization to describe the phase transition. In case of physical dimensionality, the authors find that the transition is of the first order and that fluctuations significantly affect the temperature dependence of the upper critical field.

Temperature vs. chemical potential phase diagrams of an SO(5) model for high-T_c cuprates are calculated by Monte Carlo simulation by X. Hu (Tsukuba) et al. The authors find that there is a bicritical point where the second-order antiferromagnetism (AF) and superconductivity transition lines merge tangentially into a first order line, and SO(5) symmetry is achieved. In an external magnetic field, there are both first-order and second-order AF transitions separated by a tricritical point.

The k-dependence of the gap function of a bilayer superconductor has been studied by G.G.N. Angilella (Catania) et al. using standard mean-field techniques applied to a two-dimensional extended Hubbard model, in presence of coherent interlayer pair tunneling and quenched coherent single-particle tunneling. The authors show how a gap structure evolves with temperature and band filling and how it affects various observables.

A possible mechanism of tetragonal to orthorhombic transition in high-T_c cuprates is proposed in a preprint by S. K. Ghatak (IIT, Kharagpur) and A. Taraphder (Mehta Research) based on the removal of orbital degeneracy of p states in the CuO_2 cell by electron-lattice interaction.

Applications

Planar dc-SQUID gradiometers based on $YBa_2Cu_3O_{7-x}$ thin films were prepared by P. Seidel et al. (Jena) and tested in an unshielded environment. The authors report a gradient resolution of 450 ft/cm/$\sqrt{Hz}$ (equivalent flux noise 10 $\mu\phi_0/\sqrt{Hz}$) which enables application in magnetic-field measurements. The authors present, as an example, a biomagnetic two-channel system which operated directly at a hospital setting for investigation of cardiac infarction. The authors also present results of the SQUID's performance for nondestructive evaluation of materials such as detection of weak magnetic fields in a carbon-fiber plate and its use in an eddy-current technique for the detection of hardness in steel plates.

In a related paper, details of fabrication of a flip-chip type gradiometer is presented by Y. J. Tian et al. (Jena) for use as a sensor for measurement of weak magnetic signals. The authors determine that the magnetic-field gradient resolution is sufficient to measure high-quality magnetocardiograms.

In a third preprint from Jena, S. Wunderlich et al. present improved field gradient resolution of planar galvanically coupled dc SQUID gradiometers by thickness

reduction of the *YBCO* film in the region of the grain boundary Josephson junctions on a bicrystal substrate.

Reviews

Some basic characteristic features of the vortex phases in *YBCO,* as revealed in specific experiments, is reviewed in an article by G. W. Crabtree et al. (Argonne). The authors begin with the phase diagram for a clean and nearly defect-free crystal and discuss the implications of introducing various types of pinning defects into the system. The pinning centers include point defects via electron and proton irradiation, columnar defects via heavy-ion irradiation, and naturally occurring planar twin-boundary defects. The authors also show the effect of these various defects on the vortex melting and irreversibility lines and discuss the anisotropic pinning introduced by these defects. (33 refs.).

A paper by T. E. Mason (Oak Ridge) reviews neutron-scattering studies of spin fluctuations in high-temperature superconductors, primarily in $La_{2-x}Sr_xCuO_4$ and $YBa_2Cu_3O_{7-x}$ systems. The author notes that for both $La_{2-x}Sr_xCuO_4$ and the underdoped $YBa_2Cu_3O_{7-x}$ systems, the normal-state response is characterized by incommensurate magnetic fluctuations, and the low-energy excitations are suppressed by the superconducting transition with a corresponding enhancement in the response at higher energies. For $YBa_2Cu_3O_{7-x}$, the superconducting state is accompanied by the rapid development of a commensurate resonant response whose energy varies with T_c, and in underdoped samples, this resonance persists above T_c. (82 refs.).

The results of microstructural studies of melt-grown $REBa_2Cu_3O_{7-x}$ obtained by optical microscopy is presented in a manuscript by P. Diko (Slovak Academy). The author discusses crystal-defect classification and crystal defects associated with the melt-growth process such as porosity, subgrains, *211* particles and their inhomogeneity in the sample, shape change of samples, microcracks, secondary phases, and growth-related ab planar defects. The author also discusses crystal defects influenced by volume fraction and size of *211* particles such as residual dilatation stress, microcracks in ab planes, and twin structures. The final section of the review discusses oxygen inhomogeneity. (94 refs.).

Contributed by Sreeparna Mitra

Contents:

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S. Alama, A. J. Berlinsky, L. Bronsard, and T. Giorgi, "Vortices with Antiferromagnetic Cores in the SO(5) Theory of High Temperature Superconductivity." Department of Mathematics and Statistics, McMaster University, Hamilton, Ontario, CANADA L8S 4M1; A. J. Berlinsky's e-mail berlinsk@mcmail.cis.mcmaster.ca; preprint also available at cond-mat@xxx.lanl.gov (#9812283).

***G. Aldica, P. Badica, and G. Alexe**, "Non-Isothermal Pyrolysation of the Spray-Frozen Freeze Dried Complex Nitrate in *Bi(Pb)-Sr(Ba)-Ca-Cu-O* System Investigated by X-ray Diffraction Analysis." Presented at EPDIC-6, Budapest, Hungary, Aug. 25-29, 1998; to be published in Mater. Sci. Forum. Contact P. Badica, National Institute of Materials Physics, P.O. Box MG-7, Bucharest-Magurele, R-76900 ROMANIA; telefax +40 1 4231700; e-mail badpet@alpha1.infim.ro. Key words: x-ray diffraction, non-isothermal pyrolysation, freeze-dried powder, *Bi(Pb)-Sr(Ba)-Ca-Cu-O* system. ***Corrected e-mail address.

Yoichi Ando, J. Takeya, K. Nakamura, and A. Kapitulnik, "Quasiparticles and Low-Temperature Thermal Conductivity of $Bi_2Sr_2CaCu_2O_8$ in Magnetic Fields." Submitted to Phys. Rev. Lett. Electrical Physics Department, Central Research Institute of Electric Power Industry (CRIEPI), 2-11-1 Iwato-kita, Komae, Tokyo 201-8511, JAPAN; telephone +81 3 3480 2111, ext. 3221; telefax +81 3 3480 3401; e-mail ando@criepi.denken.or.jp; preprint also available at cond-mat@xxx.lanl.gov (#9812265). 74.25.Fy; 74.62.Dh; 74.60.Ge; 74.72.Hs.

***A. Andreone, C. Aruta, M. Iavarone, F. Palomba, M. L. Russo, M. Salluzzo, R. Vaglio, A. Cassinese, M. A. Hein, T. Kaiser, G. Müller, and M. Perpeet**, "Microwave Properties

of *RE-Ni_2B_2C (RE=Y,Er)* Superconducting Thin Films." Submitted to Physica C. INFM-Dipartimento di Scienze Fisiche, Università di Napoli Federico II, Piazzale Tecchio 80, I-80125 Napoli, ITALY; telephone +39 081 768 2547; telefax +39 081 239 1821; e-mail andreone@na.infn.it or andreone@unina.it. Key words: superconducting borocarbide thin films, surface impedance. 74.72.Ny; 74.76.-w; 74.25.Nf. *****Corrected citation.

Giuseppe G. N. Angilella, Renato Pucci, Fabio Siringo, and Asle Sudbø, "Sharp k-Space Features in the Order Parameter Within the Interlayer Pair-Tunneling Mechanism of High-T_c Superconductivity." To be published in Phys. Rev. B. Dipartimento di Fisica, Università degli Studi di Catania, 57 Corso Italia, I-95129 Catania, ITALY; telephone +39 095 7195-499 or -278; telefax +39 095 383023; e-mail angilella@ct.infn.it; Web site http://www.ct.infn.it/~angilell; preprint also available at cond-mat@xxx.lanl.gov (#9810250). 74.20.-z; 74.80.Dm; 74.72.Hs; 74.25.Bt.

***P. Badica, G. Aldica, and S. Mandache**, "One Step Synthesis of *Bi(Pb)-2223* Phase in *Bi(Pb)-Sr(Ba)-Ca-Cu-*Nitrate Freeze Dried Powder." To be published in Supercond. Sci. & Technol. National Institute of Materials Physics, P.O. Box MG-7, Bucharest-Magurele, R-76900 ROMANIA; telefax +40 1 4231700; e-mail badpet@alpha1.infim.ro. *****Corrected e-mail address.

M. Belogolovskii, M. Grajcar, P. Kús, A. Plecenik, S. Benacka, and P. Seidel, "Phase-Coherent Charge Transport in Superconducting Heterocontacts." Submitted to Phys. Rev. B. Donetsk Physical and Technical Institute, 340114 Donetsk, UKRAINE; P. Seidel's telephone at Friedrich-Schiller-Universitat Jena, Jena, Germany +49 3641 947410; telefax +49 3641 947412; e-mail seidel@ifk.uni-jena.de; Web site http://www.physik.uni-jena.de/~tief/.

C. Bernhard, J. L. Tallon, Ch. Niedermayer, Th. Blasius, A. Golnik, E. Brücher, R. K. Kremer, D. R. Noakes, C. E. Stronach, and E. J. Ansaldo, "Coexistence of Ferromagnetism and Superconductivity in the Hybrid Ruthenate-Cuprate Compound *$RuSr_2GdCu_2O_8$* Studied by Muon Spin Rotation (μSR) and dc-Magnetization." Submitted to Phys. Rev. B. Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, D-70569 Stuttgart, GERMANY; telephone +49 711 689 1733; telefax +49 711 689 1010; e-mail bernhard@cardix.mpi-stuttgart.mpg.de. 76.75.+i; 74.72.Jt; 74.25.Ha; 74.25.-q.

Anand Bhattacharya, Igor Zutic, O. T. Valls, A. M. Goldman, Ulrich Welp, and Boyd Veal, "Angular Dependence of the Nonlinear Transverse Magnetic Moment of *$YBa_2Cu_3O_{6.95}$* in the Meissner State." Submitted to Phys. Rev. Lett. School of Physics and Astronomy, University of Minnesota, 116 Church St. S.E., Minneapolis, MN 55455; telephone (612) 624-9366; telefax (612) 624-4578; e-mail bhat0015@gold.tc.umn.edu; preprint also available at cond-mat@xxx.lanl.gov (#9812234).

A. Casaca, G. Bonfait, C. Dubourdieu, F. Weiss, and J. P. Sénateur, "Magnetoresistance and Hall Effect in Unidirectionally Twinned *$YBa_2Cu_3O_{7-\delta}$* Thin Films." To be published in Phys. Rev. B. Departamento de Química, Instituto Tecnológico e Nuclear, Estrada Nacional 10, P-2686 Sacavém Codex, PORTUGAL; telephone +351 1 955 00 21; telefax +351 1 994 14 55.

Biplab Chattopadhyay and A. N. Das, "Effects of c-Axis Hopping in the Interlayer Tunneling Model of High-T_c Layered Cuprates." Saha Institute of Nuclear Physics, 1/AF Bidhannagar, Calcutta 700 064, INDIA; e-mail biplab@cmp.saha.ernet.in; A. N. Das' telephone +91 337 5345 49; telefax +91 33 337 4637; e-mail atin@cmp.saha.ernet.in. 74.80.Dm; 74.72.-h; 74.20.-z.

Sujeet Chaudhary, S. B. Roy, and P. Chaddah, "Anomalous Peak-Effect in *$CeRu_2$:* Effect of Disorder." Low Temperature Physics Group, Centre for Advanced Technology, Indore 452 013, INDIA; telefax +91 731 488300; e-mail sujeetc@cat.ernet.in. Key words: *$CeRu_2$,* peak effect, collective pinning, magnetic impurities, *Fe*-doped *$NbSe_2$.*

H. S. Chauhan and M. Murakami, "On Enhancing the J_c by Refinement of *$Nd_4Ba_2Cu_2O_{10}$* Particles in OCMG Processed *Nd-Ba-Cu-O* System with *Pt* and *CeO_2* Addition." Submitted to Mater. Sci. Eng. B. Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), Morioka Laboratory, 3-35-2 Iioka-Shinden, Morioka, Iwate 020-0852, JAPAN; telefax +81 19 635 9017; e-mail chauhan@istec.or.jp. Key words: *Nd-Ba-Cu-O, Nd422* refinement, oxygen-controlled-melt-growth (OCMG) process, isothermal growth, critical current density, peak effect, *Pt* and *CeO_2* addition.

G. W. Crabtree, W. K. Kwok, D. Lopez, and U. Welp, "The Mixed State." To be published in Handbook of Supercond. Mater. (IOP Publishing). 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.

M. Crisan and I. Tifrea, "Critical Temperature of a Van Hove Superconductor with Spin-Charge Separation." To be published in Physica C (in press). Department of Theoretical Physics, University of Cluj, 3400 Cluj, ROMANIA; telefax +40 64 191 906; e-mail mcrisan@phys.ubbcluj.ro. Key words: critical temperature, Van Hove superconductor, spin-charge separation.

C. D. Dewhurst, R. A. Doyle, E. Zeldov, and D. McK. Paul, "Interaction Between Magnetic Order and the Vortex Lattice in

$HoNi_2B_2C$." To be published in Phys. Rev. Lett. Department of Physics, University of Warwick, Coventry CV4 7AL, UNITED KINGDOM; phone +44 1203 523414; fax +44 1203 692016; e-mail phsdu@warwick.ac.uk; preprint also available at Web site http://www.warwick.ac.uk/~phsdu/. 74.25.Dw; 74.25.Ha; 74.60.Ec; 74.60.Ge; 74.60.Jg; 74.70.Ad; 74.72.Ny.

Pavel Diko, "Microstructure of Melt-Grown *$REBa_2Cu_3O_{7-x}$* Superconductors." To be published in Studies of High Temp. Supercond. – Microstructural Studies in HTSC, edited by A. V. Narlikar (Nova Science Publishers, New York, 1998). Institute of Experimental Physics, Slovak Academy of Sciences, Watsonova 47, 04353 Kosice, SLOVAKIA; e-mail dikos@saske.sk.

I. Felner, U. Asaf, S. Reich, and Y. Tsabba, "Magnetic Properties of *$RSr_2RuCu_2O_{8+\delta}$ (R = Eu* and *Gd)*." To be published in Physica C (in press). Racah Institute of Physics, Hebrew University of Jerusalem, Jerusalem 91904, ISRAEL; e-mail israela@vms.huji.ac.il. Key words: non-superconducting, magnetic susceptibility, ferromagnet. 74.10.+v; 74.62.Bf; 75.50.Ee; 76.80.+y.

S. K. Ghatak and A. Taraphder, "On the Possible Mechanism of Structural Transition in Cuprates." To be published in Physica C (in press). Department of Physics and Meteorology, Indian Institute of Technology, Kharagpur 721302, INDIA; telephone +91 3222 55303; e-mail skghatak@phy.iitkgp.ernet.in. Key words: orbital degeneracy, orthorhombic transition, cuprates. 74.25.Dw; 74.25.Fy; 74.90.+n.

T.-H. Gimm, S.-S. Lee, S.-P. Hong, and S.-H. Suck Salk, "Holon Pair Condensation and Phase Diagram of High T_c Cuprates." Submitted to Phys. Rev. B. Department of Physics, Pohang University of Science and Technology, Pohang 790-784, SOUTH KOREA; telephone +82 562 279 8047; telefax +82 562 279 3099; e-mail thgim@anyon.postech.ac.kr; preprint also available at cond-mat@xxx.lanl.gov (#9812096). 74.20.Mn; 74.25.-q; 74.25.Dw.

I. K. Gopalakrishnan, T. B. Waje, and J. V. Yakhmi, "Structural and Superconducting Properties of *$Eu_{1-x}Pr_x$-$BaSrCu_3O_{7-\delta}$*." To be published in Physica C (in press). Chemistry Division, Bhabha Atomic Research Center, Mumbai 400 085, INDIA; telephone +91 22 550 5148; telefax +91 22 550 5151; J. V. Yakhmi's e-mail yakhmi@magnum.barc.ernet.in. Key words: *$Eu_{1-x}Pr_xBaSrCu_3O_{7-\delta}$*, orthorhombic, tetragonal.

Pramod Gupta and S. Teitel, "Positional Disorder (Random Gaussian Phase Shifts) in the Fully Frustrated Josephson Junction Array (2D XY Model)." Department of Physics and Astronomy, McMaster University, Hamilton, Ontario, CANADA L8S 4M1; S. Teitel's e-mail at University of Rochester, NY stte@pas.rochester.edu; preprint also available at cond-mat@xxx.lanl.gov (#9812157). 64.60.Cn; 74.60.-w.

Tetsuo Hanaguri, Takashi Tsuboi, Yoshishige Tsuchiya, Ken-ichi Sasaki, and Atsutaka Maeda, "Reduction of the Superfluid Density in the Vortex-Liquid Phase of *Bi_2Sr_2-$CaCu_2O_y$*." To be published in Phys. Rev. Lett. Department of Applied Chemistry, University of Tokyo, 7-3-1 Hongo, Bunkyu-ku, Tokyo 113-8656, JAPAN; telephone +81 3 3812 2111, ext. 7204; telefax +81 3 3815 5632; e-mail ctetsuo@komaba.ecc.u-tokyo.ac.jp; preprint also available at cond-mat@xxx.lanl.gov (#9812354). 74.60.Ec; 74.25.Jb; 74.25.Nf; 74.72.Hs.

Xiao Hu, Tomio Koyama, and Masashi Tachiki, "Phase Diagram of a Superconducting and Antiferromagnetic System with SO(5) Symmetry." National Research Institute for Metals, 1-2-1 Sengen, Tsukuba-shi, Ibaraki 305 0047, JAPAN; e-mail xhu@nrim.go.jp; preprint also available at cond-mat@xxx.lanl.gov (#9812031). 74.25.Dw; 05.70.Jk; 74.20.-z; 74.25.Ha.

Sun-Li Huang, M. R. Koblischka, K. Fossheim, T. W. Ebbesen, and T. H. Johansen, "Microstructure and Flux Distribution in Both Pure and Carbon-Nanotube-Embedded *$Bi_2Sr_2CaCu_2O_{8+\delta}$* Superconductors." To be published in Physica C (in press). Department of Physics, Norwegian University of Science and Technology, Trondheim 7034, NORWAY; telephone +47 7359 3640; telefax +47 7359 3695; e-mail sunlih@phys.ntnu.no. Key words: *Bi-2212* high-T_c superconductor, carbon nanotube, grain coupling, flux pinning, magneto-optical visualization.

Ryusuke Ikeda, "High Field Vortex Glass Transition Induced by Line-Like Disorder." Department of Physics, Kyoto University, Kyoto 606-8502, JAPAN. Key words: type-II superconductor, vortex states, Bose-glass transition, insulator-superconductor transition.

Takekazu Ishida, Kazuo Inoue, Kiichi Okuda, Zenji Hiroi, Makoto Izumi, Iksu Chong, and Mikio Takano, "Anisotropy of *$Bi_{1.5}Pb_{0.7}Sr_{1.8}CaCu_2O_{8+\delta}$* Single Crystal." Presented at the 11th Int. Symp. on Superconductivity (ISS'98), Fukuoka, Japan, Nov. 16-19, 1998. Department of Physics and Electronics, Osaka Prefecture University, Sakai, Osaka 599-8531, JAPAN; e-mail ishida@center.osakafu-u.ac.jp. Key words: *Bi2212, Pb* substitution, torque, flux pinning, anisotropy.

Takekazu Ishida, Kentaro Kitamura, Kiichi Okuda, Hidehito Asaoka, Alexandre I. Rykov, and Setsuko Tajima, "Role of Intrinsic Pinning for Melting Transition of *$YBa_2Cu_3O_{6.93}$* in the Parallel Field to *CuO_2* Layers." Presented at the 11th Int. Symp. on Superconductivity (ISS'98), Fukuoka, Japan, Nov. 16-19, 1998. Department of Physics and Electronics, Osaka Prefecture University,

Sakai, Osaka 599-8531, JAPAN; e-mail ishida@center.osakafu-u.ac.jp. Key words: $YBa_2Cu_3O_7$, melting transition, intrinsic pinning, anisotropy.

Takekazu Ishida, Kentaro Kitamura, Kiichi Okuda, Alexandre I. Rykov, and Setsuko Tajima, "Anisotropy of Underdoped $YBa_2Cu_3O_{6.5}$ Single Crystal." Presented at the 11th Int. Symp. on Superconductivity (ISS'98), Fukuoka, Japan, Nov. 16-19, 1998. Department of Physics and Electronics, Osaka Prefecture University, Sakai, Osaka 599-8531, JAPAN; e-mail ishida@center.osakafu-u.ac.jp. Key words: $YBa_2Cu_3O_{6.5}$, underdoped, magnetic torque, anisotropy parameter.

A. W. Kaiser, J. Chen, and H. J. Bornemann, "Influence of Annealing on T_c, J_c and Levitation Force of in Air Melt Textured *Sm-Ba-Cu-O.*" To be published in Physica C (in press). Forschungszentrum Karlsruhe GmbH, INFP, P.O. Box 3640, Eisenlohrstrasse 45, D-76021 Karlsruhe, GERMANY; telephone +49 721 81 2676; e-mail axel.kaiser@infp.fzk.de. Key words: *Sm-Ba-Cu-O,* solid solution, magnetization, critical current density, levitation force.

J. Karpinski, G. I. Meijer, H. Schwer, R. Molinski, E. Kopnin, M. Angst, A. Wisniewski, R. Puzniak, J. Hofer, and C. Rossel, "High Pressure Crystal Growth and Properties of *Hg*-Based Superconductors and Quasi-One-Dimensional $A_{1-x}CuO_2$ *(A=Sr,Ca,Ba)* Cuprates." To be published in Lecture Notes in Physics: Proc. of the Second Polish-US Conf. on High-Temp. Supercond., Karpacz, Poland, Aug. 17-21, 1998 (Springer Verlag, Berlin, 1999). Laboratorium für Festkörperphysik, ETH Hönggerberg, CH-8093 Zürich, SWITZERLAND. Key words: crystal growth, high pressure, $HgBa_2Ca_{n-1}Cu_nO_{2n+2+\delta}$, cuprates, $Ca_{0.83}CuO_2$, $Sr_{0.73}CuO_2$, $Ba_{0.66}CuO_2$.

Irena Knezevic and Zoran Radovic, "Quasiparticle Excitation Spectrum of an Isolated Vortex in a High-Temperature Superconductor." To be published in Physica C: Proc. of the First Crete Euroconference on Anomalous Complex Superconductors (ACS-1), Aghia Pelaghia, Crete, Greece, Sept. 25-Oct. 2, 1998. Department of Physics, University of Belgrade, P.O. Box 368, 11001 Belgrade, YUGOSLAVIA; e-mail irena-k@eunet.yu; preprint also available at cond-mat@xxx.lanl.gov (#9812132). Key words: vortex core, localized states, d-wave superconductor. 74.60.-w; 74.20.Fg.

Irena Knezevic and Zoran Radovic, "Quasiparticle Spectrum of Vortices in Cuprates." 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, University of Belgrade, P.O. Box 368, 11001 Belgrade, YUGOSLAVIA; e-mail irena-k@eunet.yu; preprint also available at cond-mat@xxx.lanl.gov (#9812129). Key words: vortex core, bound states, d-wave superconductivity.

K. Knízek, M. Veverka, and E. Pollert, "Preparation of $Hg_{0.8}Cr_{0.2}Ba_2CuO_{4+\delta}$ Under Controlled Oxygen and Mercury Partial Pressures." To be published in Physica C (in press). Institute of Physics ASCR, Cukrovarnická 10, CR-162 53 Prague 6, CZECH REPUBLIC; telephone +420 2 2431 1137; telefax +420 2 312 3184; e-mail knizek@fzu.cz. Key words: mercury superconductor, chromium substitution, stability, oxygen and mercury partial pressures. 74.72.Gr.

V. M. Krasnov, N. Mros, A. Yurgens, and D. Winkler, "Fiske Steps in Intrinsic $Bi_2Sr_2CaCu_2O_{8+x}$ Stacked Josephson Junctions." Department of Microelectronics and Nanoscience, Chalmers University of Technology, S-41296 Göteborg, SWEDEN; telephone +46 31 772 3397; telefax +46 31 772 3471; e-mail krasnov@fy.chalmers.se; Web site http://fy.chalmers.se/~krasnov/.

V. M. Krasnov, N. Mros, A. Yurgens, and D. Winkler, "Multiple Flux-Flow Branches and Phase Transition of Josephson Fluxon Lattice in Intrinsic $Bi_2Sr_2CaCu_2O_{8+x}$ Stacked 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. Department of Microelectronics and Nanoscience, Chalmers University of Technology, S-41296 Göteborg, SWEDEN; telephone +46 31 772 3397; telefax +46 31 772 3471; e-mail krasnov@fy.chalmers.se; Web site http://fy.chalmers.se/~krasnov/.

A. L. Kuzemsky, I. G. Kuzemskaya, and A. A. Cheglokov, "Role of Layered Structure for Superconducting Critical Temperature of the Mercurocuprates." Preprint #E17-98-267. Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Moscow Region, RUSSIA; e-mail kuzemsky@thsun1.jinr.ru.

C. Leblond, I. Monot, J. Provost, and G. Desgardin, "Optimization of the Texture Formation and Characterization of Large Size Top-Seeded-Melt-Grown *YBCO* Pellets." To be published in Physica C (in press). Laboratoire CRISMAT, CNRS, URA 1318, ISMRA/Université de Caen, Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE; telephone +33 2 31 45 2630; telefax +33 2 31 95 1600; e-mail leblond@crismat.ismra.fr. Key words: *Ce* doping, *YBaCuO,* top seeding, texture.

A. Leenders, M. Ullrich, L.-O. Kautschor, and H. C. Freyhardt, "High Temperature Deformation of VGF Melt-Textured *YBCO.*" To be published in J. Mater. Res. Zentrum für Funktionswerkstoffe gGmbH Göttingen, Windausweg 2, D-37073 Göttingen, GERMANY; telephone +49 551 507 1730; telefax +49 551 507 1750; e-mail leenders@umpsun1.gwdg.de. Key words: $Y_1Ba_2Cu_3O_{7-x}$, superconductors, mechanical properties, high-temperature deformation. 74.72.Bk; 74.80.Bj; 62.20.Fe.

J.-Y. Lin, S. J. Chen, S. Y. Chen, C. F. Chang, H. D. Yang, S. K. Tolpygo, M. Gurvitch, Y. Y. Hsu, and H. C. Ku, "Anisotropic Impurity Scattering Effects on T_c and H_{c2} in $YBa_2Cu_3O_x$." To be published in Phys. Rev. B. Institute of Physics, National Chiao Tung University, Hsinchu 300, Taiwan, REPUBLIC OF CHINA; telephone +886 3 573 1653; telefax +886 3 572 0728; e-mail ago@cc.nctu.edu.tw. 74.62.-c; 74.62.Dh.

Y. Lin, J. Sichelschmidt, J. E. Eldridge, T. Wahlbrink, and S.-W. Cheong, "Observation of Magnetic Order in $La_{1.9}Sr_{0.1}CuO_4$ from Two-Magnon Raman Scattering." Submitted to Phys. Rev. B. Department of Physics and Astronomy, University of British Columbia, 6224 Agricultural Road, Vancouver, BC, CANADA V6T 1Z1; e-mail ylin@physics.ubc.ca; preprint also available at cond-mat@xxx.lanl.gov (#9812027). 74.25.Ha; 78.30.-j; 72.10.Di; 74.72.-h.

M. Lisowski, E. Zipper, and M. Stebelski, "Possibility of Long-Range Order in Clean Mesoscopic Cylinders." Institute of Physics, University of Silesia, ul. Uniwersytecka 4, 40-007 Katowice, POLAND; e-mail lisow@server.phys.us.edu.pl; preprint also available at cond-mat@xxx.lanl.gov (#9812319). 71.10.Pm; 73.23.-b; 64.60.Cn; 05.50.+q.

H. L. Liu, D. B. Tanner, H. Berger, and G. Margaritondo, "ab-Plane Optical Properties on *Ni*-Doped Bi_2Sr_2Ca-$Cu_2O_{8+\delta}$." To be published in Physica C (in press). Department of Physics, University of Illinois at Urbana-Champaign, Urbana, IL 61801; telephone (217) 333-9019; telefax (217) 244-2278; e-mail liu@uimrl7.mrl.uiuc.edu. Key words: infrared spectroscopy, optical reflectivity, superconductor. 74.25.Gz; 74.62.Dh; 74.72.Hs; 78.30.-j.

A. Lopatin and G. Kotliar, "Large-N Treatment of the Abrikosov Transition at Low Temperatures." To be published in Phys. Rev. B. Department of Physics and Astronomy, Rutgers University, P.O. Box 849, Piscataway, NJ 08855; phone (732) 445-4665; e-mail lopatin@physics.rutgers.edu; preprint also available at cond-mat@xxx.lanl.gov (#9811400).

A. M. Martin and James F. Annett, "The Importance of Self-Consistency in Determining Interface Properties of S-I-N and D-I-N Structures." Submitted to Superlatt. and Microstruc. Département de Physique Théorique, Université de Genève, CH-1211 Genève 4, SWITZERLAND; e-mail martin@serifos.unige.ch; preprint also available at cond-mat@xxx.lanl.gov (#9811389).

T. E. Mason, "Neutron Scattering Studies of Spin Fluctuations in High Temperature Superconductors." To be published in the Handbook on the Physics and Chemistry of Rare Earths, Special Volumes on High Temperature Rare Earth Superconductors, edited by K. A. Gschneidner, Jr., L. Eyring, and M. B. Maple. Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, TN 37831-8218; e-mail masont@ornl.gov; preprint also available at cond-mat@xxx.lanl.gov (#9812287).

M. Mora, J. Fernández, L. A. Angurel, and R. Navarro, "Pinning by Planar High J_c Defects and Self Field Limited Currents of Textured *Bi-2212* Thin Rods." To be published in Physica C. Departamento de Ciencia y Tecnología de Materiales y Fluidos, Centro Politécnico Superior, Instituto de Ciencia de Materiales de Aragón (I.C.M.A.), Universidad de Zaragoza, María de Luna 3, E-50015 Zaragoza, SPAIN; L. A. Angurel's telephone +34 976 761958; telefax +34 976 761957; e-mail angurel@posta.unizar.es. Key words: *BSCCO,* pinning mechanisms, flux flow, grain boundaries, superconductivity. 74.25.Fy; 74.60.Ge; 74.72.Hs.

Paul Muzikar, "Stability Analysis of a Low Energy Vortex Configuration." Department of Physics, Purdue University, West Lafayette, IN 47907.

B. D. Padalia, Gunadhor S. Okram, Om Prakash, R. Suba, Sanjay Gupta, S. J. Gurman, and J. C. Amiss, "X-Ray Absorption Near Edge Structure Study of T'-Type Revived Superconducting Compounds, $Nd_{1.82-z}A_zCe_{0.18}CuO_y$ *(NACCO); A=Ca,Sr,* or *Ba,* $z \leq 0.18$." To be published in Supercond. Sci. & Technol. Department of Physics, Indian Institute of Technology, Powai, Mumbai 400 076, INDIA; e-mail phbdpia@niharika.phy.iitb.ernet.in.

B.L.T. Plourde and D. J. Van Harlingen, "Scanning SQUID Microscopy of Flux Distributions and Motion Near Surface Features in $NbSe_2$." To be published in Phys. and Mater. Sci. of Vortex States, Flux Pinning, and Dynamics: Proc. of the NATO Adv. Study Inst., Kusadasi, Turkey, July 26-Aug. 8, 1998; edited by R. Kossowsky, S. M. Bose, V. Pan, and H. Z. Durusoy (Kluwer, 1999). Department of Physics and the Science and Technology Center for Superconductivity, University of Illinois at Urbana-Champaign, 1110 West Green Street, Urbana, IL 61801.

M. J. Qin, A. W. Kaiser, and H. J. Bornemann, "Study of Magnetic Properties of Melt Textured $YBa_2Cu_3O_{7-\delta}$ with *Pt, Ce* and *Ag* Dopants." To be published in Physica C (in press). Contact A. W. Kaiser, Eisenlohrstr. 45, D-76135 Kalrsruhe, GERMANY; telephone +49 721 812676; e-mail axel.kaiser@sgz-bank.de. Key words: critical current density, magnetic relaxation, levitation force.

J. D. Riches, J. A. Alarco, and J. C. Barry, "Phase Composition of the Rapidly Quenched Melt of $YBa_2Cu_3O_{7-y}$ + 20mol% Y_2BaCuO_5." To be published in Physica C. Department of Physics, University of Queensland, St. Lucia, Brisbane, Queensland 4072, AUSTRALIA; telephone +61 7 3365 1245; telefax +61 7 3365 1242; e-mail riches@physics.uq.edu.au. Key words: phase equlibria, $YBa_2Cu_3O_{7-y}$, solidification. 74.72.Bk; 64.75.+g.

I. V. Rozhdestvenskaya, T. I. Ivanova, and O. V. Frank-Kamenetskaya, "Crystal Structure of the Superconducting Infinite-Chain Cuprate $Ba_2Cu_{2.89}O_{6-y}$." To be published in Physica C (in press). Contact T. I. Ivanova, Department of Crystallography, St. Petersburg State University, University emb. 7/9, 199034 St. Petersburg, RUSSIA; telephone +7 812 218 9647; e-mail tanya@cryst.geol.pu.ru. Key words: infinite-chain cuprate, crystal structure, superconductivity. 61.66.-f; 61.10.-i; 74.70.-b.

A. Schmehl, B. Goetz, R. R. Schulz, C. W. Schneider, H. Bielefeldt, H. Hilgenkamp, and J. Mannhart, "Doping Induced Enhancement of the Critical Currents of Grain Boundaries in $YBa_2Cu_3O_{7-\delta}$." Contact H. Hilgenkamp, Experimentalphysik VI, Center for Electronic Correlations and Magnetism, Institute of Physics, University of Augsburg, Universitätsstr. 1, D-86135 Augsburg, GERMANY; telephone +49 821 598 3653; telefax +49 821 598 3652; e-mail hans.hilgenkamp@physik.uni-augsburg.de. Key words: high-temperature superconductivity, critical current density, grain boundaries, Josephson junctions.

P. Seidel, F. Schmidl, R. Weidl, S. Wunderlich, and L. Dörrer, "High-T_c SQUID Systems for Biomagnetic Clinical Research and for Nondestructive Evaluation." To be published in Adv. in Supercond. XI: Proc. of the 11th Int. Symp. on Superconductivity (ISS'98), Fukuoka, Japan, Nov. 16-19, 1998; edited by N. Koshizuka and S. Tajima (Springer-Verlag, Tokyo). Institut für Festkörperphysik, Friedrich-Schiller-Universität Jena, Helmholtzweg 5, D-07743 Jena, GERMANY; telephone +49 3641 947410; telefax +49 3641 947412; e-mail seidel@ifk.uni-jena.de; Web site http://www.physik.uni-jena.de/~tief/. Key words: planar high-T_c SQUID gradiometers, biomagnetism, nondestructive evaluation.

V. Selvamanickam, G. Galinski, J. DeFrank, C. Trautwein, P. Haldar, U. Balachandran, M. Lanagan, and M. Chudzik, "*Y-Ba-Cu-O* Film Deposition by Metal Organic Chemical Vapor Deposition on Buffered Metal Substrates." To be published in IEEE Trans. Appl. Supercond.: Proc. of the 1998 Appl. Supercond. Conf. (ASC), Palm Desert, Calif., Sept. 13-18, 1998. Contact L. Lehner, Technology Development, Intermagnetics General Corporation, 450 Old Niskayuna Rd., Latham, NY 12110-0461; phone (518) 782-1122, ext. 3070; fax (518) 783-2615; e-mail tlehner@igc.com.

V. J. Styve, J. Geny, J. K. Meen, and D. Elthon, "Melting Relations of Bi_2O_3-*SrO-CaO-CuO* Superconductors at Various Oxygen Fugacities." Preprint #98:153; submitted to the Proc. of the 1998 Fall Meeting of the Mater. Res. Soc., Boston, Mass., Nov. 30-Dec. 4, 1998; to be published in Solid State Chem. of Inorg. Mater. II. Texas Center for Superconductivity, University of Houston, Houston, TX 77204-5932; telephone (713) 743-8200; telefax (713) 743-8201; e-mail styve@uh.edu or preprints@www.tcs.uh.edu.

X. F. Sun, X. Zhao, X.-G. Li, and H. C. Ku, "Hole Filling and Interlayer Coupling of $Bi_2Sr_2Ca_{1-x}Pr_xCu_2O_y$ Single Crystals." To be published in Phys. Rev. B. Department of Materials Science and Engineering, University of Science and Technology of China, Hefei 230026, PEOPLE'S REPUBLIC OF CHINA; e-mail xfsun@ustc.edu.cn. 74.72.Hs; 74.62.Dh.

R. Szymczak, H. Szymczak, M. Baran, E. Mosiniewicz-Szablewska, L. Leonyuk, G.-J. Babonas, V. Maltsev, and L. Shvanskaya, "Magnetic and Superconducting Properties of Doped $(Sr,Ca)_{10}Cu_{17}O_{29}$-Type Single Crystals." To be published in Physica C (in press). Contact M. Baran, Institute of Physics, Polish Academy of Sciences, Al. Lótników 32/46, PL 02-668 Warsaw, POLAND; telefax +48 22 843 09 26; e-mail baran@ifpan.edu.pl. Key words: spin-ladder system, $(Sr,Ca)_{10}Cu_{17}O_{29}$, magnetic susceptibility, magnetization, high-T_c superconductivity, penetration depth. 74.72.-h; 74.72.Jt; 74.25.Ha; 74.62.Dh; 75.40.Cx.

I. Takeuchi, Y. Gim, F. C. Wellstood, C. J. Lobb, Z. Trajanovic, and T. Vankatesan, "Systematic Study of Anisotropic Josephson Coupling Between $YBa_2Cu_3O_{7-x}$ and *PbIn* Using In-Plane Aligned a-Axis Films." To be published in Phys. Rev. B. Material Sciences Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720; e-mail ichiro@ux8.lbl.gov.

Y. J. Tian, S. Linzen, F. Schmidl, L. Dörrer, R. Weidl, and P. Seidel, "High-T_c Directly Coupled Direct Current SQUID Gradiometer with Flip-Chip Flux Transformer." Submitted to Appl. Phys. Lett. Institut für Festkörperphysik, Friedrich-Schiller-Universität Jena, Helmholtzweg 5, D-07743 Jena, GERMANY; P. Seidel's telephone +49 3641 947410; telefax +49 3641 947412; e-mail seidel@ifk.uni-jena.de; Web site http://www.physik.uni-jena.de/~tief/. 85.25.Dq; 74.76.Bz; 87.40.+w.

Yoshinori Uzawa, Zhen Wang, and Akira Kawakami, "Performance of Quasi-Optical SIS Mixer with *NbN/AlN/NbN* Tunnel Junctions and *NbN* Tuning Circuit at 760 GHz." To be published in Appl. Supercond. (in press). Communications Research Laboratory, Kansai Advanced Research Center, Ministry of Posts and Telecommunications, 588-2 Iwaoka, Iwaoka-cho, Nishi-Ku, Kobe 651-2401, JAPAN; telephone +81 78 969 2195; telefax +81 78 969 2199; e-mail uzawa@crl.go.jp.

M. Veillette, Ya. B. Bazaliy, A. J. Berlinsky, and C. Kallin, "Stripe Formation Within SO(5) Theory." Department of Physics, University of California, Santa Barbara, CA 93106; C. Kallin's e-mail at McMaster University, Canada, kallin@mcmaster.ca; preprint also available at cond-mat@xxx.lanl.gov (#9812282). 74.80.-g; 74.25.Dw; 75.10.Hk.

K. Verbist, O. I. Lebedev, G. Van Tendeloo, F. Tafuri, F. Miletto Granozio, A. Di Chiara, and H. Bender, "A

Potential Method to Correlate Electrical Properties and Microstructure of a Unique High-T_c Superconducting Josephson Junction." To be published in Appl. Phys. Lett. EMAT, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, BELGIUM; telephone +32 3 2180 249; telefax +32 3 2180 257; e-mail kaverb@ruca.ua.ac.be.

A. Wahl, D. Thopart, G. Villard, A. Maignan, V. Hardy, J. C. Soret, L. Ammor, and A. Ruyter, "c-Axis Magnetoconductivity of Anisotropic Superconducting Single Crystals: The Density of States Fluctuations Scenario." To be published in Phys. Rev. B. Laboratoire CRISMAT, UMR 6508 associée au CNRS, ISMRA et Université de Caen, 6 Boulevard du Maréchal Juin, F-14050 Caen Cedex, FRANCE.

S. Wunderlich, F. Schmidl, L. Dörrer, H. Schneidewind, and P. Seidel, "Improvement of Sensor Performance of High-T_c Thin Film Planar SQUID Gradiometers by Ion Beam Etching." Submitted to IEEE Trans. Appl. Supercond. Institut für Festkörperphysik, Friedrich-Schiller-Universität Jena, Helmholtzweg 5, D-07743 Jena, GERMANY; P. Seidel's telephone +49 3641 947410; telefax +49 3641 947412; e-mail seidel@ifk.uni-jena.de; Web site http://www.physik.uni-jena.de/~tief/. 85.25.Dq.

K. Yamafuji, T. Fujiyoshi, and T. Kiss, "Effect of Flux Pinning on the Nernst and Ettingshausen Effects in High-T_c Superconductors." To be published in Physica C (in press). Ariake National College of Technology, Omuta 836-8585, JAPAN; telephone +81 944 53 8601; telefax +81 944 53 1361; e-mail yamafuji@ariake-nct.ac.jp. Key words: high-T_c superconductors, flux pinning, Nernst effect, Ettingshausen effect, glass-liquid transition. 74.60.Ge; 74.25.Fy.

In-Sang Yang, Bo-Youn Chang, and Gun Yong Sung, "Raman Study of the 90° Grain Boundaries in $YBa_2Cu_3O_{7-\delta}$ Thin Films." To be published in Physica C (in press). Department of Physics, University of Illinois, 1110 W. Green Street, Urbana, IL 61801; telephone (217) 244-4085; telefax (217) 244-8544. Key words: Raman spectra, $YBa_2Cu_3O_{7-\delta}$ film, 90° grain boundaries, stress. 78.30.Er; 74.72.Bk; 74.25.Kc.

COMING EVENTS

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

June 21 - 25, 1999: The 7th International Superconductive Electronics Conference (ISEC'99), Berkeley, California. One in a series of biennial conferences specifically on superconductive electronics. Conference is held in odd-numbered years and the location circulates among Japan, Europe, and the US. Topics cover all electronics applications, including underlying theory and practical realization. No parallel oral sessions in the main conference. Topics are: SQUID sensors and applications, processing technology, junction fabrication, detectors and mixers, HTS digital, LTS digital, ADC and DAC circuits, analog filters and communication circuits, NMR and MRI, single-frequency sources, and other analog devices and circuits. Appended to the conference this year will be a day of parallel optional workshops (June 25), in which details of particular applications and the related technologies will be discussed in depth. Attendance at the workshops requires an additional registration fee. The following topics are tentatively scheduled for workshop: HTS fabrication, LTS fabrication, SQUID devices, SQUID applications, microwave devices, microwave applications, digital and analog/digital circuits, and digital systems. **Abstract deadline, February 15, 1999; early registration deadline, April 30, 1999.** For information, contact Ted Van Duzer, Conference Chairman, EECS Department, University of California, Berkeley, CA 94720-1770; telephone (510) 642-3306; telefax (510) 643-8194; e-mail vanduzer@eecs.berkeley.edu. Or contact Conference Administration, Centennial Conferences, 4800 Baseline Road A-112, Boulder, CO 80303; telephone (303) 499-2299; telefax (303) 499-2599; e-mail centennial@orci.com. Information also available at inqueries@isec99.org or the Web site www.isec99.org.

July 11 - 12, 1999:* 16th Space Cryogenics Workshop, Quebec City, Canada. Theme will be "Cryogenics for Space Exploration in the Next Millennium," with a focus on the particular technological challenges related to long-term space exploration missions. (This workshop precedes the CEC/ICMC'99 Conference in Montreal.) Selected papers to be published in a special issue of Cryogenics. **Abstract deadline, March 1, 1999, pre-registration deadline, June 1, 1999. For information, contact Louis J. Salerno, Chair, 1999 Space Research Workshop, NASA Ames Research Center, Mail Stop 234-1, Moffett Field, CA 94035-1000; telephone (650) 604-3189; telefax (650) 604-0487; e-mail lsalerno@mail.arc.nasa.gov.

†Aug. 29 - Sept. 10, 1999: NATO Advanced Study Institute (ASI) on Microwave Superconductivity, Millau, France. This ASI will cover microwave properties of superconductors, fabrication and measurement of superconducting devices, circuits which operate at microwave frequencies, and technological issues and market potential of all current and emerging microwave applications. Free room and board and other possible subsidies are available to students and recent Ph.D.s resident in NATO and FSU countries. Directors: Martin Nisenoff (NRL) and Harold Weinstock (AFOSR). **Application deadline, February 1, 1999.** For information and application, visit Web site www.geocities.com/Pentagon/Quarters/9088 or contact Sandy Ronayne, AFOSR/NL, 801 N. Randolph St., Room 732, Arlington VA 22203-1977; e-mail sandy.ronayne@afosr.af.mil. **†(Note changed venue and extended abstract deadline.)**

Sept. 27 - 30, 1999: Conference intends to address the recent developments and improvements in the science and engineering of superconductivity and magnetism and their applications. Themes are designed to attract researchers and educators to share their recent findings and techniques in these fields. The main focus of the conference will be physics, materials science, and applications of magnetic and superconducting materials. Topics will include production, synthesis, and physical chemistry; microstructure; physical properties; flux dynamics; special magnetism; mathematical modeling; and applications. **Abstract deadline, January 31, 1999.** Graduate students and young researchers under 40 are encouraged to participate in the Young Researcher Award Competition. For information, contact The Secretariat,Magnet Research Laboratory, Department of Physics, Sharif University of Technology, P.O. Box 11365-9161, Tehran, Iran; telephone and telefax +98 21 6019246; e-mail msm-99@sina.sharif.ac.ir; Web Site http://www.sharif.ac.ir/~msm-99.

Oct. 17 - 22, 1999:* Fifth Symposium on Low Temperature Electronics – 196th Electrochemical Society Meeting, Honolulu, Hawaii. Symposium is intended to provide a forum for discussion of the latest developments and evolution in the field of low-temperature electronics. Besides providing an opportunity to review developments since the last symposium, it will focus on new aspects of electronic materials, devices, and systems operating at cryogenic temperatures. Will consist of both invited and contributed papers. Contributed papers are solicited in the following areas: 1) Fundamentals: theoretical limitations and restrictions, physical phenomena, new low temperature effects; 2) Devices: semiconductor components, infrared components, optoelectronic devices, hybrid and monolithic integration, nanostructures and novel devices, processing, modeling, etc.; 3) Circuits: integrated circuits; digital and analog, charge-coupled devices and read out circuits, low temperature systems, design considerations; 4) Systems: packaging, assembly and interconnections, reliability performance, low-room temperature interfaces, heat transfer and refrigeration systems, device and system testing; and 5) Applications: computer and telecommunications, space applications, infrared astronomy, instrumentation, low-temperature measurement systems. **Abstract deadline, March 1, 1999. Suggestions and inquiries should be sent to W. D. Brown, University of Arkansas, 3217 BELL, Fayetteville, AR 72701; telephone (501) 575-6045; telefax (501) 575-7967; e-mail wdb@engr.uark.edu.

RESOURCES

Information

New Books: *Photoemission Studies of High-Temperature Superconductors,* by David W. Lynch and Clifford G. Olson. Book describes the current status and results of photoelectron spectroscopic techniques, both theoretical and experimental, that have been applied to the study of the cuprate superconductors. The techniques described include angle-resolved photoelectron spectroscopy of valence electrons, core-level spectra (XPS), and some special variations such as resonance photoemission. Book discusses difficulties in interpreting such spectra, problems obtaining good sample surfaces and high resolution, and includes comparison of photoemission results to other experimental techniques. Authors also outline expected future developments in the techniques. Readership: graduate students and researchers in physics, chemistry, and materials science, with an interest in high-temperature superconductors. Publ. 1998; 444 pp.; price $100.00; ISBN 0-521-55189-7.

Superconductivity and Superfluidity, by T. Tsuneto. This graduate-level text describes the physics of superconductivity and superfluidity. In the first part of the book, the author presents the mean field theory of generalized pair condensation followed by a description of the properties of ordinary superconductors using BCS theory. The book then discusses strong-coupling theory, the Ginzburg-Landau theory, and the properties of superfluid helium 3. Recent topics in the field, such as the cuprate high-temperature superconductors and exotic superconductivity of heavy fermion systems, are discussed in the final chapter. Readership: graduate students and researchers in condensed-matter physics, especially those working in superconductivity and superfluidity. Publ. 1998; 224 pp.; price $69.95; ISBN 0-521-57073-5.

For information, contact the Customer Service Department, Cambridge University Press, 110 Midland Avenue, Port Chester, NY 10573; telephone (800) 872-7423; telefax (914) 937-4712; e-mail orders@cup.org; Web site http://www.cup.org.

FYI

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Position Open: Two experimental-scientist positions in the materials-processing field are available at the Chinese University of Hong Kong. Experience in superconductivity is an advantage. Starting weekly salary is appoximately U.S. $890; initial contract is for two years (renewable). Send application by e-mail or otherwise to Prof. John K.F. Yau, Materials Science, Department of Physics, Chinese University of Hong Kong, Shatin, N.T., Hong Kong; telephone +852 2609 6278; telefax +852 2603 5204; e-mail kfyau@phy.cuhk.edu.hk.

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