

Technical report, M. Onellion

In Refs. 1-2, we study the effects of irradiation-induced disorder on electronic properties of cuprates. Refs. 3-4 studies, both with optics and photoemission, the evolution of superfluid density with doping. Refs. 5-6 show the first results of growing cuprate films for in-situ photoemission measurements at a synchrotron. Refs. 7-11 discuss different aspects of disorder and doping on cuprate superconducting optical and electronic properties. Ref. 12 reports the first results in studying ruthenocuprates using synchrotron techniques. Refs. 13-14 discuss additional effects of temperature and disorder on cuprate photoemission spectra. Ref. 15 discusses the effect of strain on YBCO-123 cuprate films. Refs. 16-17 use our single crystals to obtain optical and transport information on cuprate superconducting properties. Refs. 18-19 report on our improving thin film capability for in-situ measurements. Ref. 20 compares magnetic and electronic properties of superconducting ruthenocuprates. Refs. 21-22 discuss photoemission measurements from in-situ grown films, including the first report of a metallic Fermi edge from such films. Ref. 23 reports on carrier dynamics in cuprates. Ref. 24 further investigates the superfluid density in cuprates. Refs. 25 and 27 reports on different magnetic interactions in ruthenocuprates. Ref. 26 reports on structural studies of strained cuprate films. Refs. 28-29 report on more systematic studies of carrier dynamics in cuprates.

DOE Patent Clearance Granted

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Office of Intellectual Property Law

DOE Chicago Operations Office

*Apr. 9, 2003*  
Date

#### 29 refereed journal publications

1. "Electronic structure and doping in cuprate superconductors," M. Onellion, NATO-ASI 371, 209 (1998).
2. "Irradiation induced disorder in high  $T_c$  cuprates- electronic band structure study," I. Vobornik, C. Quitmann, M. Zacchigna, F. Zwick, M. Gioni, A. Karkin, R.J. Kelley, M. Onellion and G. Margaritondo, Surf. Sci. 402-405, 761 (1998).
3. "Superfluid and normal fluid density in high- $T_c$  superconductors," D.B. Tanner, H.L. Liu, M.A. Quijada, A.M. Zibold, H. Berger, R.J. Kelley, M. Onellion, F.C. Chou, D.C. Johnston, J.P. Rice, D.M. Ginsberg and J.T. Markert, Physica B 244, 1 (1998).
4. "Evolution of the quasiparticle spectral function in cuprates," Shashank Misra, R. Gatt, T. Schmauder, Andrey V. Chubukov, M. Onellion, M. Zacchigna, I. Vobornik, F. Zwick, M. Gioni, G. Margaritondo, C. Quitmann and C. Kendziora, Phys. Rev. B 58, R8905 (1998).
5. "Pulsed Laser Deposition for in-situ photoemission studies on  $YBa_2Cu_3O_{7-x}$  and related oxide films," T. Schmauder, B. Frazer, R. Gatt, X.X. Xi, M. Onellion, D. Ariosa, M. Gioni, G. Margaritondo and D. Pavuna, SPIE, in press (1998).
6. "Electronic properties of layered oxides- pulsed-laser deposition of YBCO films for in-situ studies by photoemission spectroscopy," D. Pavuna, D. Ariosa, H. Berger, S. Christensen, B. Frazer, R. Gatt, M.