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Theoretical Study of Orthorhombic Distortions in High-Temperature Superconductors ANDREAS SCHNYDER, Paul Scherrer Institute, CH-5232 Villigen PSI, Switzerland, DIRK MANSKE, Max Planck Institut für Festkörperforschung, Heisenbergstrasse 1, D-70569 Stuttgart, Germany, CHRISTOPHER MUDRY, Paul Scherrer Institute, CH-5232 Villigen PSI, Switzerland, MANFRED SIGRIST, Institut für Theoretische Physik, ETH Zürich, Hönggerberg, CH-8093 Zürich, Switzerland — Using a Fermi-liquid-based theory we calculate the response function for various spectroscopic probes in hole-doped high-T_C superconductors, and determine the effects of orthorhombic distortions in the crystal lattice and asymmetry in the superconducting gap function. Employing the two-dimensional one-band Hubbard model and a generalized RPA-type theory we consider anisotropic hopping parameters ($t_x \neq t_y$) and a mixing of d- and s-wave symmetry of the superconducting order parameter. Within this model, both the electronic Raman spectra and the dynamical magnetic susceptibility [1] are studied in detail. The relevance of these calculations to electronic Raman scattering measurements and inelastic neutron scattering experiments [2] on untwinned $YBa_2Cu_3O_{6+x}$ are discussed. [1] A. P. Schnyder, D. Manske, C. Mudry, and M. Sigrist, cond-mat/0510790. [2] V. Hinkov, S. Pailhes, P. Bourges, Y. Sidis, A. Ivanov, A. Kulakov, C. T. Lin, D. P. Chen, C. Bernhard, and B. Keimer, Nature **430**, 650 (2004).

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