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Nonlinear Electron-lattice Coupling Solution to High Temperature Superconductivity in Cuprates DENNIS NEWNS, RAZVAN NISTOR, GLENN MARTYNA, MARTIN MUESER, CHANG TSUEI, IBM T.J. Watson Research Center — Resolving the High Temperature Superconductivity problem requires understanding both pseudogap and superconducting phenomenologies. Here we present a model, the Fluctuating Bond Model (FBM) based on strong, local, nonlinear electron-lattice coupling and now including long range Coulomb interactions (LRCI), which can claim to achieve this requirement. We summarize the results on the pseudogap temperature scale T^* and pseudogap doping dependence, relating them to low temperature STM experiments ("C4 symmetry breaking") and to ARPES data ("arcing" of the Fermi surface). We also summarize results on the doping dependence of the superconducting T_c and the isotope shift. We conclude with a list of challenges to be met by theory.

D.M.Newns and C.C. Tsuei, Nature Physics **3**, 184 (2007).

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