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A DFT study of electron-phonon mediated superconductivity in doped Mott-Hubbard proxy cubic-tetragonal copper monoxide PAUL GRANT, W2AGZ Technologies — We report our preliminary study of electron-phonon mediated Cooper pairing as a component underlying high temperature superconductivity, in the presence of a Hubbard U driven antiferromagnetic ground state, subject to itinerant carrier doping, in the copper oxide perovskites. Our model is based on a proxy CuO fcc cubic-tetragonal structure that contains the basic physics of the electronic structure of copper oxide perovskites readily amenable to numerical analysis. We explore its phase diagram as a function of carrier concentration and coulomb repulsion ranging from the pure Mott-Hubbard AF insulating state to that of a metallic Fermi liquid, focusing on those conditions which might manifest high temperature superconducting behavior. In the Fermi liquid state, we find clear evidence that superconductivity arises from Jahn-Teller instabilities in the CuO bond which guided Bednorz and Mueller on the path to their 1986 discovery.

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