An intermediate model for cuprates SHIU LIU, STEVEN WHITE, UC, Irvine — We propose an effective two-band model, which is similar to the model considered previously by Frenkel, Gooding, Shraiman, and Siggia (PRB 41, number 1, page 350), for describing high-T_c superconducting cuprates. Instead of rotating away all oxygen states to construct the effective sites in the Hubbard or t-J model, we keep all oxygens allowing the hopping of the doped holes under an antiferromagnet background on the copper sites. This approach will be useful to explain STM experimental data which resolves the oxygen atoms (for example, Hanaguri et al Nature 3, 865. 2007). The magnitudes of the interactions in two-band model are derived from a three-band Hubbard model with reasonable parameters by applying numerical canonical transformations with appropriate truncations. The proposed two-band model is studied by applying DMRG calculation for different lattices, such as ladders, and the results are compared with same calculations done for three band model.

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