

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

The effect of charge transfer fluctuation on superconductivity in high temperature superconductors¹ YIHSUAN LIU, HUAN-KUANG WU, TING-KUO LEE, Academia Sinica — *High-T_c* Cuprates have been studied quite often as an effective one band $t - J$ model that neglects charge fluctuation between oxygen $2p^6$ band and copper $3d^{10}$ band, and Zhang-Rice singlet is just a hole in the model. However, recent Scanning Tunneling Spectra(STS) measurement on underdoped Cuprate shows that charge transfer gap is only of order 1.2 eV. This small gap necessitates a re-examination of the charge transfer fluctuation. Here we modify the t - J model by including charge transfer fluctuation allowing the formation of doubly occupied sites. For certain parameters it is similar with the t - J - U model. This model is studied via variational Monte Carlo method(VMC). Our result shows that this model can give a unified behavior of superconducting dome with different long range hopping parameters. The anti-correlation between charge transfer gap and pairing is also confirmed. More interestingly the charge fluctuation is found to affect pairing order parameter in different ways in underdoped and overdoped regions.

¹This work is partially supported by Taiwan Ministry of Science and Technology with Grant. MOST 105-2112-M-001-008 and calculation was supported by a National Center of High Performance Computing in Taiwan

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Date submitted: 11 Nov 2016

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