

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Variational Monte-Carlo study for the pairing mechanism and symmetry of superconducting copper-oxide monolayer films on Bi-cuprates¹ FAN YANG, CHEN LU, Beijing Institute of Technology, TAO XIANG, Institute of Physics, Chinese Academic of Science — The recent STM experiments suggest a U-shape pairing gap for the superconducting copper-oxide monolayer films on the $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ [Science Bulletin 2016,61(16):1239-1247]. To explore the physical origin of this U-shape gap, we performed a variational Monte-Carlo (VMC) study for the possible pairing symmetry on the t-t'-J model over a wide doping region and parameter range. Our VMC results suggest that in a physically reasonable doping region and parameter range for the model, the standard d-wave pairing is robustly the leading pairing symmetry, with the possibilities of s-wave and the d+is wave pairing symmetries ruled out. Our results excluded the possibility of s-wave or s-wave component driven by antiferromagnetism in the material. Other possibilities of the origin of the U-shape gap in the system will also be discussed.

¹This work is supported by the NSFC under the Grant No.11274041 and 11334012

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Date submitted: 11 Nov 2016

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