Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Competition between antiferromagnetism and superconductivity: a quantum Monte Carlo study** TIANXING MA, 1, Department of Physics, Beijing Normal University, Beijing 100875, China 2, Department of Physics, University of California, San Diego, California, DA WANG, School of Physics, Nanjing University, Nanjing, 210093, China, CONGJUN WU, Department of Physics, University of California, San Diego, California 92093, USA — Among correlated materials, the vicinity between various magnetic orders and superconductivity is one of the most notorious issues, which is present in high temperature superconductors like doped cuprates and ironpnictides, as well as in organic superconductors. In a multi-band Hubbard model, or, equivalently, a large-spin Hubbard model, it has been shown that the sign problem of quantum Monte Carlo simulations can be removed at arbitrary fillings in a wide parameter regime, which offers the unique opportunity to perform a detailed unbiased analysis of the competition between antiferromagnetism and superconductivity. Within this framework, we performed QMC simulations to investigate the phase diagram as doping and interaction strength, and our nonbiased numerical results reveal that the antiferromagnetic long-range order can be realized around doping 0˜0.06, and the maximal superconducting pairing correlation is brought by doping, which occurs around the optimal doping 0.30, and then decreases in both the underdoped and overdoped regimes.

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Date submitted: 05 Nov 2015 Electronic form version 1.4