

Abstract Submitted  
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**Determinant Quantum Monte Carlo simulations on quantum magnetism of the  $SU(2N)$  ultra-cold fermions**<sup>1</sup> DONG ZHENG, Department of Physics, Tsinghua University, HSIANG-HSUAN HUNG, Department of electrical and computer engineering, University of Illinois at Urbana-Champaign, ZI CAI, CONGJUN WU, Department of Physics, University of California, San Diego — We investigate the quantum magnetism of the repulsive  $SU(2N)$ -Hubbard model on a two-dimensional square lattice at half-filling. At  $2N = 4$ , our numerical results suggest that there exists a long-range Neel ordering at large  $U$ . In this regime, both of the antiferromagnetic structure factor per site and the farthest two-point spin-spin correlation functions are saturated to finite values in the thermodynamic limit. The single-particle excitations are finite and the spin gaps vanish. All of above evidences support the presence of the Neel ordering in the  $SU(4)$ -Hubbard model. For  $2N > 4$ , such features are not explicitly observed.

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