Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Quantum simulation of correlated-hopping models with fermions in optical lattices**[1] M. DI LIBERTO, Utrecht University, C.E. CREFFIELD, Universidad Complutense de Madrid, G.I. JAPARIDZE, Ilia State University, C. MORAIS SMITH, Utrecht University — By using a modulated magnetic field in a Feshbach resonance for ultracold fermionic atoms in optical lattices, we show that it is possible to engineer a class of models usually referred to as correlated-hopping models. These models differ from the Hubbard model in exhibiting additional density-dependent interaction terms that affect the hopping processes. In addition to the spin-SU(2) symmetry, they also possess a charge-SU(2) symmetry, which opens the possibility of investigating the $\eta$-pairing mechanism for superconductivity introduced by Yang for the Hubbard model. We discuss the known solution of the model in 1D (where $\eta$ states have been found in the degenerate manifold of the ground state) and show that, away from the integrable point, quantum Monte Carlo simulations at half filling predict the emergence of a phase with coexisting incommensurate spin and charge order.

[1]This work was supported by the Netherlands Organization for Scientific Research (NWO) and by the Spanish MICINN through Grant No. FIS-2010-21372 (CEC).

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Date submitted: 15 Nov 2013 Electronic form version 1.4