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Dynamical simulation of spin-density-wave states in triangular-lattice Hubbard model KIPTON BARROS, Los Alamos National Laboratory, CRISTIAN BATISTA, University of Tennessee, GIA-WEI CHERN, University of Virginia — We present a numerical framework for the dynamical simulation of quantum states with spin-density wave (SDW) order. Within a semiclassical approximation that retains electronic degrees of freedom, we demonstrate that the SDW order parameter field obeys a generalized Landau-Lifshitz (gLL) equation. To simulate this dynamics, we use the kernel polynomial method to solve the electron density matrix at every time step. Our linear scaling approach enables dynamical gLL simulations with $N \approx 10^5$ lattice sites. We apply our method to the triangular-lattice Hubbard model, and outline a phase diagram for filling fractions $n = 1/2$ and $3/4$. Our results at small and large Coulomb repulsion U agree with those obtained from analytical calculations. At intermediate U we uncover several intriguing SDW phases, including incommensurate structures.

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