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The itinerant ferromagnetic phase of the Hubbard model
GIUSEPPE CARLEO, SAVERIO MORONI, FEDERICO BECCA, STEFANO BARONI, SISSA and CNR-IOM DEMOCRITOS - Trieste, Italy — Using a newly developed quantum Monte Carlo technique, we provide strong evidence for the stability of a saturated ferromagnetic phase in the high-density regime of the two-dimensional infinite-U Hubbard model. By decreasing the electron density, a discontinuous transition to a paramagnetic phase is observed, accompanied by a divergence of the susceptibility on the paramagnetic side. This behavior, resulting from a high degeneracy among different spin sectors, is consistent with an infinite-order phase transition. The remarkable stability of itinerant ferromagnetism renews the hope to describe this phenomenon within a purely kinetic mechanism and will facilitate the validation of experimental quantum simulators with cold atoms loaded in optical lattices.

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