Abstract Submitted
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Probing ferromagnetism with few-fermion correlated spin-flip dynamics[1] GEORGIOS KOUTENTAKIS, ZOQ, CUI, Univ Hamburg, SIMEON MISTAKIDIS, ZOQ, Univ Hamburg, PETER SCHMELCHER, ZOQ, CUI, Univ Hamburg — According to the Stoner instability, the ferromagnetic phase of a spin-1/2 Fermi system occurs for strong interparticle repulsion, resulting in the occupation of states with anti-oriented spins being energetically forbidden. However, the clean realization of a ferromagnetic phase in quantum gases verifying this viewpoint is elusive. We unravel the stability of a fully polarized one-dimensional ultracold few-fermion spin-1/2 gas subjected to inhomogeneous driving of the itinerant spins. The existence of a ferromagnetically ordered regime for interaction strengths comparable to the confinement energy is revealed. Within the latter regime, the two-body spin-spin correlator unveils that the itinerant spins remain close to be maximally aligned throughout the dynamics, despite the magnitude of the polarization fluctuating between zero and unity. This implies that the interaction alone is not able to stabilize the spin polarization and hence the magnetization of a trapped Fermi gas.

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