

Abstract Submitted
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Interplay of Phase Separation and Itinerant Magnetism in the Correlated Dynamics of Few Fermions Confined in a Double-Well¹ GEORGIOS KOUTENTAKIS, SIMEON MISTAKIDIS, PETER SCHMELCHER, University of Hamburg — We explore the stability of the phase separation phenomenon in few-fermion spin-1/2 systems confined in a double-well potential. It is shown that within the SU(2) symmetric case, where the total-spin is conserved, the phase separation cannot be stabilized. An interaction regime characterized by metastable phase separation emerges for intermediate interactions which is inherently related with the ferromagnetic spin-spin correlations emanating within each of the wells. The breaking of the SU(2) symmetry crucially affects the stability properties of the system as the phase-separated state can be stabilized even for weak linear gradients of the magnetic potential. Our results imply a more intricate relation between phase separation and ferromagnetism that lies beyond the view of the Stoner instability.

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