

Abstract Submitted
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Fermions in a harmonic trap with spin-imbalanced filling¹ DENIS MORATH, STEFAN A. SOEFFING, SEBASTIAN EGGERT, Univ. of Kaiserslautern — In recent experiments with ultra-cold fermions it was possible to prepare states with imbalanced pseudo-spin fillings, analogous to electrons in quantum dots. This offers the opportunity to make controlled studies of the influence of finite interactions, spin filling and temperature on the density of confined fermions, We now consider the situation in a one-dimensional trap theoretically and with numerical quantum simulations (quantum Monte Carlo and DMRG). Already for three particles in a trap there is a surprising alignment of spin up and down particles with a rather dramatic effect of the temperature. Naively an antiferromagnetic correlation between the spin species should be expected for repulsive interactions, i.e. density maxima of spin-up should correlate in space with spin-down minima and vice versa. However, already very low finite temperatures can induce *ferromagnetic* correlations. Based on the analysis of few particle situations and symmetry considerations we can also explain the behaviour of many particle systems.

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