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Strongly interacting mixtures in 1D box traps: nonequilibrium dynamics and symmetry breaking

jeudi 8 février 2024 12:00 (30 minutes)

My talk focuses on strongly repulsive one-dimensional gases consisting of two-equally balanced spin components under a box confinement. We describe these systems using a generalized Tonks-Girardeau ansatz for the many-body wave function [1, 2].

In particular, we are interested in the nonequilibrium dynamics induced by the initial separation of the spin components and the subsequent evolution of the system at strong interactions. First, we extend the results of Ref.[3] to a time-dependent system and show how rigid borders of the trapping potential lead to the appearance of finite-size oscillations in the tails of the momentum distribution, the amplitude of which depends on time-dependent spin coherence.

Second, we highlight the role of the symmetry by comparing SU(2) fermions with SU(2)-breaking bosons with an interaction imbalance.

[1] F. Deuretzbacher et al., PRL, 100, 160405 (2008);
[2] A.G. Volosniev et al., Nat. Comm., 5, 5300 (2014);
[3] G. Aupetit-Diallo, SM et al., PRA, 107, L061301 (2023).

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