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Ultracold atomic gases and condensed matter

Mini-colloque *PM5*

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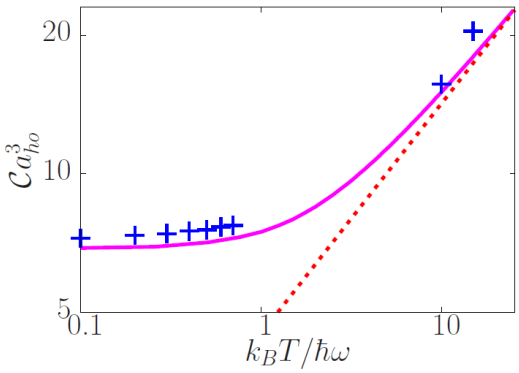
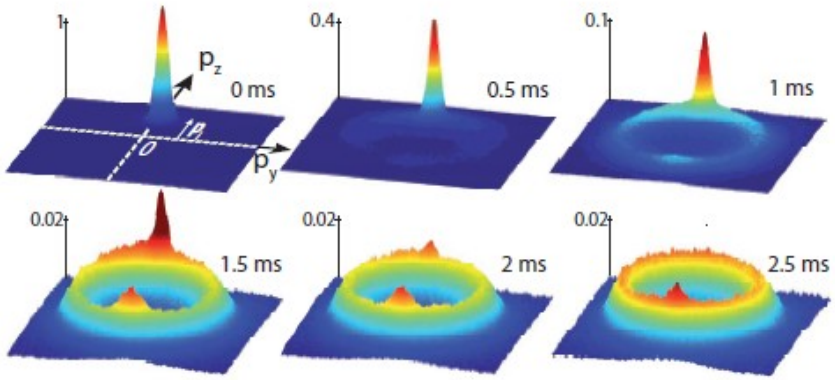
Recent experimental progresses with ultracold atomic waveguides provide spectacular advances in the realization of new confining geometries, excitation tools and experimental observables. Few examples include the realizations of ring traps, linear waveguides, two-reservoir geometries. The possibility of applying a controllable disorder, of tuning the sign and the strength of interactions make these systems ideal candidates for simulating ultracold atoms counterparts of condensed matter systems and devices. Further, a challenging new direction is the interfacing of ultracold atoms with solid-state and photonic components, with applications ranging to the storage of information or to the realization of opto-mechanical devices.

In this mini-colloquium we plan to put together experts of ultracold atoms and condensed matter, both theorists and experimentalists, to explore the effects of confinement, interactions, disorder and dimensionality in the equilibrium and dynamical properties, from the fundamental aspects of quantum many-body systems to the applications for new atom-based devices.



Tan's contact for one-dimensional strongly interacting bosons at finite temperature, [from Physical Review Letters 110, 020403 (2013)] .



Coherent backscattering of ultracold atomic gases [from Physical Review Letters 109 (2012) 195302]

Mots clés : ultracold atoms ; condensed matter ; low dimensional systems ; quantum many-body systems.