CFEL SCIENCE

SEMINAR

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Building 49, Seminar Room (108)

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Low-dimensional quantum gases on an atom chip

The typical geometry of a wire trap on an atom chip implicates very elongated traps and allows the realization of ultracold one-dimensional quantum gases of bosons. Their behavior fundamentally differs from three-dimensional Bose-Einstein condensates because no full long range order can be established. These so called "quasi-condensates" are hence marked by a diminished first order coherence, which can be observed by a density correlation measurement in expansion or an interference experiment using two independent elongated Bose gases.

In this talk the experimental realization of such systems and their special quantum phases not existing in a three-dimensional bosonic cloud are introduced. Furthermore the realization of two tunnel-coupled quasi-condensates in equilibrium is presented. This allows the investigation of phase locking mechanisms due to coupling, which can lead to enhanced phase coherence in the system. A profound knowledge of these phenomena is essential for possible future applications of one-dimensional Bose gases in interferometers.

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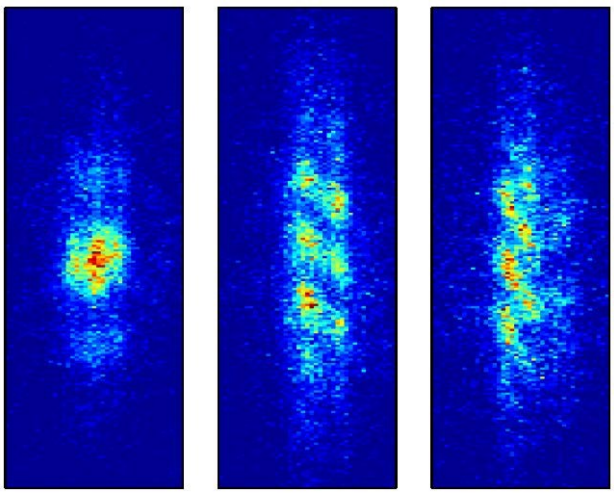

Host: Melanie Schnell, CFEL Molecular Physics Seminar