SFB/TRR 21 - Seminar

20. Oktober 2015, Ulm

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Optical control of Feshbach Resonance

Optical control of atomic interaction is a long sought goal in cold atom research. Former works report short lifetimes and parasitic dipole force that limit the applications. Based on a far detuned laser operated at a magic wavelength, we demonstrate a scheme that resolves both issues: zero dipole force and >1 second condensate for an optical variation of scattering length of >180 Bohr [1].

To demonstrate new prospects of quantum gas research with optically controlled interactions, we modulate scattering length over a very wide time scale of mili-second to nano-second, which shows many features. We also vary atomic interaction locally, and observe interesting partial collapse dynamics of the condensate.

[1] Quantum dynamics with spatiotemporal control of interactions in a stable Bose-Einstein condensate Logan W. Clark, Li-Chung Ha, Chen-Yu Xu, Cheng Chin Phys. Rev. Lett. 115, 155301 (2015)

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