EINLADUNG
ZUM LASER- UND QUANTENOPTIKSEMINAR

Am Freitag, 24.05.2013 um 10:00 Uhr
Raum 46/387-388

Es spricht: PD Dr. Alexej I. Streltsov
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Thema:
”Towards quantum systems with customized inter-particle interactions”

Recent experiments with ultra-cold polarized clouds of chromium $^{52}$Cr dysprosium $^{164}$Dy and erbium $^{168}$Er can be considered as a very successful step towards control and manipulation of the overall shape of the inter-particle interaction potentials. The perspective of working with quantum systems where the inter-particle interaction is customized encourages us to get a deeper insight on a role it plays. The role of the sign is evident: if it is negative - the system is attractive, if it is positive - repulsive, but what roles are playing its range and tails? What physical phenomena or properties they are envisioned to impact? Here we theoretically show that strong inter-particle repulsion inevitably leads to macroscopic multi-hump fragmentation of trapped Bose-Einstein condensates in the ground state. The fragmentation phenomenon is universal - it takes place in traps of different dimensionality and topologies and for very broad classes of repulsive inter-particle potentials. A particular scenario of fragmentation, namely, the number of fragments, their shapes and occupations, is controlled by the ratio between the length of the trap and width of the inter-particle interaction function. The tails of the interaction function are found to be responsible for melting or blurring of the fragmentation.

Der Gast wird betreut von Prof. Dr. M. Fleischhauer

GÄSTE SIND HERZLICH WILLKOMMEN!