



PHYSIKALISCHES KOLLOQUIUM

EINLADUNG

23.6.2009/Wh

Am Montag, dem 29.6.2009, 16.15 Uhr in W2-1-148

spricht

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über

“Coherent control of dressed matter waves”

ABSTRACT:

Experiments with ultracold atoms in optical lattices now allow one to probe quantum dynamics with unprecedented precision. In particular, strong driving of a periodic potential can lead to a reduction or even complete suppression of tunneling between the lattices wells. In our experiments with Bose-Einstein condensates in strongly driven ("shaken") optical lattices we have demonstrated this tunneling suppression and found that the coherence of the wavefunction can be preserved if the parameters of the driving are chosen appropriately. This allowed us to load the condensate adiabatically into a single Floquet state of the driven system and to explore the properties of the resulting "dressed matter waves". In particular, in a three-dimensional lattice we have seen strong evidence that the superfluid-to-Mott insulator quantum phase transition can be induced through the strong driving, as suggested by previous theoretical work done in Oldenburg.

Einladender: Martin Holthaus