

QUANTUM OPTICS SEMINAR



Title: Freezing by shaking: Dynamical control of matter-wave tunneling in periodic potentials

Speaker: Oliver Morsch,
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Time: Monday, January 14 at 13:15

Place: 1525-323

Abstract:

The tunneling of particles through a classically forbidden barrier between two potential wells is a hallmark of quantum physics. A particle initially trapped on one side of the barrier can "decay" to the other side, and intuitively one would expect that decay to be accelerated if the system is disturbed. Surprisingly, it turns out that certain kinds of disturbances can actually reduce the tunneling and even suppress it completely. We have observed this dynamical suppression of tunneling in periodically "shaken" optical lattices filled with Bose-Einstein condensates. In my talk I shall discuss these findings and their theoretical background and also present recent results in which tunneling is first suppressed by tilting the lattice and then resuscitated by shaking it, an effect which is analogous to photon-assisted tunneling in solid state physics.

Michael Drewsen