SFB/TRR 21 - Colloquium

8. Februar 2013, Stuttgart

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Light and Motion on a Lattice: Dynamics of Optomechanical Arrays

The field of cavity optomechanics studies the interaction of light and nano- or micromechanical motion. A large variety of experimental implementations exist. Photonic crystal systems are particularly promising, due to their large coupling strengths, small size, flexible design, and high mechanical frequencies that make it easier to reach the quantum regime.
In this talk I will review some of our recent theoretical work on the dynamics of light and motion in future optomechanical arrays based on photonic crystals. For example, a blue-detuned laser drive can drive the mechanical oscillators into self-sustained oscillations, and we study how the phases of those oscillators influence each other. This leads to complex behaviour which is only now being explored, both in the classical and in the quantum domain. Synchronization and nonequilibrium phase transitions driven by quantum noise are but two examples.

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