

# Allgemeines Physikalisches Kolloquium

Donnerstag, 25.06.2015 um 16 Uhr c.t.

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## Light force devices on a chip

The enormous increase in data generating and processing devices in recent years has led to intense efforts to drastically increase information processing power. While electrical devices are predicted to reach intrinsic boundaries in the not too far future, using optical approaches will provide almost unlimited bandwidth and speed to emerging integrated optical circuits. Besides carrying energy for information processing light also allows for applying physical pressure via momentum transfer. Radiation pressure forces exerted by photons are generally considered to be too weak for real-world applications. The picture changes, however, when moving to nanoscale dimensions, at which considerable momentum transfer can result from illumination with light. Here I will describe a chip-scale framework in which optical forces can be exploited as an efficient driving and sensing mechanism for nanoscale resonators. Besides allowing for unprecedented measurement sensitivity, such optomechanical interactions provide a new paradigm for tunable nanophotonic components. I will present recent progress on circuit optomechanics and illustrate how this platform can be extended towards on-chip quantum optics. In these systems components for generating, manipulating and detecting smallest optical intensities are united to provide the tools for next-generation optical signal processing on a chip.

