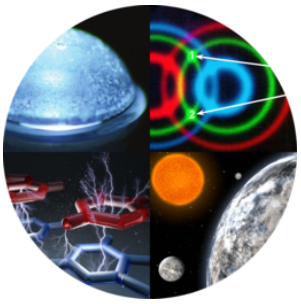

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Physics of high Q microresonators: From Quantum Mechanics of Macroscopic Objects to Chipscale Frequency Combs

Prof. Dr. Tobias Kippenberg, *EPFL, Lausanne, Switzerland*

Monday, 19 April 2021, 17:15 h
https://tum-conf.zoom.us/j/93234766313 Meeting-ID: 932 3476 6313 Password: Kolloquium
Please install the software in advance.

The quest for ultra-low dissipation systems is of relevance in precisions measurements in Physics, as well as technological applications, determining decoherence rate, phase noise or field enhancements. Over the past two decades research in optical microcavities has enabled to achieve ultra low dissipation, that is ultra-high Q, and thereby to explore a host of novel phenomena related to confinement of light: ranging from radiation pressure to parametric interactions of photons. The former, radiation pressure coupling has allowed optomechanical phenomena, and the limits imposed by quantum mechanics on continuous interferometric displacement measurements, to be explored. Although mechanical oscillator are ubiquitous in our modern information technology, and used in time-keeping, MEMS accelerometers or in radio frequency filters in cell-phones, accessing and manipulating them in the quantum regime has been challenging. Over the past decade, this has become a reality: Following quantum control of individual isolated quantum systems, the latter has now been extended to macroscopic, engineered mechanical oscillators, owing to the advances in the field of cavity optomechanics.

Moreover, optically driven nonlinear high Q microresonators have heralded a new generation of integrated nonlinear optical devices, including *microcombs* – sources of coherent and broadband frequency combs, that have witnessed rapid advances in a wide range of scientific and technological applications. Such dissipative solitons are coherent phases in driven non-linear systems, and may the potential to impact a wide range of scientific and technological applications.

Taken together, on a broader view, such hybrid integrated nonlinear photonic devices find applications in basic science, to emerging quantum, or state of the art technologies.

Student event: Meet the speaker

*We invite you to a **student-only** discussion-round with Prof. Dr. Tobias Kippenberg before his Munich Physics Colloquium talk.*
Be curious and feel free to ask any question.
Monday, 19 April 2021, 16:00 h,
more information: https://www.moodle.tum.de/course/view.php?id=57309