

**LASER-COOLING AND ENTANGLEMENT WITH MICROMIRRORS:
TOWARDS QUANTUM-OPTO-MECHANICS**

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The quantum regime of mechanical systems offers fascinating new possibilities for both applied and fundamental physics. Quantum optics provides a well- developed tool box to help entering and controlling this regime. I will highlight our recent experiments in Vienna on this topic, in particular the demonstration of laser-cooling of micromirrors that promises cooling capabilities close to the quantum ground state. I will also discuss the prospects and challenges to generate (optomechanical) quantum entanglement, which is an important resource for quantum information processing and is also at the heart of Schrödinger's cat paradox.