

**Fakultät für Mathematik, Informatik und Physik
Universität Innsbruck**

**Ankündigung des öffentlichen Vortrags
(„defensio dissertationis“)**

im Rahmen der abschließenden kommissionellen Prüfung (Verteidigung der
Dissertation) im Doctor of Philosophy - Doktoratsstudium Physik

von

Stefan Ostermann, BSc MSc

über

**“Light-Induced Emergent Quantum Phenomena in
Ultracold Atomic Gases”**

Zeit: Montag, 18. Februar 2019, 14.00 Uhr

Ort: SR1 / ICT-Gebäude

Inhalt:

The development of new techniques to control and manipulate atomic gases with laser light introduced a new era of interdisciplinary physics. In particular, ultracold atom clouds interacting with the modes of optical resonators show a variety of interesting dynamics and features. In this case the direct backaction of the atomic motion onto the resonator modes results in a dynamic optical potential which mediates long-range interactions between the atoms. The resulting collective instabilities lead to novel emergent quantum phases. In this talk I will present my contributions to this growing research field, studying novel emergent phases of matter. I will focus on geometries where the induced quantum phase transitions break a continuous translational symmetry. This leads to particularly interesting phenomena like light-induced crystallization, supersolidity and continuous spin-waves with light-mediated long-range interactions.

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