Contribution ID: **372** Type: **Talk**

【511】A free space selforderd atom-photon crystal

Thursday 24 August 2017 14:00 (30 minutes)

Coherent scattering of light from ultracold atoms involves exchange of energy and momentum so that particles can spontaneously form periodic configurations that simultaneously maximize light scattering and minimize the atomic potential energy. Similar to self-ordering with Bose-Einstein condensates (BECs) inside an optical resonator we study periodic pattern formation in free space by off-resonant counterpropagating, noninterfering lasers. As no spatial light modes are preselected the transition from homogeneous to periodic order amounts to a crystallization of light and ultracold atoms breaking a continuous translational symmetry. In the crystallized state the BEC acquires a phase similar to a supersolid with emergent length scale allowing gapped phononic excitations gapped due to infinte-range interactions.

Primary authors: Prof. PIAZZA, Francesco (MPKS Dresden); Prof. RITSCH, Helmut (Universität Innsbruck); OSTERMANN, Stefan (Universität Innsbruck)

Presenter: Prof. RITSCH, Helmut (Universität Innsbruck)

Session Classification: Atomic Physics and Quantum Optics

Track Classification: Atomic Physics and Quantum Optics