



## Quantum Optics Seminar

**Title:** Qubits, cats and other strange creatures captured in optical lattices.

**Speaker:** Poul Jessen, Optical Sciences Center, University of Arizona

**Time:** Tuesday, October 1, 15.15-16.00

**Place:** Fys. Aud.

**Abstract:**

Over the past decade cold atoms trapped in optical lattices – periodic potentials formed by laser standing waves – have emerged as a powerful tool to implement and study prototype quantum devices, and also to explore foundational issues in quantum mechanics. I will discuss a new project to encode qubits in the ground hyperfine manifold of trapped Cs atoms, and to perform entangling quantum gate operations between them. Of course, the prospects of building small quantum processors in this fashion depend on our general ability to prepare, control and measure the quantum state of atomic spinor wavepackets in optical lattices. To illustrate the degree to which this is possible I will describe some recent experiments to study coherent tunneling in optical double well lattices, and to perform tomographic reconstructions of the quantum state of the atomic spin.

Klaus Mølmer