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# An Apparatus for Atom Interferometry on an Optical Clock Transition with Squeezed States (F)

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Atom Interferometry for gravity measurements is now approaching its precision limits set by the Standard Quantum Limit (SQL) of phase estimation [1]. Within the bounds of the SQL, the minimum statistical uncertainty in gravity measurements scales as $1/\sqrt{N}$ , where N is the number of atoms entering the interferometer. Quantum entanglement is an important resource that can potentially improve this scaling with atom number and therefore the sensitivity of atom interferometers beyond classical limits. In this context I will present a recently developed apparatus for the production of entangled squeezed states of strontium atoms that can be injected in a matter-wave interferometer with separated arms. The core of the apparatus is a high-finesse optical ring cavity conceived in order to induce strong collective coupling between the atomic ensemble and the cavity mode. I will show that this setup allows for optical and atomic access for interferometer operation and for homogeneous atom-light interaction - essential requirements for the operation of atom interferometers. This setup will enable the production of squeezed states either by quantum nondemolition measurement or by deterministic protocols such as one-axis twisting [2]. Motivated by the recent achievement of squeezing in an optical atomic clock [3], I will present our work towards the realization of a squeezed atom interferometer based on the strontium 1S0-3P0 optical clock transition.

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