



LENS-QSTAR Seminar
July 14, 2014 at 16:00, at Lens – Aula Querzoli

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Multimode Kapitza-Dirac interferometry with trapped Cold Atoms

We present a novel proposal to realize a multimode interferometer with cold atoms confined in a harmonic trap. A first Kapitza-Dirac pulse creates several spatially addressable modes which are coherently recombined by the harmonic potential and mixed again by a second Kapitza-Dirac pulse. A phase shift among the mode is estimated by fitting the density profile or by measuring the number of atoms in each output mode. The expected sensitivity is rigorously calculated with the Fisher information and the Cramer-Rao lower bound. For the measurement of the gravitational acceleration g we predict, with typical parameters of a compact setup, a temperature independent sensitivity which can exceed by different order of magnitudes the sensitivity of current atomic interferometers.

Ref: Phys. Rev. Lett. (2014), in press.

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