ID de Contribution: **446** Type: **Poster**

Frequency-comb-driven Atom Interferometry

Light-pulse atom interferometry, where light pulses are used as atom beam splitters, has led to extremely sensitive and accurate quantum sensors that offer many applications in fundamental physics, geosciences and inertial navigation. Until recently, light-pulse atom interferometry had only exploited continuous-wave (cw) laser sources. During this talk, I will present atom interferometers where the beam splitters are realized with pulsed lasers, or more specifically frequency-comb lasers [1]. This technique, which we demonstrated in the visible spectrum on rubidium (Rb) atoms, paves the way for extending light-pulse interferometry to other wavelengths (e.g. deep-UV to X-UV) and therefore to new species, since one can benefit from the high peak intensity of the ultrashort pulses which makes frequency conversion in nonlinear media efficient.

[C. Solaro et al., "Atom interferometer driven by a picosecond frequency comb", Physical Review Letters 129, 173204 (2022).]

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Classification de Session: Session Poster 2: MC1, MC4, MC8, MC10, MC12, MC14, MC20, MC21, MC23, MC24, MC25, REDP

Classification de thématique: MC8 Dernières avancées dans le domaine des technologies quantiques