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TINSLEY, Jonathan (Università degli Studi di Firenze)

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Contemporary atomic clocks and atom interferometers provide measurements of frequency and gravity with unprecedented precision. Atom interferometers based on the intercombination transitions of alkaline-earth and alkaline-earth-like atoms operate at the intersection of these two devices and represent an emerging technology with a broad range of applications for fundamental physics tests. Here, work is presented towards the realization of a dual-species strontium and cadmium atom interferometer, which possess intercombination transitions in the visible and UV regions, respectively. A complete baseline, continuous-wave UV laser package for cadmium has been developed and characterized, including for the ultranarrow clock transition at 332 nm. A state-of-the-art vacuum apparatus for cadmium has been designed, which has been thoroughly numerically simulated and optimised considering the challenges arising when working with such low wavelengths. The future prospects of the cadmium-strontium interferometer are presented, including for tests of the weak equivalence principle and gravitational time-dilation-induced decoherence. In particular, the suitability of the developed laser systems for large-momentum-transfer single-photon gravimetry is analysed, suggesting gains in sensitivity up to 100 are possible.

Poster Abstract

Session Classification: Poster Session

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