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## Feasibility of OTIMA interferometry for antihydrogen gravity measurement

Goal for the AEGIS collaboration is an antihydrogen free-fall measurement which would test one of cornerstones of General Relativity - Weak Equivalence Principle and might give insights about the baryonic asymmetry. The chosen method for this measurement is the moiré deflectometer.

Optical time-domain ionizing matter wave (OTIMA) interferometry has been established as a powerful tool in the field of high mass organic molecule interferometry and has been used for measurements using free fall of organic molecules. Using an OTIMA interferometer for antihydrogen free-fall measurement has multiple advantages compared to that of the moiré deflectometer. Grating periodicity is significantly smaller with optical gratings which allows for increased resolution or shorter measurement device, or both, and as the gratings are time based, the mechanical alignment is simplified due to position being determined by the timing of the laser pulses.

To study the feasibility of OTIMA interferometry for antihydrogen gravity measurement multiple simulations were developed - plane wave formalism simulation to determine fringe visibility, calculations of the solid angle and timing overlap to estimate the usable flux and Monte Carlo simulation to check the flux estimates.

### Type of contribution

Talk

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