Poster Session #A
Laboratory tests of gravitation

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Inertial sensing with quantum gases: A comparative performance study of condensed versus thermal sources for atom interferometry

Thomas Hensel (Leibniz University Hannover)

Quantum sensors based on light-pulse atom interferometers allow for measurements of inertial and electromagnetic forces such as the accurate determination of fundamental constants as the fine structure constant or testing foundational laws of modern physics as the equivalence principle. These schemes unfold their full performance when large interrogation times and/or large momentum transfer can be im- plemented. In this article, we demonstrate how interferometry can benefit from the use of Bose-Einstein condensed sources when the state of the art is challenged. We contrast systematic and statistical effects in- duced by Bose-Einstein condensed sources with thermal sources in three exemplary science cases of Earth- and space-based sensors.