



Contribution ID: 35

Type: **Poster**

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Monday 13 March 2023 18:03 (1 minute)

The search for violations of the Einstein equivalence principle and dark matter is a driving force for atom interferometry. A scalar, light dilaton field constitutes such a basic but consistent extension to known physics. While recent works focus on the coupling of matter to gravity and dilaton fields, we include the propagation of the light essential to manipulate the atoms. In particular, we derive modified Maxwell equations including an expanded gravitational and dilaton field. We show that to leading order the dilaton has no influence on the phase of the electromagnetic field, and only modifies the wave vector via gravity. We transfer this result to various classes of atom interferometers and show that the coupling to the dilaton field is solely given via the atom's mass, whereas the modified light propagation also enters via gravity.

Poster Abstract

Session Classification: Poster Session

Track Classification: Theory/Simulations/HEP