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Interferometer for the LEMING experiment

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A high quality superthermal muonium beam (bound e^-/μ^+) has recently been developed, which might be amenable for atom interferometry, and next generation laser spectroscopy experiments.
Here we provide an overview into the design and development of the first interferometer prototype, together with the theoretical expectations of sensitivity.
A Talbot-Lau interferometer is being designed for this purpose, where the vertical phase of the interferogram encodes the gravitational acceleration of the atoms, which will be sampled by scanning the third (masking) grating.
The main challenges include strict control over vibrational, displacement, and alignment constraints of a sub-nm measurement.

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