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Long-Baseline Atom Interferometry

Long-baseline atom interferometry is a promising technique for probing various aspects of fundamental physics, astrophysics and cosmology, including searches for ultralight dark matter (ULDM) and for gravitational waves (GWs) in the frequency range around 1¯Hz that is not covered by present and planned detectors using laser interferometry. The MAGIS detector is under construction at Fermilab, as is the MIGA detector in France. The PX46 access shaft to the LHC has been identified as a very suitable site for an atom interferometer of height $\sim$ 100m, sites at the Boulby mine in the UK and the Canfranc Laboratory are also under investigation, and possible sites for km-class detectors have been suggested. The Terrestrial Very-Long-Baseline Atom Interferometry (TVLBAI) Proto-Collaboration proposes a coordinated programme of interferometers of increasing baselines.

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