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An experiment to search for signatures of quantized space-time: QUEST

Monday, 23 June 2025 15:30 (15 minutes)

We report on the 'QUantum-Enhanced Space-Time experiment' (QUEST), which consists of two co-located Michelson interferometers with the ultimate goal of searching for signatures from the quantization of space-time. We have performed a first engineering run with QUEST which already sets new upper limits for stochastic gravitational waves in the range 13 to 80 MHz, an auxiliary result from the fact that our experiment resembles a table-top scale gravitational-wave detector. We will also report on the planned future version of this experimental paradigm, in which we plan to employ single-photon detection readout on a larger-scale set of Michelson interferometers with 5 m long arms. In this planned version of the experiment (SPI-QG), single photon readout is expected to increase sensitivity to stochastic signal sources, such as from quantization of space-time. With this we should be able to test existing predictions of quantized space-time signatures.

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