



Contribution ID: 104

Type: **Poster presentation**

## Interferometric measurements for the LEMING experiment

*Tuesday 9 September 2025 17:18 (1 minute)*

The LEMING experiment is designing the next generation of laser spectroscopy and gravity experiments using a novel atomic beam of muonium ( $\text{Mu} = \mu^+ + e^-$ ). Cold atomic muonium beams are generated in vacuum and subsequently undergo self-interference using newly engineered, self-aligned diffraction gratings. The setup allows for nanometer-sensitive measurements of muonium displacements due to gravitational acceleration. Here we present the development of the atomic interferometer setup, detailing its construction, characterization, and performance validation using a combination of x-ray diagnostics and imaging techniques.

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**Session Classification:** Poster Session and BBQ