



Contribution ID: 6

Type: **Poster**

## Novel production method of a cold muonium beam

*Thursday 15 June 2023 20:10 (5 minutes)*

The LEMING experiment at the Paul Scherrer institute aims to measure the free fall of muonium ( $M = \mu^+ + e^-$ ), an exotic atom consisting purely of leptons. Measuring the free fall of  $M$  would be the first test of the weak equivalence principle using elementary antimatter of the second generation and using a system without large hadronic contributions to its mass.

Such a direct measurement is performed by atom interferometry, which requires a high intensity, low emittance  $M$  beam. We are developing a novel  $M$  source based on stopping accelerator muons in a layer of superfluid helium at cryogenic temperatures.

In this contribution, results from the first observation of  $M$  emitted from superfluid helium are presented. An initial characterization of the  $M$  source shows a high vacuum  $M$  yield and sub-thermal beam dynamics. Prospects of this novel beam in the context of a free fall experiment will be discussed.

**My contribution is about a project related to sustainability**

### Field of contribution

Particle physics

### Limited flash talk slots

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