



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

Author: ZHANG, Jesse (ETH Zürich)

Co-authors: Dr SOTER, Anna (ETH Zürich); GOELDI, Damian; WEGMANN, Paul (ETH Zurich); WADDY, Robert

Presenter: ZHANG, Jesse (ETH Zürich)

Session Classification: CHIPP/CHART