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Physikalisches Kolloquium
Einladung

Physics Colloquium
Invitation

Monday, 15 May 2023

Lecture Hall N24/H13, at 16:15

Coffee and cookies will be served in front of the lecture hall from 16:00 hrs

Cold Atom Quantum Technology to Explore Fundamental Physics

Prof. Dr. Oliver Buchmüller

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CERN

 <https://www.imperial.ac.uk/people/o.buchmueller>



The presentation will outline the scientific opportunities of a multi-stage programme based on large-scale Atom Interferometry (AI) quantum detectors. The central goals of the programme are to search for ultra-light dark matter, to explore gravitational waves in the mid-frequency range between the peak sensitivities of LISA and LIGO/Virgo/ KAGRA/INDIGO/Einstein Telescope/Cosmic Explorer experiments, and to probe other frontiers in fundamental physics. This programme would complement other planned searches for dark matter, as well as probe mergers involving intermediate-mass black holes and explore early-universe cosmology.

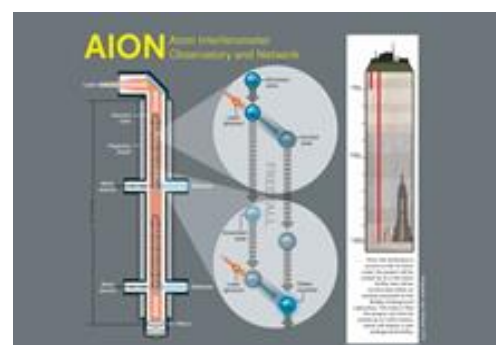
The experimental landscape of AI projects has expanded significantly in recent years and several large-scale fully funded prototype projects are currently under construction. These will demonstrate the feasibility of AI detectors at macroscopic scales, paving the way for terrestrial km-scale experiments as the next steps.

These projects are uniquely interdisciplinary missions that will harness cold atom quantum technologies to address key issues in fundamental physics, astrophysics and cosmology that can be realized in the next few decades.

The colloquia will review the current landscape of large-scale AI quantum detectors and highlight important recent events, like the Cold Atoms in Space Workshop Summary & Roadmap [1] and Terrestrial Very-Long-Baseline Atom Interferometry Workshops held at CERN [2].

[1] EPJ Quantum Technology volume 9, Article number: 30 (2022)
<https://indico.cern.ch/event/1064855/>

[2] <https://indico.cern.ch/event/1208783/>



Host: Prof. Dr. Wolfgang Schleich, Institute of Quantum Physics

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