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Particle Physics at LPTHE

Mardi 4 Mars 2025, 14 :00
LPTHE, Library and Zoom (link in the comments)(https ://cern.zoom.us/j/63031219326 ?pwd=STlDY
)
Domaines : hep-ph

Titre : *Atom interferometers as particle detectors*

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Résumé : *Despite the remarkable success of the Standard Model in describing nature, experimental evidence suggests the existence of new physics beyond its framework. However, such new physics may remain elusive, evading detection due to the energy thresholds of current detectors if these are higher than the energy deposited. This regime of low momentum transfers is particularly relevant for interactions where coherent effects can significantly enhance scattering rates.*

In this talk, I propose using atom interferometers as nearly thresholdless detectors to search for elusive particle scatterings. By leveraging quantum properties such as coherence and decoherence, atom interferometers offer a powerful and complementary approach to traditional detection methods, expanding the accessible parameter space to low momentum transfers. I will discuss how background particles imprint signatures in atom interferometer observables.

If time permits, I will also examine the 5-sigma tension between the latest LKB measurement of the fine-structure constant and a similar measurement from the Berkeley group in the context of new physics. Finally, I will propose novel observables in atom interferometers that could be relevant in detecting elusive particle interactions.