

## **Atom interferometry: a cavity approach**

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Two atomic gradiometer set ups are developed in the laboratory LP2N (Laboratoire Photonique, Numérique et Nanosciences belonging to the Institut d'Optique Graduate School and to the University of Bordeaux) for the MIGA project. They consist in test benches for the MIGA experiment located in Rustrel (150 meters long gradiometer, including three sensor heads). They allow to test how we could do measurements with Bragg transition in cavity and how Newtonian Noises could be characterized.

The poster will present the results of one cavity atom interferometer (1 meter long): Large Momentum Transfer in cavity have been done up to the order 4.

Plus, it will explain the challenges and goals expected for the second gradiometer (6.5 meters long) and show the advancements realized: atoms heads implementation, control system details, time of flight measurement.

Then, it will introduce the Bragg system we would like to settle for this gradiometer, using advanced quantum engineering states such as Floquet states [1].

[1] T. Rodzinka, E. Dionis, L. Calmels, S. Beldjoudi, A. Béguin, D. Guéry-Odelin, B. Allard, D. Sugny, A. Gauguet, arXiv:2403.14337 [physics.atom-ph] (2024)