

Abstract Submitted
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High precision measurement using atom interferometers with a Bose Einstein Condensate source. LEO MOREL, JUN SUN, PIERRE CLADE, SADA GUELLATI-KHELIFA¹, Laboratoire Kastler Brossel, Sorbonne Université, CNRS, ENS-PSL University, Collège de France, 4 place Jussieu 75005 Paris, METROLOGY OF SIMPLE SYSTEMS AND FUNDAMENTAL TESTS TEAM — The sensitivity of atom interferometers scales as the spatial separation between the two wavepackets. The ability to increase the area enclosed between the two arms of the atom interferometer being limited by the temperature of the atom source, a Bose Einstein Condensate (BEC) gaz would be a relevant source. However, an atom in a condensed state will experience a phase shift due to atom-atom interactions. We aim to use BEC to perform absolute precision measurements of the atom recoil velocity to determine the fine structure constant to a fraction of ppb. In this scope, we need a precise calibration of the systematic effect induced by interactions. We present the work we have done towards calibration of the mean field effect, as well as the most recent developments we made for the control, splitting, manipulation and recombination of a BEC. In particular, we will focus on the implementation of Large Momentum Transfer Beam Splitters, combining Raman transitions and Bloch Oscillations, and discuss the sensitivity enhancement they allow.

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