

Abstract Submitted  
for the DAMOP14 Meeting of  
The American Physical Society

**A Nuclear-Electronic Spin Gyro-Comagnetometer** GEOFFREY RENON, NASSIM ZAHZAM, YANNICK BIDEL, ALEXANDRE BRESSON, ONERA - The French Aerospace Lab, Palaiseau, France, PIERRE-JEAN NACHER, Laboratoire Kastler Brossel, ENS, CNRS, UPMC, Paris, France — We have started a project aiming to fully characterize a new generation of atomic gyroscope very promising for applications requiring miniature sensors with high performances. Our experiment is based on the detection of a nuclear spin orientation with an alkali magnetometer [1]. The key element of the device is a spherical gas cell filled with an alkali gas (Rb) with an electronic spin and a noble gas ( $^{129}\text{Xe}$ ) with a nuclear spin and heated at about 110 °C and shielded from parasite magnetic fields. The first step of our project was the conception of the atomic spin gyroscope. The second step was the realization and the validation of the filling system. The gas mixture filled into the spherical cells was checked by the study of the collisional broadening and frequency shift of the D1 lines of the Rb. We are currently analyzing the  $^{129}\text{Xe}$  polarization by NMR and measuring the spin-exchange and relaxation parameters to estimate the future gyroscope performances. In parallel, the realization and of a first prototype of atomic spin gyroscope is in progress.

[1] T.W. Kornack, et al., “Nuclear Spin Gyroscope Based on an Atomic Comagnetometer,” PRL, vol. 95, 230801, 2005.

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Date submitted: 28 Jan 2014

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