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Development of a multi-species cold atom interferometer CLEMENT DIBOUNE, NASSIM ZAHZAM, YANNICK BIDEL, ALEXANDRE BRESSON, ONERA - Palaiseau, France, MALO CADORET, LCM-CNAM - Paris, France — Atom interferometry is now proven to be very efficient to achieve highly sensitive and absolute inertial sensors. As a matter of fact gravimeters based on this technique by using cold atoms have already been developed and give now very promising performance. Our work concerns particularly the development of a three atomic species -^{87}Rb/^{85}Rb/^{133}Cs- interferometer addressing mainly the topics of on-board applications such as navigation or geophysics, but also fundamental physics. We will point out, through the development of original concepts, the interest of using more than one atomic species in the instrument to improve inertial measurements. The first step towards the interferometer was the development of the laser system needed for the atom's cooling and manipulation. Important developments have been achieved to obtain compact and robust laser systems for rubidium atoms, particularly with fiber laser systems based on second harmonic generation (SHG) of a telecom fiber bench. For cesium atoms, there was no fiber laser system available. For our project, we developed a four laser diode fibered system, based on the frequency conversion of laser at 1560 nm and 1878 nm, which addresses both rubidium and cesium atoms. A ^{87}Rb/^{85}Rb/^{133}Cs triple magneto-optical trap (MOT) was obtained with this laser system. We will present the current state of the experiment and the first results concerning the triple MOT. This experimental development is opening the way to multi-species atom interferometry using cesium and rubidium atoms.

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