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**Optimization of an onboard atomic interferometer and a new technique of acceleration measurement with Bloch oscillations** RENÉE CHARRIERE, OLIVIER CARRAZ, MALO CADORET, NASSIM ZAHZAM, YANNICK BIDEL, ALEXANDRE BRESSON, FRANÇOIS NEZ — In the last years, great progresses have been achieved in the manipulation of De Broglie atomic waves by coherent light pulses. They make possible the realization of very sensitive atomic interferometers, such as gravimeters, gradiometers, or gyroscopes. We propose to realize an onboard atomic gravimeter. Such gravimeter has many applications: navigation by ground correlation, positioning with a gravity map, oil deposits or buried ruins localization by detection of gravity anomaly, test of the equivalence principle. The principle of an atomic gravimeter is as follows. The atoms are first cooled down. Then, while falling under the gravity, they are exposed to light pulses. The phase excursion between the two possible paths of the atoms is directly linked to the value of the gravity, and is also proportional to the fall distance of the atoms. Thus, a higher sensitivity of the measurement requires a higher interferometer height. A new measurement technique is currently being implemented. It will reduce the fall distance while keeping the same sensitivity: atoms are put in levitation into a vertical optical lattice where they make Bloch oscillations. We can thus make our gravimeter smaller, which is interesting for an onboard gravimeter.

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