

Dual-species BEC source: First step towards matter neutrality test with atom interferometry.

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We are building a new atom interferometer[1] using Bose-Einstein Condensate for applications in precision measurements. A first objective of the project is to create an atom interferometer based on a new type of BEC source compatible with transportable applications. This source combines on a chip[2], the magnetic trapping with microscopic wires and an optical dipole trap. It will also be possible to condense the two isotopes of rubidium. Besides these technological developments, we plan to apply this new atom interferometer to test the neutrality of atoms with a new method[3,4]. Since the electrical neutrality of atoms is directly connected to elementary charges (electron and quark), this measurement is of a great significance in fundamental theory of particles. The target sensitivity of this experiment might improve the current laboratory limits by 3 orders of magnitude[5].

In this poster, I will present the technological choices implemented on this new experiment(Fig. 1).

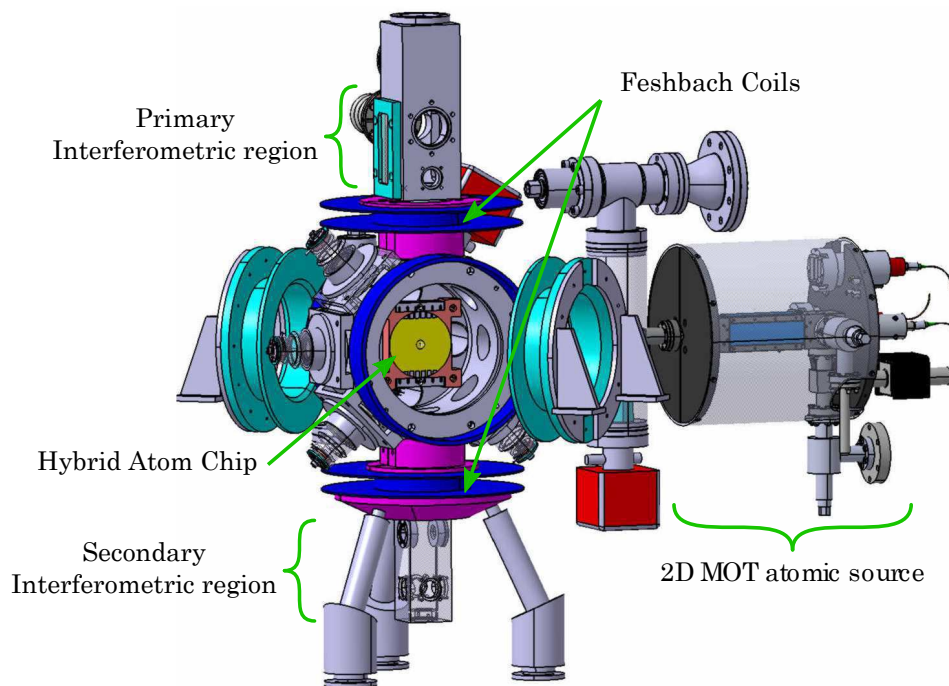


Figure 1: *Experimental setup featuring the dual species atomic source (2D MOT), the Hybrid Atom chip allowing for fast evaporative cooling, the Feshbach Coils necessary for tuning the interactions in the Rubidium 85 condensate and the interferometer regions where multi $\hbar\vec{k}$ Bragg pulses will allow for large spatial separations and long (~ 15 ms) interaction times.*

References

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