Leibniz Ferdinand Braun Institut

Master / Bachelor Thesis

Joint lab Integrated Quantum Sensors – O. Fartmann, Dr. M. Krutzik

Design of a compact high-flux strontium source for an atomic clock onboard a sounding rocket

As part of our activities on frequency references based on atomic strontium we are looking for highly motivated Bachelor or Master students in the fields of experimental physics, optical sciences and/or engineering. The desired starting date for the thesis is within the first half of the year 2020.

Compact and robust optical frequency references receive increased attention with respect to space-borne operation. Current and planned applications for optical frequency standards in space include earth-observation and fundamental science missions. Furthermore, optical clocks built around those frequency references can address a variety of precision timing applications. For example, such a device and the underlying key technologies are candidates for the core equipment of next-generation Global Navigation Satellite Systems (GNSS).

We are currently setting up a system for investigating the 7.4 kHz broad $^1S_0 \rightarrow {}^3P_1$ intercombination line in strontium. Using an optical Ramsey technique, we intend to perform high resolution spectroscopy on a thermal strontium beam. One important feature of such a system to achieve low frequency instabilities is a high-flux and well-collimated atomic beam.

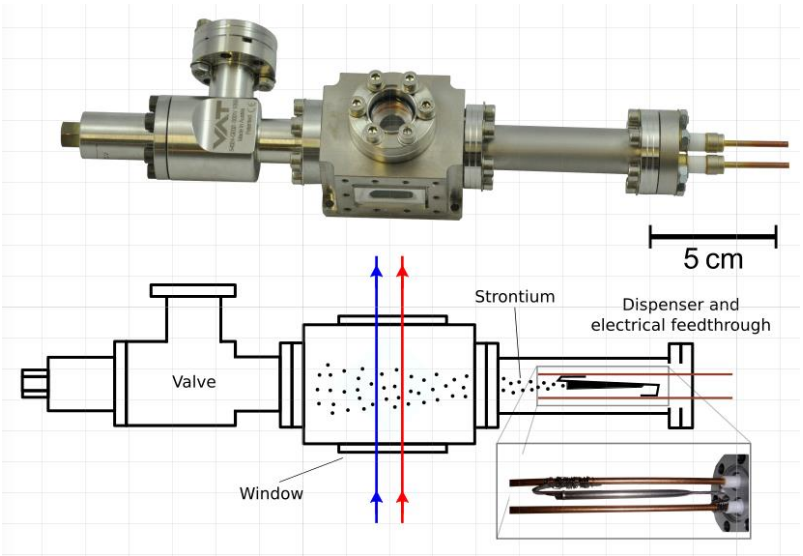

Figure 1: Currently employed spectroscopy cell with a simple strontium source

Figure 2: Start of a sounding rocket

The activities of the Master thesis aim at the design, assembly, characterization and simulation of an atomic strontium source. A background in laser physics, spectroscopy or optical technologies is desired. If you're interested, don't hesitate to contact us.

Contact

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