

Master / Bachelor Thesis

Joint lab Integrated Quantum Sensors

Quantum sensors with strontium atoms for space applications – Atomic Beam Clock

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 and optical sciences.

Compact and robust optical frequency references receive increased attention with respect to space-borne operation. Current and planned applications in space include navigation, earth-observation and fundamental science missions.

Using an optical Ramsey technique, we intend to perform high resolution spectroscopy on a thermal strontium beam. This signal is subsequently used to stabilize the frequency of the spectroscopy laser to better than one part in 10^{15} . This stable oscillator can then be used for a clock.

Simultaneously, we are setting up an experiment to laser-cool and trap strontium atoms in an ultra-high vacuum system. This provides a flexible platform for a variety of new exciting experiments, among other things a more stable optical lattice clock.



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

The activities of the Bachelor or Master thesis aim are diverse and will be tailored to the experience and interests of the student. Possible tasks include the assembly of a new atomic beam source and its characterization, setting up a low-noise fluorescence detection system, precisely aligning optical paths by interferometric measures as well as evaluations of the clock stability.

We offer support optimized individually for every new group member. Goals and problems are set and solved together and the progress is discussed regularly. A background in laser physics, spectroscopy or optical technologies is desired. If you're interested, don't hesitate to contact us.

We are a place where all members of the LGBTQ community are welcomed.

Contact

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