



Project:
Hot and Cold Rubidium
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Summary

The main objective of this project is to study and manipulate the index of refraction of a Rubidium vapour through the interaction with laser light of two different wavelengths. Using a theoretical, numerical and experimental approach, we aim to understand and characterize the Rubidium vapour and the effects of light interacting with this system. The project will be divided into three main stages: theoretical study, numerical simulations, and experimental validation. The theoretical study will focus on the fundamentals of atomic quantum optics, with emphasis on the interaction between light and matter. The numerical simulations will be used to model the interaction between light and Rubidium vapour, and to predict the behaviour of the system under different conditions. Finally, the experimental validation will involve the construction of an experimental setup to measure the index of refraction of the Rubidium vapour and compare the results with the theoretical and numerical predictions. The expected results of this project include a better understanding of the interaction between light and matter, and the development of new techniques for manipulating the index of refraction of Rubidium vapour. This research has the potential to have a significant impact on the field of quantum optics and quantum information processing, and to open up new possibilities for the development of quantum technologies.

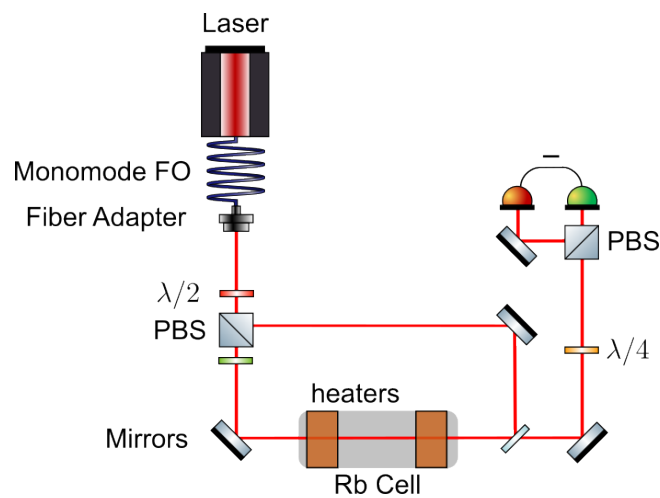


Figure 1: Set up for Laser 1

Rubidium

Atomic Structure

Laser 1

- 1. Oscilloscope
- 2. Signal Generator
- 3. TEC: Temperature Controller
- 4. Control of Control
- 5. Laser Control
- 6. Current Control
- 7. Rubidium Heater for Glass Cell

Laser 2

Laser 3

Bragg Reflections in Rubidium Vapours

Objectives

Experimental Set Up

Rubidium Borosilicate Reference Cell, Ø25.4 mm x 71.8 mm SM1FCA - FC/APC Fiber Adapter Plate with External SM1 (1.035"-40) Threads, Wide Key (2.2 mm)

Bragg Reflections in Cold Rubidium

Objectives

Experimental Set Up



References