

# **I dont know yet**



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This thesis is submitted for the degree of  
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## **Abstract**

This is where you write your abstract...



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# **Chapter 1**

## **Theory**

## 1.1 Rubidium

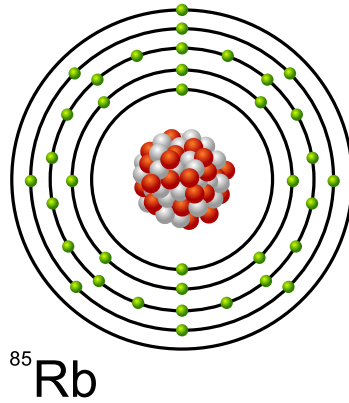


Fig. 1.1 Schematical representation of <sup>85</sup>Rb

Rubidium is a chemical element with symbol Rb and atomic number 37. It is a soft, silvery-white metallic element of the alkali metal group, with an atomic mass of 85.4678. Elemental rubidium is highly reactive, with properties similar to those of other alkali metals.

German chemists Robert Bunsen and Gustav Kirchhoff discovered rubidium in 1861 by the newly developed technique, flame spectroscopy. Because of the bright red lines in its emission spectrum, they chose a name derived from the Latin word rubidus, meaning “deep red”. [1]

Although rubidium is monoisotopic, rubidium in the Earth’s crust is composed of two isotopes: the stable <sup>85</sup>Rb and the radioactive <sup>87</sup>Rb. [2]

Rubidium		
Isotope	85	87
Atomic mass	84.911794	86.909187
in 10 <sup>-25</sup> kg	1.40999	1.44316
Abundance	72.17%	27.83%
Spin I	5/2	3/2

Table 1.1 Properties of rubidium isotopes

**1.2 D2 line****1.3 Two-level atom****1.4 Laser absorption****1.5 Doppler shifts****1.6 Behavior of absorption coefficient  
Non-linear differential equation****1.7 Non-linear differential equation**



# **Chapter 2**

## **Experiment**

### **2.1 Setup & Tools**

### **2.2 Laser diameter measurement**

### **2.3 Power / intensity measurement**

### **2.4 Doppler-free measurement**





# **Chapter 3**

## **Evaluation**

**3.1 Data processing**

**3.2 Temperature & saturation intensity**

**3.3 Comparison with theory**

**3.4 Compare Doppler-free measurement with theoretical values**



# References

- [1] G. Kirchhoff and R. Bunsen. Chemische Analyse durch Spectralbeobachtungen. *Annalen der Physik*, 189:337–381, 1861.
- [2] G. Audi, O. Bersillon, J. Blachot, and A. H. Wapstra. The NUBASE evaluation of nuclear and decay properties. *Nuclear Physics A*, 729:3–128, December 2003.



# **Appendix A**

## **Theory**



# **Appendix B**

## **Experiment**





# **Appendix C**

## **Evaluation**

