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Abstract

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Chapter 1

Theory

1.1 Rubidium

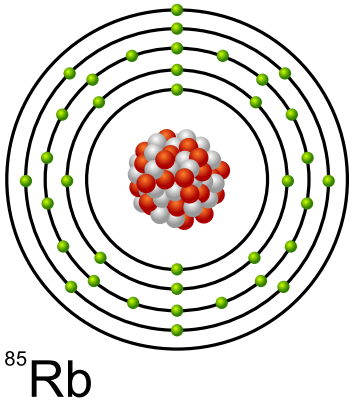

Fig. 1.1 Schematical representation of ^{85}Rb

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 ^{85}Rb and the radioactive ^{87}Rb. [2]

	Rubidium	
Isotope	85	87
Atomic mass	84.911794	86.909187
in 10^{-25}kg	1.40999	1.44316
Abundance	72.17%	27.83%

Table 1.1 Properties of rubidium isotopes

1.2 Two-level atom

1.3 Laser absorbtion

1.4 Doppler shifts

1.5 Behavior of absorbtion coefficient

1.6 Non-linear differential equation

Chapter 2

Experiment

2.1 Setup & Tools

2.2 Laser diameter measurement

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Chapter 3

Evaluation

3.1 Data processing

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3.3 Comparison with theory

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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

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Evaluation