Optical Pumping and Magnetic Resonance

Dongwon Han and Kevin R. Wood
Stony Brook University
(Dated: February 21, 2017)

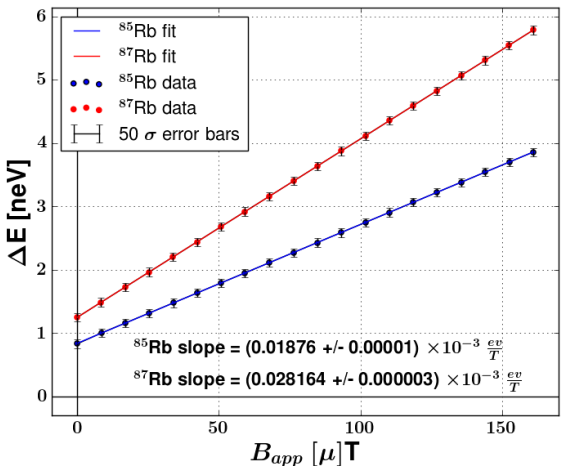

FIG. 1. Measurement of the magnetic moment of ^{85}Rb and ^{87}Rb.

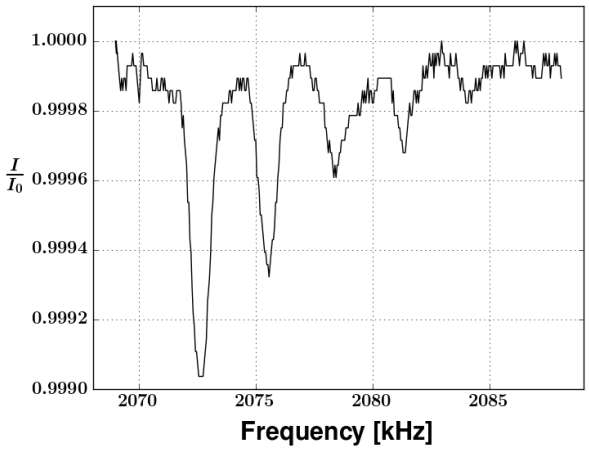

FIG. 2. (data) Observation of hyperfine splitting of ^{85}Rb.

INTRODUCTION

Rubidium (Rb) is an alkali metal with atomic number $Z = 37$. Neutral states contain four entirely filled electron shells with no net angular moment and a single valence electron. In its ground state, the valence electron carries no orbital angular momentum: $5^2S_{1/2}$. It its first exited state, the valence electron carries one quanta of orbital angular momentum which can either align or anti-align with its spin contribution: $5^2P_{1/2}$ or $5^2P_{3/2}$.

The energy splitting of the 5^2S and 5^2P states due to the Coulomb interaction with the nucleus on on the order of a few electron-volts. The degeneracy of the first excited state is lifted by the spin-orbit coupling

REVIEW OF PREVIOUS WORK

EXPERIMENTAL SET-UP

MEASUREMENTS

THEORETICAL MODEL

COMPARISON OF DATA AND THEORETICAL MODEL

DISCUSSION AND CONCLUSIONS

AUTHOR CONTRIBUTIONS