Towards trapping of molecular ions in a linear Paul Trap

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PhD Progress Report

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Abstract

An abstract...

Colophon

Towards trapping of molecular ions in a linear Paul Trap

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Introduction

In the 1950's Wolfgang Paul invented the so-called Paul trap, which could be used to trap charged particles within a quadrupolar electromagnetic field.CITE. In 1989 he would go on to recieve the Nobel Prize in physics, alongside Hans Dehmelt, "for the development of the ion trap technique" CITE. With the many technological and scientific advancements since the Paul trap's inception, among which the laser is an especially important one, it is now possible to trap, and cool single ions to temperatures below 1mK CITE Wineland. Such cold ions pose many interesting possibilities for science, as they can make good candidates for atomic clocks CLOCK, or the basis for quantum computers Wineland, Cirac Zoller.

Paul traps are also used for the study of fluorescence of molecules in the gas phase CITE Steen?, where pulsed lasers can be used to excite large clouds of molecular ions, whose fluorescence spectrum may then be recorded and studied. However as most molecules lack the necessary energy level structure for laser cooling, the temperature of these experiments are limited by their cryogenic cooling environment.

Chapter 2

The Linear Paul Trap

THIS SECTION CONTAINS INFORMATION ON THE PAUL TRAP

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Chapter 3

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Chapter 5

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Future Work

In the following, I will outline the topics I will work on in the final part of my PhD …