

Rutherford Scattering

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September 17, 2018

Abstract

This paper is written as the *first* of four mandatory reports during the course *Experimental Physics III*.

In the experiment we will be working with ...

At last

This resulted in ... in confirmation of the theory

of 400 keV.

In low energy physics, scattering phenomena provide the standard tool to explore solid state systems, and historically this was used as a first step towards our current understanding of the atom.

1 Introduction

Almost all of our knowledge in the field of nuclear and atomic physics, has been discovered by scattering experiments. Scattering theory underpins one of the most ubiquitous tools in physics.

This paper has a limited extend, and to keep our discussion simple and relevant, we will only examine elastic collisions in the semi-classical regime, governed by the Sommerfeld criterion for classical scattering.

This is usually fine for low energy physics, in which internal energies remain constant and no further particles are created or annihilated.

Our experiment involves a single Van-de-Graaf accelerator and the energy is in the order

2 Experimental Setup

The following equipment, as described in this section, can be seen on fig. 1, fig. 2 and fig. 3.

We will be accelerating particles by the Van-de-Graaf accelerator up to 400 keV. The variety of incoming particles are limited by the source, which is a flask of gas connected to the accelerator tank. We will not change this flask, for which our experiment is limited to protons, and the hydrogenic ions: H^+ and H^{++} . By changing the magnetic field, one can choose which of these particles will interact with the target.

When calibrating,

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Calibration

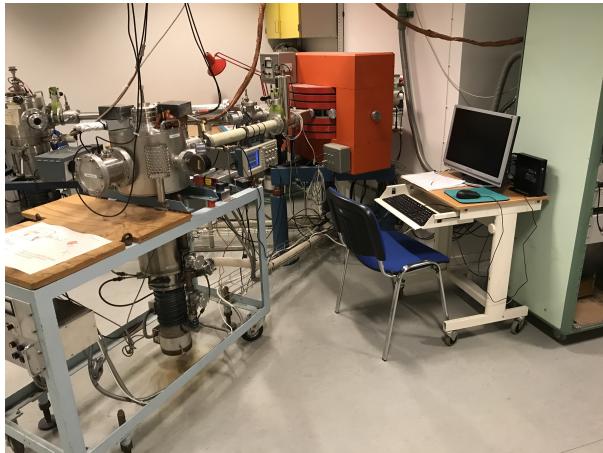


Figure 1: Experimental setup 1: The detector and a computer for the data analysis.



Figure 2: Experimental setup 2: All components with variables.



Figure 3: Experimental setup 3: The single Van-de-Graaf accelerator.

3 Data

4 Discussion

5 Conclusion

References

Griffiths, David J. *Introduction to Electrodynamics*. Cambridge, 2017. ISBN: 978-1-108-42041-9.

Jensen, Jens Ledet. *Statistik viden fra data*. Aarhus Universitetsforlag, 2012. ISBN: 978-87-7124-0245.