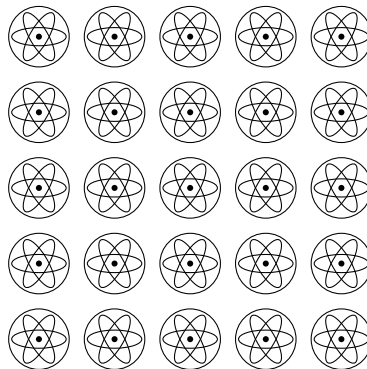


Università degli Studi di Padova  
Dipartimento di Fisica e Astronomia  
Advanced Physics Laboratory

# Rutherford Scattering



**AUTHORS:**

Ardino Rocco

Mat. 1231629

Bortolato Gabriele

Mat. ???????

Valente Alessandro

Mat. ???????

**SUPERVISOR:**

Prof. Gianmaria Collazuol

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# **1 Introduction**

## **1.1 History background**

In the beginning of the 20<sup>th</sup> century, the study of the structure of atoms began to intensify. In particular, J.J. Thomson, after the discover of the electrons, hypothesized the “plum pudding” model: the structure of the atom consists of electrons occupying a region of space uniformly and positively charged. Ernest Rutherford tested if this behaviour of nature was plausible and set up his famous experiment, proving that Thomson’s prediction was not explained by experimental data. Moreover, he tried to explain the this riddle by introducing a new hypothesis, namely the Rutherford model, where the positive charge is densely-packed in the center, forming the nucleus.

## **1.2 Theoretical background**

In this work we reproduce Rutherford experiment and give a This laboratory experience aims at reproducing Rutherford’s experiment, namely the study of  $\alpha$  particles scattering on a foil of a certain material. For the purpose, appropriate mechanical and electronics

# **2 Experimental apparatus**

## **2.1 Vacuum chamber**

## **2.2 Electronics chain and beam control**

## **2.3 Silicon detector**

## **2.4 ALPIDE detector**

# **3 Preliminary tests**

## **3.1 Silicon detector characterization**

## **3.2 ALPIDE detector characterization**

# **4 Numerical simulation of the experiment**

## **4.1 Beam profile**

## **4.2 Scattering angular distribution**

# **5 Experimental data analysis and results**

## **5.1 Beam profile**

## **5.2 Scattering angular distribution**

# **6 Conclusions**

# References

[1] Author *Title*. Publisher Date