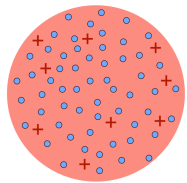
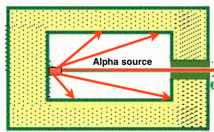
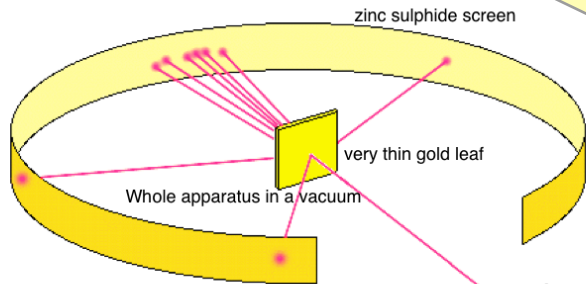


2



In the plum pudding model the atom was thought to have negative charges (electrons) embedded in a lump of positive charge, rather like currants in a cake.



The lead box produced a fine beam from the alpha source

Alpha source within a lead block

2

1 Rutherford's gold leaf experiment was set up to confirm the widely held model of atomic structure called "The Plum Pudding Model".

Alpha particles were directed at a very thin gold leaf held in the centre of a detecting strip within a vacuum.

6

## 6 The conclusions from the experiment were:

Most of matter is empty space occupied by electrons of negligible mass.

because

Almost all of the mass of an atom is within a very small positively charged space - the nucleus.

Most of the alpha particles travelled straight through with no deflection.

A very few alpha particles (around one in eight thousand) was deflected by a large angle.

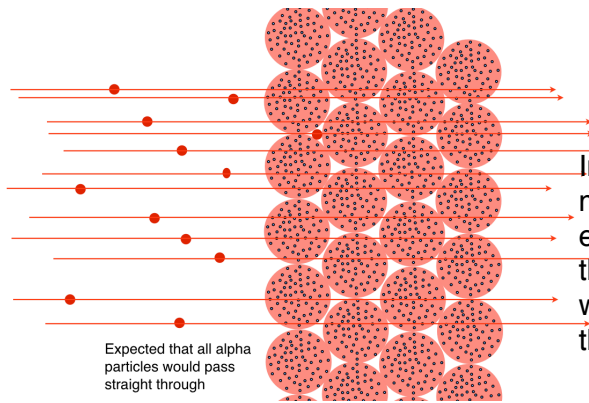
and

Rutherford went on to show that the number of alpha particles deflected at different angles was consistent with the inverse square law for the force of repulsion between the alpha particles and the nucleus.

3

In the plum pudding model it was expected that all the alpha particles would pass straight through.

3

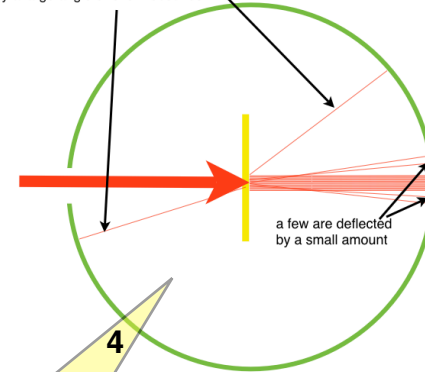


Expected that all alpha particles would pass straight through

4

In the actual experiment a few of the particles were deflected a lot and even rebounded so a different explanation was needed.

The occasional particle is deflected by a large angle or even rebounds

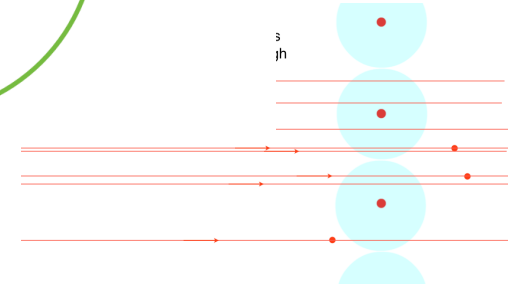


4

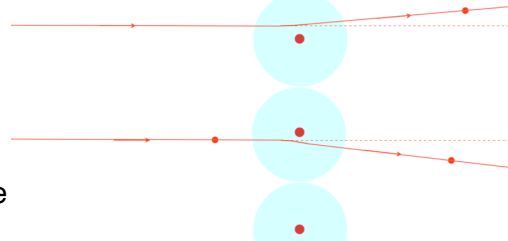
5

Rutherford explained the results by a new model in which the atom was imagined as having a small nucleus where all the positive charge and mass are concentrated with a large space around the nucleus occupied by a cloud of electrons.

5



A few alpha particles are slightly deflected



An occasional alpha particle is deflected a lot or rebounds

