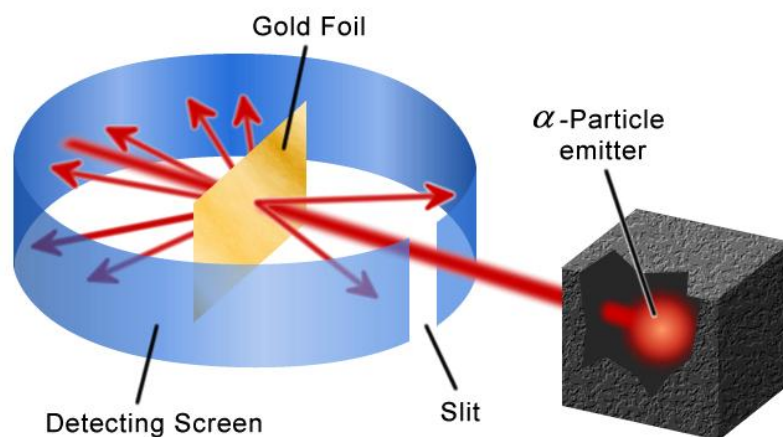


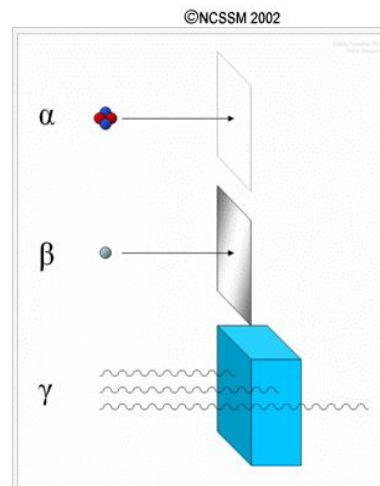
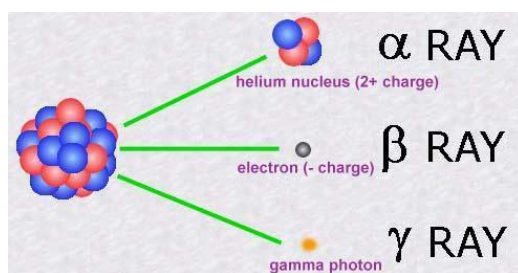
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|---|-------------------------------------|
| Topic: | Rutherford model of the atom |
| Objective: | FK_01_02 |
| <p>Given a picture of the experiment the student must be capable of doing the following tasks:</p> <ul style="list-style-type: none"> describe the experiment in general terms define alpha, beta and gamma rays in term of particles, charge and power of penetration describe the Rutherford model of the atom | |

Rutherford's experiment

When alfa radiation (alpha particles, helium nuclei) were emitted from a radioactive source and fired against a very thin foil (of gold and other metals), most of that particles went straight through the foil, without changing the direction of their path. But some of them, were **bounced back**, which, at that time, was considered a remarkable event.



Gold Foil



Alpha radiation consists of helium-4 nuclei and is readily stopped by a sheet of paper. Beta radiation, consisting of electrons, is halted by an aluminium plate. Gamma radiation is eventually absorbed as it penetrates a dense material.

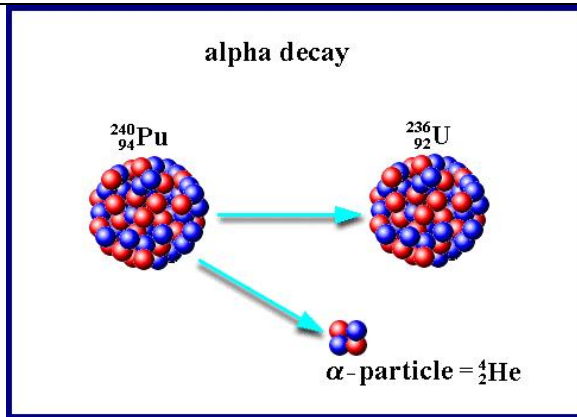
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Alpha rays are nuclei of helium and can be stopped by a sheet of paper. They have mass and are positively charged.

Beta rays are electrons and can be stopped by an aluminium plate. They have much less mass and are negatively charged.

Gamma rays can be stopped by thick materials (concrete 1 metre thick, for instance). They haven't mass nor charge.

Radiactivity is a phenomenon that happens when an atomic nucleus decays (is split into two or more fragments)

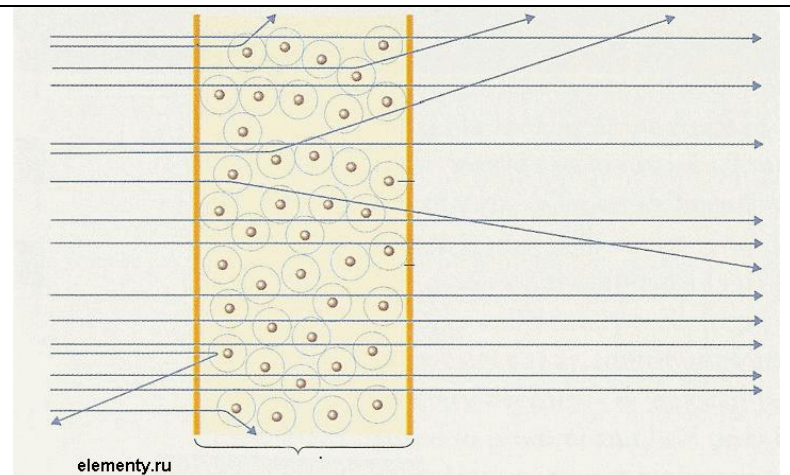


Rutherford model of the atom

A new model, consistent with the results of the experiment, were needed. That new model was the model described by Rutherford. Rutherford depicted the atom as divided in two parts: a **nucleus** (with protons in it –the neutrons were not discovered at that time-) and an **empty space**, where the electrons moved around the nucleus.

The major part of alpha particles go through the foil without changing their path, which means that they don't meet any obstacle.

But some of them are bounced back by the foil, which means that they meet a massive obstacle.



The previous atomic model (Thomson, that described the positive charge as something diffuse) couldn't explain favourably the experiment and that situation led to a change on the atomic model.

According to the new model (Rutherford's atomic model) the atom has a nucleus with protons (the massive part of the atom and positively charged) and the electrons move around that nucleus.

