Radiation Experiment

AIM:

- To explore the properties of radiation
- To examine how the intensity of the radiation measured depends on the distance from the source to the detector and on shielding placed between the source and the detector
- To examine the differences between alpha beta and gamma radiation

SAFETY PRECAUTIONS

- Radioactive materials must be handled and stored safely
- Use tongues to handle the radioactive materials
- Don't point the radioactive material towards other people
- The voltage used for GM tube is high. Therefore do not touch the back of the instrument
- Wash your hands thoroughly after the experiment

METHOD

- Natural radiation exists around us. If we want to study radiation we first need to measure this "background radiation" that is always present and subtract its effects from our results. We will use the Geiger-Mueller detector to count the average background radiation.

- Observing the effect of distance on intensity:
  Measure the distance from the entrance of the detector to the radioactive source. Use the equipment to count the amount of radiation detected in one minute. Repeat this for different distances, and for all three radioactive sources, (alpha, beta and gamma). Always subtract the background radiation.
- Observing the effects of shielding on radiation:
  This time the distance Take a measurement. This represents the radiation received without any shielding. Now place in the second selve the thinnest lead shield and take a reading. Continue to do this for all the lead shields. What do you oberve?

Alpha rays are made up of alpha particles, and each alpha particle is identical to the nucleus of a helium atom. Because of its relatively large size (compared with other forms of radiation) an alpha particle is easily blocked by many common materials.

Similarly, beta rays are made up of beta particles. A beta particle is actually an electron. It is much smaller than an alpha particle and, therefore, has greater penetrating power. Denser materials are needed to stop beta particles.

But of the three, gamma rays have the greatest penetrating power; so they require the densest shielding materials. Gamma rays are not made up of particles. Gamma rays consist of individual packets of energy called photons.