

OCR B Physics A-Level

PAG 7.2

Investigating the absorption of α -particles,
 β -particles and γ -rays by appropriate materials



Equipment

- 3 unlabelled radioactive sources e.g. Americium-241, Strontium-90, Iodine-131
- A few sheets of paper
- 1 cm aluminium
- 4 cm lead
- Geiger counter
- Long handled tongs for handling sources

Method

1. Before moving the radioactive source into the room you will be working in, you must calculate the background count by switching on the counter (connected to the GM tube) for at least 5 minutes. Record this background count.
2. Using the tongs place the source about 5 cm from the geiger counter, and measure the count rate after 5 minutes. Calculate the corrected count rate. (Corrected count rate is the difference between measured count rate and background count).
3. Place a few sheets of paper in front of the source and repeat the step above.
4. If the corrected count rate drops to 0 we can assume the source was emitting only alpha radiation, if there is a significant drop we can assume it was emitting partly alpha radiation.
5. Repeat the above step using the aluminium foil and 4 cm of lead. If there is a significant decrease in count rate for aluminium foil, then beta radiation is being emitted and if there is a significant decrease in count rate for the lead block, then gamma radiation is being emitted.
6. Repeat this procedure for each of the sources to identify the types of radiation they're emitting.

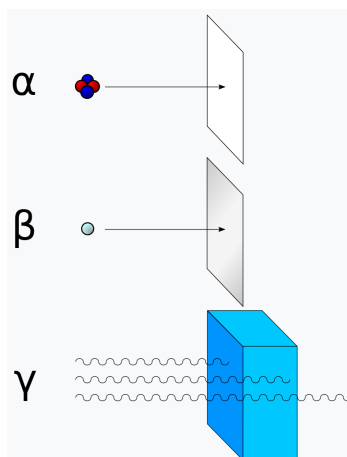


Image source: [Stannered, CC BY-SA 3.0](#)

Safety

- Ionising radiation can be incredibly dangerous, to reduce your exposure:
 - Never directly handle the source, use long handled tongs
 - Store the source in a lead-lined container when not in use
 - Never point the source at others
 - Keep the source as far away as possible from yourself and others

