Nuclear Physics

For: Year 11 Physics Students

Description

This workshop links with the 'Nuclear Models and Radioactivity' section of the SACE Stage 1 Physics curriculum.

Students conduct three procedures that explore concepts of radiation and radioactive decay – calculating the half-life of an indium isotope, exploring the attenuation of gamma rays, and determining the penetrative range of beta particles through aluminium.

In addition to the above procedures, a small cloud chamber is available for demonstration purposes and can be viewed by school visitors.

What will Students do?

Students participate in three experimental procedures:

The Half-Life of Indium

Students:

- Use a scintillation detector and counter to record the number of gamma rays emitted by the decay of a radioactive isotope of indium
- Calculate the half-life of the isotope from the data

The Attenuation of Gamma Rays

Students:

- Use a Geiger-Muller tube and ratemeter to record the number of gamma rays penetrating progressively thickening blocks of aluminium
- Analyse the data to determine the attenuation abilities of aluminium
- Measure the attenuation capacity of a number of other materials

The Absorption of Beta Particles

Students:

- Use a Geiger-Muller tube to measure the transmission of beta-particles through increasing thicknesses of aluminium attenuators
- Calculate the penetrative range of the beta particles
- Determine the thickness of an unknown aluminium attenuator using their data

In addition to the formal procedures, students also have the opportunity to investigate levels of environmental radiation with a portable radiation counter, and view a small cloud chamber in operation. *Please note that the cloud chamber must be requested in advance of your session as it requires significant preparation.*

Foundation of Physics Full Day Program

This program is combined with the DST Radar Technology program to create a Full Day Program experience.

Please consult the descriptions on the website for details about the DST Radar Technology program or contact UniSA Connect for more information.

Conditions

- As this program is a practical activity, students and accompanying adults will be required to wear closed in shoes and appropriate dress.
- Teachers will receive confirmation of booking and pre-visit information.