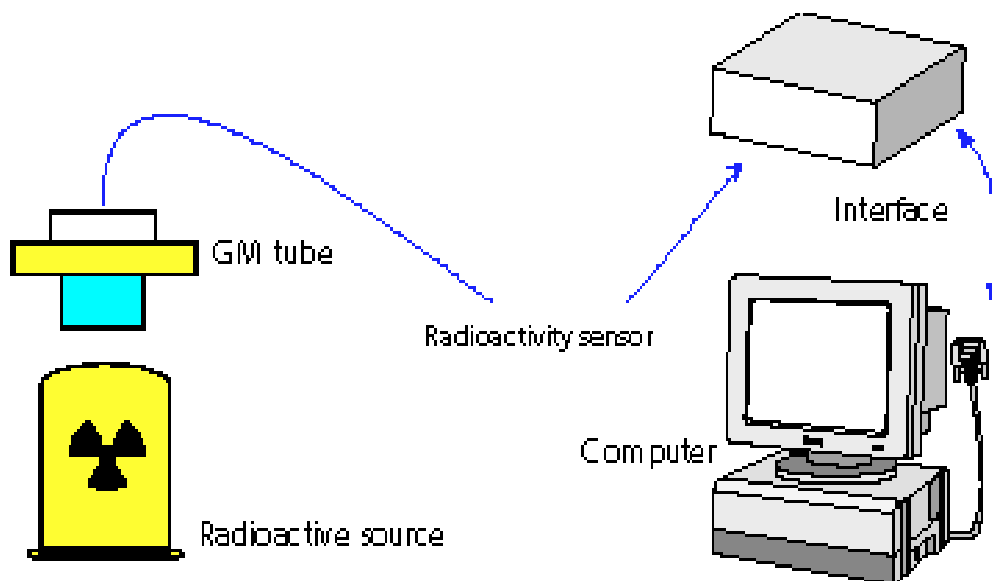


Radioactive decay



The radioactivity sensor is normally connected to a standard Geiger-Muller tube and can produce a radioactive decay curve in 'real-time'. This is a very convincing display of radioactive decay. Protactinium, with its half life of just 72 seconds, makes an ideal radioactive material for this experiment.

Apparatus

Geiger-Muller tube, clamp stand, source such as a Protactinium generator, interface, radioactivity sensor.

Connect the GM tube to the sensor and the sensor to socket 1 on the interface.

Setting up

Some systems recognize the sensors you attach automatically, in others you do this yourself. If you can adjust the range on the sensor, set it to around 50 cps.

You may be able to get the software to calculate $\ln(\text{count rate})$ and plot this in real time.

Recording the data

If you are using a Protactinium generator, give it a shake and then start recording. Record for up to 10 minutes. The exact time will depend on the source.

Using the results

How is a decrease in radioactivity shown on your graph?

Does the radioactivity change steadily or is there more to it?

Use the software to calculate $\ln(\text{count rate})$ and plot this against time. How is this graph different?

Use the software to perform a least squares fit on the raw decay curve.

Save your data on disk. Print the graph.

