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Geiger Muller Counter

Product Number: ENGEM116

Overview

The principles of radiation – energy being released as either particles or waves – were developed in the 19th and early 20th century. Since then, they have become an important part of modern science. Everything from X-rays to the microwave oven have depended on these principles. The Geiger Muller Counter is able to record radiation levels and plays an important role in studying electromagnetism.

The Geiger Muller Counter can be connected to all types of einstein™ data loggers.

Typical experiments

Electromagnetism

- Demonstrating the random nature of radioactive radiation
- Measuring Activity vs. Distance of a radioactive source

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- Investigating the effect of different materials on absorbing radiation

How it works

Some radioactive materials emit high-energy particles powerful enough to knock electrons away from individual atoms. When these electrons are knocked off these atoms become ions. This type of radiation is known as ionizing radiation. The Geiger Muller counter contains a tube filled with low pressure gas. When the tube comes into contact with ionizing radiation new ions are created in the tube. These ions create a current used to measuring the amount of radiation.

Sensor specification

Range:	0-∞ Count, Cpm, Cps
Resolution (12-bit):	1 count
Sensitivity:	Alpha, Beta, Gamma
Window Thickness	1.5 to 2.0 mg/cm^2
Window Material:	Mica
Gas Filling:	Neon, Argon and Halogen
Dead Time, at Recommended	90 µs
Data Logger Input Type:	Digital

Equipment List

- Geiger Muller Counter
- DT-to-einstein™ sensor adaptor

(In some cases, there will be an extra cable included to connect between the sensor and the DT-to-einstein™ adaptor

Data logging and analysis

MiLAB

1. Take your einstein™ Tablet OR pair your einstein™ LabMate™ with your Android or iOS tablet via Bluetooth
2. Connect the sensor to the sensor port via the DT-to-einstein™ sensor adaptor
   (Note: In some cases, you will need to connect the sensor to the sensor adaptor with a sensor-to-adaptor cable)
3. Launch MiLAB

4. In Launcher View, tap the box marked "Empty" and select Geiger Muller from the dropdown list

5. Check the icon next to the sensor (✓) to enable it for logging

MiLAB Desktop

1. Pair your einstein™ LabMate™ with your PC, MAC, or Linux machine via Bluetooth, or connect it via the USB cable (found in the einstein™ LabMate™ box)
2. Connect the sensor to the sensor port via the DT-to-einstein™ sensor adaptor
    (Note: In some cases, you will need to connect the sensor to the sensor adaptor with a sensor-to-adaptor cable)
3. Launch MiLAB Desktop
4. Click on Full Set up in the Current Setup Summary Box
5. Scroll down to the box marked "Empty" and select Geiger Muller from the dropdown list
6. Click the Run button (▶) on the main toolbar of the Launcher View to start logging

Calibration

The Geiger Muller Counter ships fully calibrated. No further calibration is needed.

Experiment set up

Important Note

The Geiger Muller Counter contains a tube made of a very thin and delicate material, which is easily damaged; therefore, it is equipped with a protective cap. The cap should be left on except when measuring Alpha radiation. The cap contains a venting hole to avoid creating a vacuum when it is removed. When removing the cap or replacing it, make sure your fingers do not cover the venting hole.

An example of using the Geiger Muller Counter
Measuring radiation vs. distance

1. Connect the Geiger Muller Counter.
2. Locate a radioactive source in front of the counter, about 30cm away.
3. Click the Run button (▶) on the main toolbar of the Launcher View to start logging.
4. Gradually, bring the source closer and closer to the GM counter.
5. See expected results on figure 1.

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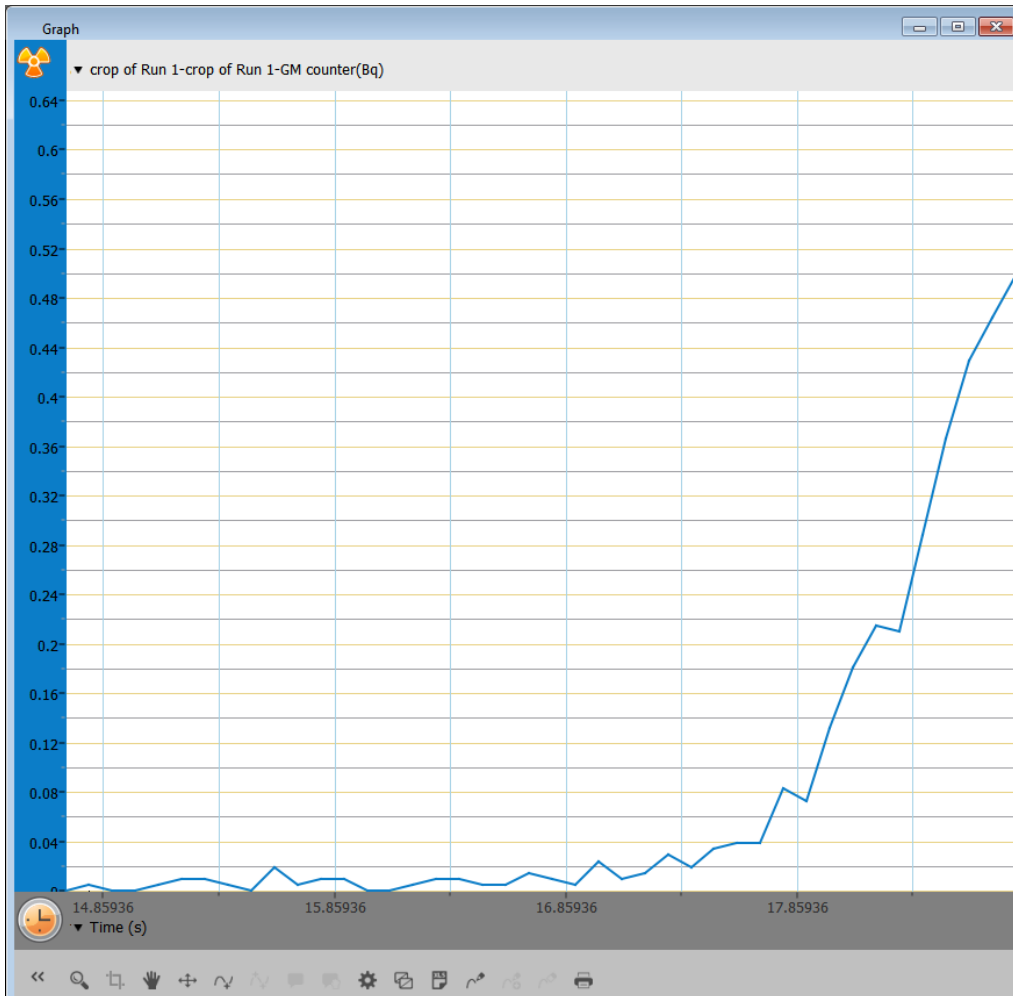
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