

Sensors & Transducers

RADIATION DETECTOR

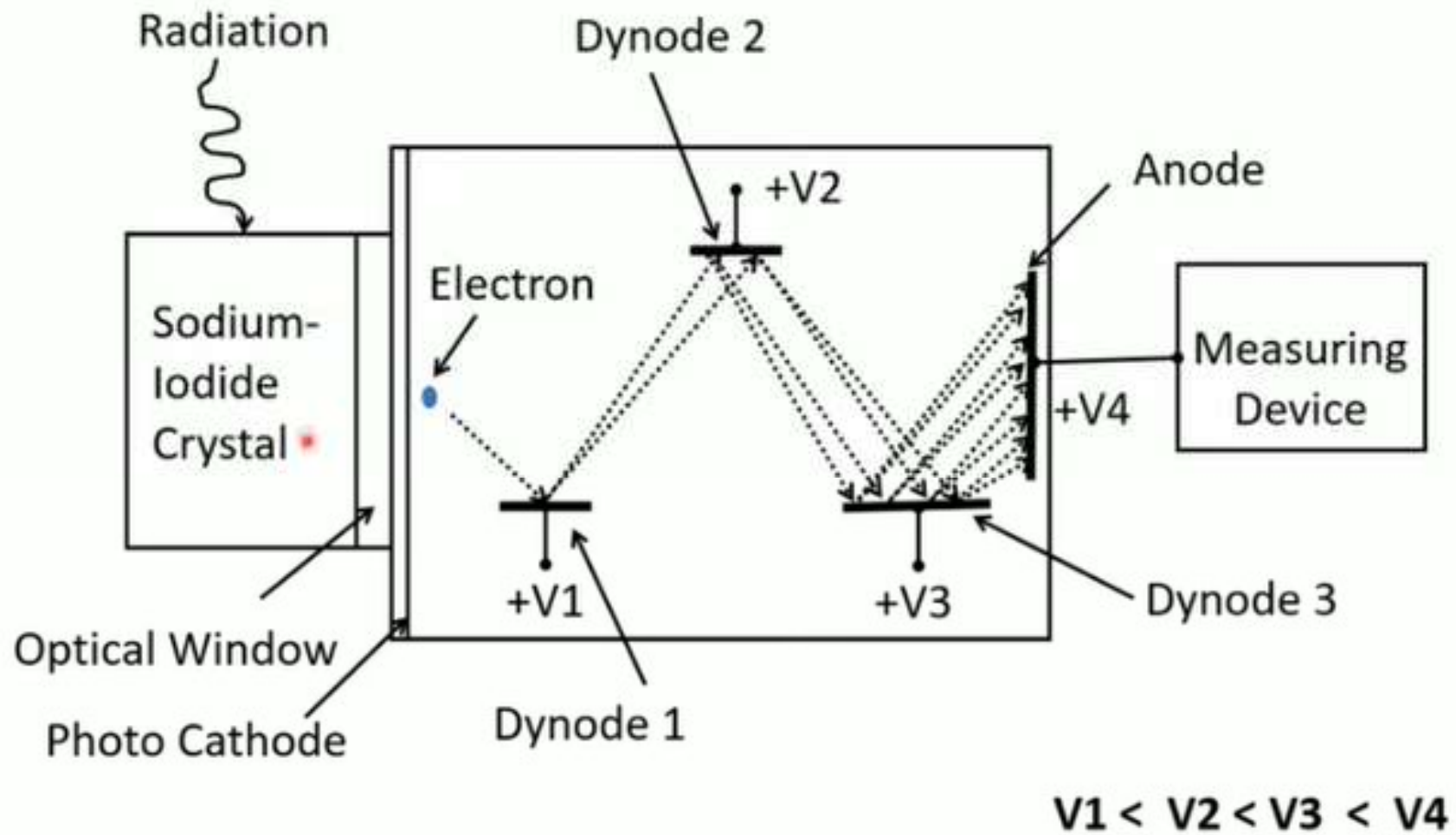
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As the name implies, a nuclear radiation detector identifies nuclear radiation by measuring ionizing radiation of alpha, beta and gamma particles.

- The gas like helium, argon or neon are ionized with the presence of radiation and the rate of ionization is a measure of radiation.
- Some types of radiations have such high energy that when they interact with materials, they can remove electrons from the atoms in that material. This process is known as ionization.
- Radioactivity is a process by which the unstable atoms of an element emit or radiate excess energy in the form of particles or waves. These emissions are called ionizing radiations.

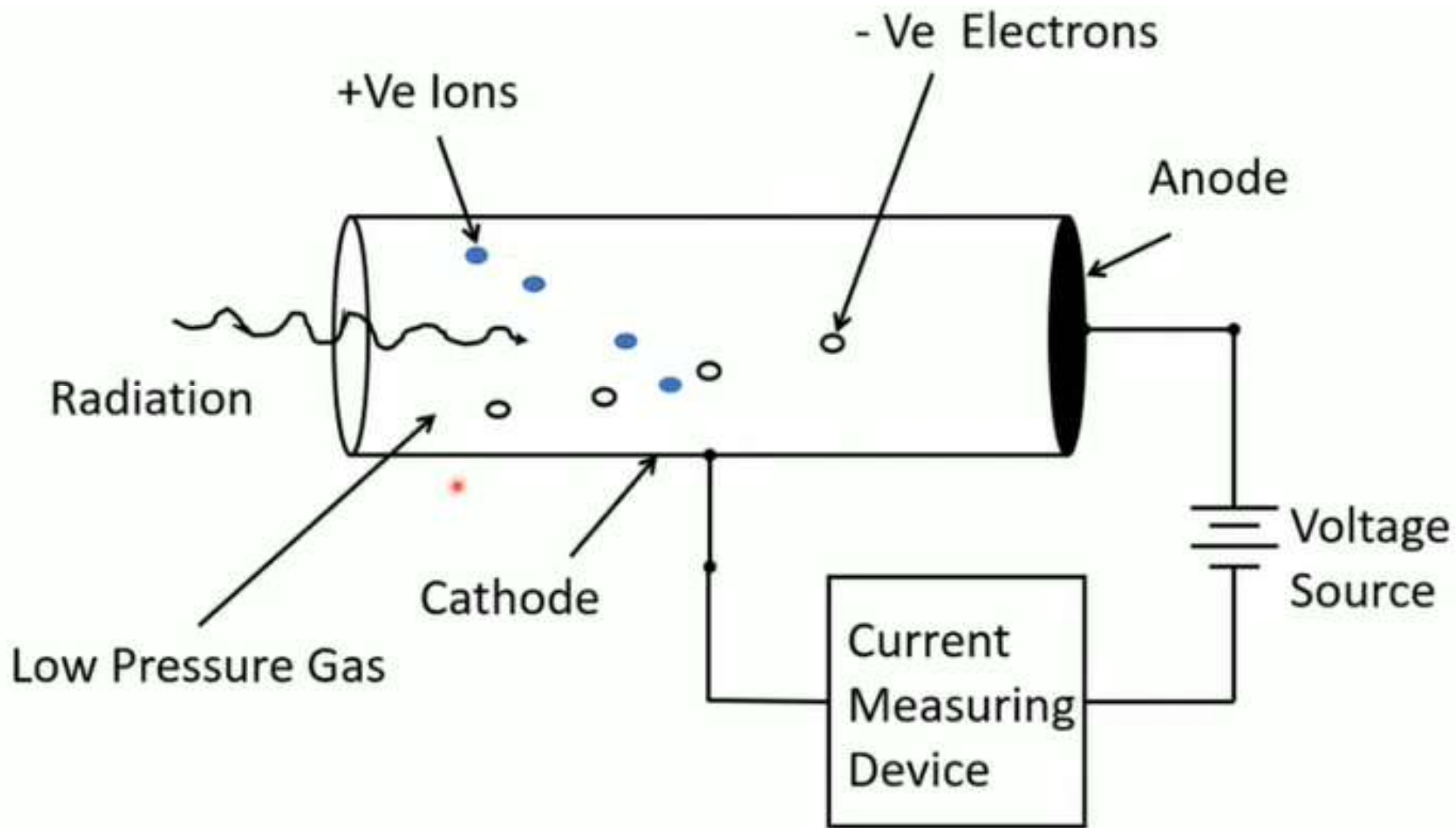
Scintillation Detector

- It consists of a special material which glows or "scintillates" when radiation interacts with it.
- The most common material is sodium-iodide. When radiation happens, light is produced by the scintillation process.
- The light is reflected through an optical window and then it interacts with a photomultiplier tube.



GAS FILLED DETECTOR

- Most common type of gas filled detector is Geiger-Muller or GM detector.
- A gas filled detector consists of sealed glass tube, cathode plate and an anode plate.
- The anode is made positive potential with respect to cathode.
- The gas tube is filled with gas like helium, argon or neon at low pressure level.
- When radiation occurs, the gas is ionized. For every ionization, a free electron and a positive ion pair is created.



SOLID STATE detectors

- In the case of a solid-state radiation detector, this depletion region acts like the detection area.
- At the time of radiation, the radiation interacts with the atoms inside the depletion region. As a result of this interaction re-ionization happens in the depletion region.
- The re- ionization creates movable charge carries inside the depletion region and can be measured.
- The measure value is proportional to amount of radiation happened.