

# Detection of ionizing radiation

The **detection of ionizing radiation** works on **the principle of interaction of radiation with the substance of the sensor**. The sensor, or detector, transforms the radiant energy into another form of energy, which can then be easily registered by ordinary sensors. We consider the use of different types of detectors according to the type of interaction, e.g. ionization, scintillation.

After detection at the input of the measuring system and absorption of a photon or particle, an **electrical impulse** is generated at the output part of the detector. Furthermore, electrical impulses are registered and counted by an **impulse counter** (in the case of activity measurement), or the mean frequency of electrical impulses is measured by an **integrator** (in the case of mean radiation intensity measurement). This course can be observed with detectors in impulse connection.

In the case of using multiple detectors, we distinguish between two types of connection:

- **coincidence connection** registers only impulses that arose simultaneously in two or more detectors;
- **the anti-coincidence connection** does not allow the registration of impulses that occurred simultaneously, and on the contrary, it accepts impulses that did not occur simultaneously in two or more detectors.

## Ionization chambers

The **ionizing chamber** is an electrode system used to detect ionizing radiation, which can be isolated from the environment or freely placed in the air.

 *For more information see Ionization chamber.*

## Geiger-Müller computer

**Geiger-Müller computer (GM computer)** is a detector of ionizing radiation (usually  $\beta$  and  $\gamma$ , but also  $\alpha$  particles if properly arranged). The device consists of a tube filled with an inert gas (Geiger tube).

 *For more information see Geiger-Müller computer.*

## Scintillation detectors

**Scintillating detector** consists of a luminescent scintillation crystal (mostly thallium-activated sodium iodide NaI(Tl)) capable of detecting ionizing radiation in the form of  $\gamma$  or X-rays.

 *For more information see Scintigraphy.*

## Links

### Related articles

- Ionizing Radiation
- Ionization

### Used literature

BENEŠ, Jiří – STRÁNSKÝ, Pravoslav – VÍTEK, František. *Základy lékařské biofyziky*. - edition. Karolinum, 2005. 196 pp. ISBN 9788024610092.