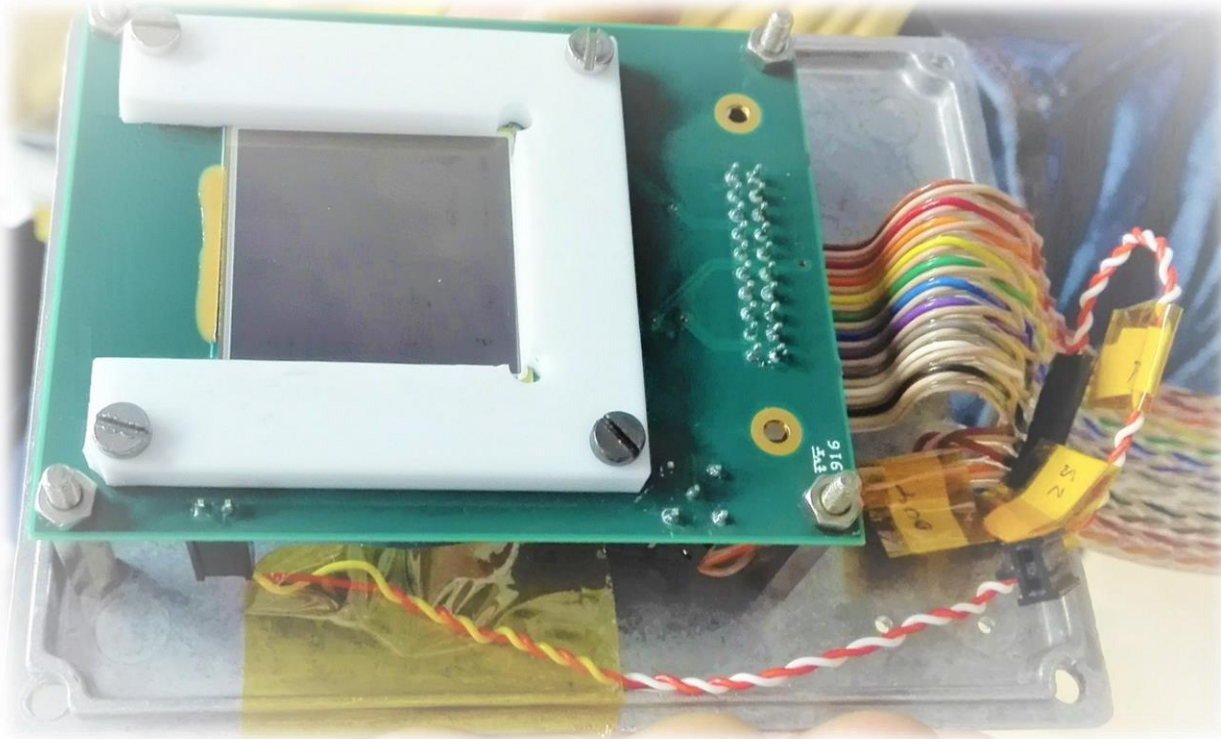


# DETECTION OF TRANSURANIC ELEMENTS



## PRIORITY NUMBER:

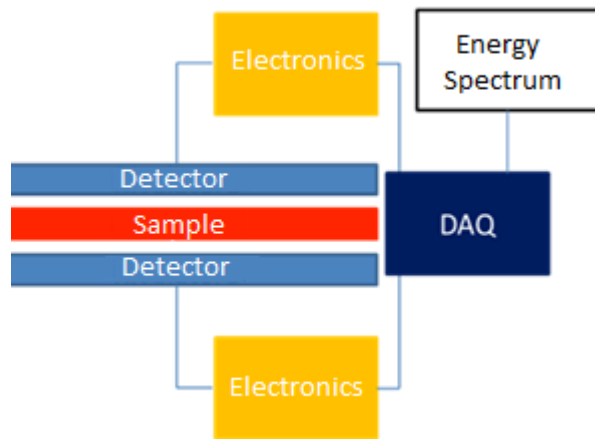
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## KEYWORDS:

Transuranic elements  
Environmental monitoring  
On-site measurements  
X-ray detection

Due to their toxicity, detection of transuranic elements has attracted a lot of interest. Conventional methods to detect transuranic elements are represented by alpha spectroscopy and IPC-MS; gamma spectroscopy is not convenient since it requires very long acquisition time. The presence of transuranic elements such as  $^{238}\text{Pu}$ ,  $^{239}\text{Pu}$ ,  $^{240}\text{Pu}$  and  $^{235}\text{U}$  can be revealed by means of X-ray detector which is active in the range of 10-25 keV.

# DETECTION OF TRANSURANIC ELEMENTS



## DESCRIPTION :

INFN technology detects X-rays emitted by transuranic elements following their decays in order to predict their content in any kind of sample.

Active surface large more than 10 cm<sup>2</sup> is required for measurements with level of sensitivity well below the level of *clearance* typically indicated by the IAEA.

The new product consists in a coincidence detection system based on two planar semiconductors which face each other and host the sample between them. It is worth to point out that the sample does not need any chemical or physical treatment before such a measurement.

Simulations show that contamination of 1 Bq/kg can be assessed in few hours.

A prototype comprising a couple of Silicon Drift Detectors (SDD) has been positively tested.



## ADVANTAGES:

- Portable detection system
- Fast on-site measurements
- No need of equipped laboratories
- Low cost analysis on crude sample
- High sensitivity achieved

## APPLICATIONS:

- Environmental monitoring
- Monitoring system for nuclear plants
- Nuclear fallout monitoring
- Radioactive waste management
- Nuclear decommissioning