

## Compact and lightweight detector for simultaneous imaging of gamma and neutron radiation in nuclear applications

CSIC and the University of Valencia have developed a device that detects and represents gamma and neutron radiation sources simultaneously, and that offers a high spatial resolution to accurately locate and characterize the emission source. It combines both portability and sensitivity, thereby enabling the detection and monitoring of a very broad range of intensities and radioactive sources/isotopes. Simultaneous real-time imaging of gammas and neutrons is of interest in the nuclear industry. Our system consists in a compact and lightweight device, portable, scalable and easy to adapt to different needs of space, volume and weight in these applications.

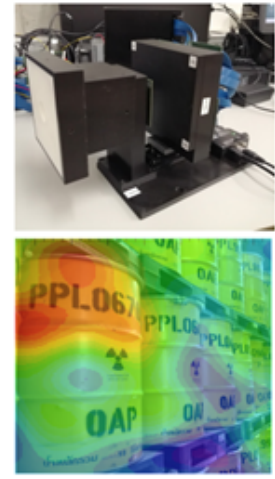
Industrial partners are being sought to collaborate through a patent licence agreement for the manufacture and commercialization of the device.

### *An offer for Patent Licensing*

#### An accurate and light device for the nuclear sector

Currently available radiological instrumentation in the nuclear sector have limitations with regards to the combined detection of gamma and neutron radiations, so it is common to find devices optimized for the detection of a single radiation type. Alternatively, detectors for combined radiation present thresholds that do not allow detecting low energy radiations, and cannot generate high spatial resolution images. Furthermore, these devices are based on large and heavy detector arrays, which makes them difficult to transport.

Our new device successfully overcomes these difficulties, by integrating in a single small and portable device, the capability to image both gamma and neutron radiations, while offering high spatial resolution measurements. This allows obtaining accurate information about the location and the properties of the emission sources.



Top: Picture of the gamma-neutron imaging device. Bottom: gamma image reconstructed from a set of nuclear waste barrels superimposed onto the visual image.

#### Main innovations and advantages

- Simultaneous images of gamma- and neutron- radiations in a single device.
- Offers high resolution measurements for a fast and accurate localization, characterization and quantification of the sources.
- Scalable design, compact and light, can be easily transported/adapted to many different situations (remote use, drones, field work, etc).
- Gamma imaging capabilities demonstrated in industrially relevant environments (TRL 6-7).
- Industrial applications: nuclear sector (radiation monitoring during operation, waste transport and disposal) and security (analysis and control of goods, border inspection).
- Developed in the framework of the ERC Consolidator Grant Agreement Nr. 681740 HYMN.

#### Patent Status

Patent application filed in Europe, United States and Japan

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