

Compact and lightweight high-resolution detector for simultaneous imaging of gamma and neutron radiation

DESCRIPTION OF THE TECHNOLOGY

CSIC and the University of Valencia have developed, in the framework of ERC Consolidator Grant Nr. 681740 HYMNS, a device that allows detecting gamma and neutron radiation sources simultaneously, and that offers a high spatial resolution to accurately determine the location, nature and intensity of the emission source. Furthermore, its sensitivity can be adjusted to cope with a broad range of radiation intensities for both gamma and neutron sources. It consists in a compact and lightweight device, portable and easy to adapt to different needs of space, volume and weight, being therefore very versatile and promisingly useful for multiple applications.

Current available devices for nuclear radiation detection 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 neutrons, and cannot generate high spatial resolution images. Furthermore, these devices are generally big and heavy which makes them difficult to transport.

Our new device successfully overcomes these difficulties, by integrating in a single small and portable device both gamma and neutron radiation detectors, covering a wide energy spectrum and offering high spatial resolution measurements. This allows obtaining accurate information about the location and the properties of the emission sources.

MARKET APPLICATION SECTORS

Energy (detection and control of nuclear radiation sources), medical (control and monitoring of hadron therapy), research, etc.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- Allows obtaining simultaneous images of thermal neutrons and gamma-radiation in a wide energy range, in a single device and within one measurement.
- Offers high resolution measurements for a fast and accurate detection, localization, characterization and quantification of the radiation sources.
- Its structure is compact and light, so it can be easily transported and adapted to many different situations (remote use, drones, field work, etc).

CURRENT STATE OF DEVELOPMENT

Priority application filed suitable for international extension. The device has been tested in laboratory conditions.

COLLABORATION SOUGHT

Companies interested in the license of the patent for the pre-commercial development and the commercialization of the device are being sought.

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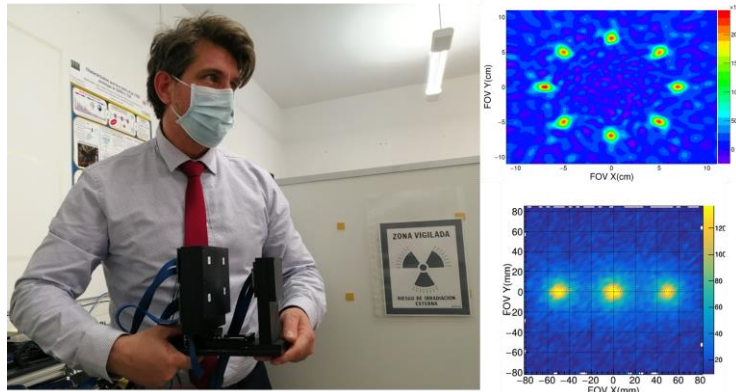


Image 1. Picture of the gamma-neutron imager being operated by a user. On the right-hand side one can see the result obtained for an array of 8 gamma-ray radioactive sources (top) and for three collinear sources of thermal neutrons (right).

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