Compact and lightweight detector for simultaneous imaging of gamma and neutron radiation in medical 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.

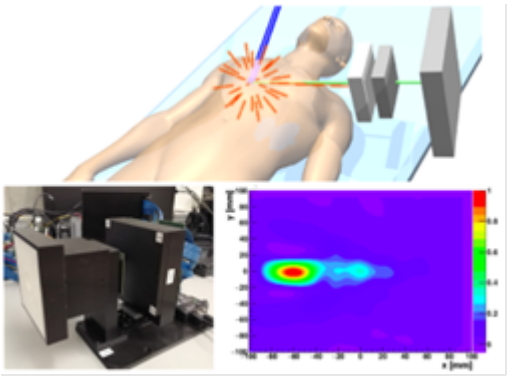
Industrial partners from the medical industry are being sought to collaborate through a joint project or a patent licence agreement for the development and commercialization of the device.

An offer for Patent Licensing

An efficient and light device for medical imaging

Currently available imaging devices in Hadron Therapy facilities cannot provide a combined and correlated detection and imaging of gamma and neutron radiations, and available commercial Compton cameras feature too low efficiency, limiting their potential for real time gamma imaging. Therefore, real-time (neutron and gamma) dose monitoring and ion-beam range verification are among the main challenges in Hadron Therapy, one of the most promising methodologies for cancer treatment.

Our system consists in a compact and lightweight device, portable, scalable and easy to adapt to different needs of space, volume and weight of the clinical facilities. It successfully integrates in a single small and portable device the capability to image with high efficiency both gamma radiation and neutrons. This allows obtaining accurate information to improve the safety and precision of Hadron Therapy treatments).



Top: Prompt gammas and secondary neutrons produced in a HT treatment and detected with our Gamma-neutron imaging device (bottom left). Bottom right: gamma image of the Bragg peak of 18 MeV protons in a graphite block).

Main innovations and advantages

- Simultaneous images of visual, gamma- and neutron- radiations in a single device.
- Offers high resolution measurements for a fast and accurate imaging of gamma and neutron sources.
- Scalable design, compact and light, so that it can be easily adapted to the clinical environment and remotely operated.
- Gamma imaging capabilities demonstrated in industrially relevant environments (TRL 6-7).
- Medical applications: gamma and neutron imaging for quality assurance and dose monitoring in Hadron Therapy treatments.
- Developed in the framework of the ERC Consolidator Grant Agreement Nr. 681740 HYMNS.

Patent Status

Patent application filed in Europe, United States and Japan

For more information, please contact:

Marc Escamilla

Deputy Vice-Presidency for Knowledge Transfer

Spanish National Research Council (CSIC)

Tel.: (+34) 96 161 29 95

E-mail: m.escamilla@dicv.csic.es
comercializacion@csic.es