EUROfusion
TECHNOLOGY TRANSFER PROGRAMME

CeBr Scintillators

Technology, know--how, and expertise have been developed by a world--renowned nuclear fusion organization within the field of CeBr (Cerium Bromide) Scintillators. These scintillators have been characterized to have a fast response time of less than 20ns and the energy resolution at 511keV is about 4%. Previously, conventional gamma ray detectors have been unsatisfactory in their time resolution, limiting their applications in medical PET scanners and material science measurements.

Description of the technology

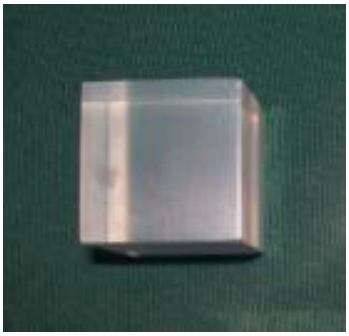
A leading European Centre for nuclear research has developed technology, knowhow, and expertise in the application of CeBr3 scintillators. These scintillators have a much faster response time at 20ns than many others that are on the market and have an energy resolution that is in the region of 4% at 511keV. One of the key advantages of these scintillators is that they can be used at varying temperatures whereas others have to have their environments strictly controlled to achieve similar performance characteristics.

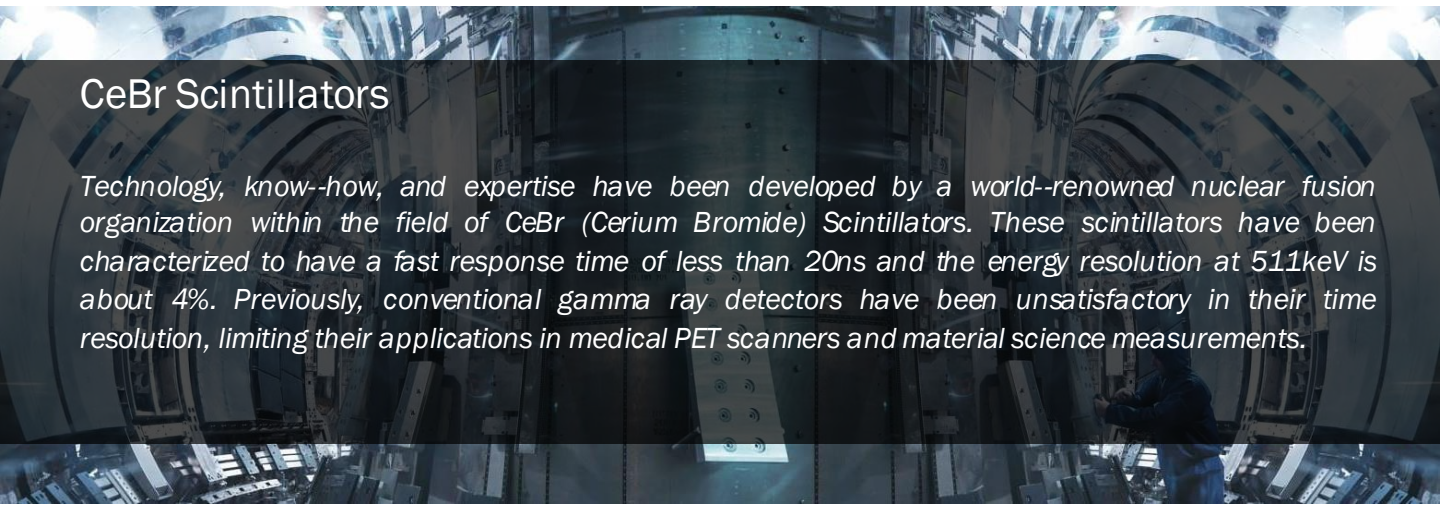
The scintillators characterized are slightly larger than 76 x 76 mm but have also been produced down to 10 x 10 mm with a depth of 5mm. This allows for many applications to be explored. The organization is looking to apply this world leading knowledge in scintillators to other markets. This could involve data analysis and getting the best performance out of current systems in a variety of applications or even simply consulting on relevant projects.

Innovation and advantages of the offer

The main advantage is that the CeBr Scintillators can be used in an environment where the temperature is variable.

It is also more intrinsically radiation hard than Lanthanum based scintillators making it attractive for space missions.





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Non-fusion Applications

When coupled with a photoelectron multiplier tube, applications involving gamma ray detection are possible.

Positron Emission Tomography (PET) in Medical Treatments

If the time resolution is enhanced, it is possible to detect the position of a positron from time information. This results in better service for patients by reducing measurement time and a decrease in the strength of a line source.

Positron Lifetime Measurements

In materials science, the lifetime measurement of a positron is utilized for the detection of a lattice defect. The detection sensitivity is improved by enhancing the time resolution.

CeBr scintillators are currently being investigated for use in space missions by ESA, in particular for gamma ray detection.

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