



Research:

**Gamma detectors**

In 2016 we delivered to the Joint European Torus (JET) a new detector for the Gamma-ray Spectrometer based on a 3"×3" CeBr<sub>3</sub> scintillator coupled to a photomultiplier tube. A dedicated active voltage divider was designed at NCBJ for this detector. In test measurements at NCBJ a strong <sup>137</sup>Cs source with an activity of ~400 MBq was used to check the stability of the detector performance at high count rates. The results of tests already performed at NCBJ and JET have shown that the new detector based on CeBr<sub>3</sub> with the active voltage divider is well suited to measurements at rates of up to ~1 Mcps. The studies at JET will prepare detectors for the International Thermonuclear Experimental Reactor (ITER) as well as the DEMOnstration Pow-

er Plant (DEMO). At JET the α particle diagnostics are based on the <sup>9</sup>Be(α,ny)<sup>12</sup>C nuclear reaction occurring between confined α particles and beryllium impurity ions typically present in the plasma. A 4.4 MeV gamma line is emitted as a result of this reaction. Gamma-ray diagnostics of magnetically confined plasmas provide information on runaway electrons (fast electrons that often appear during plasma disruptions), fusion products and other fast ions due to nuclear reactions with fuel ions or main plasma impurities such as carbon and beryllium.

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