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6.20 The upgraded JET Gamma-ray Camera based on high resolution/high count rate compact spectrometers

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The JET gamma ray camera has been very recently upgraded within the EUROFUSION enhancement program by the Gamma-ray Camera Upgrade (GCU) project. Aim of the GCU project is to improve the spectroscopic properties of the existing gamma ray camera both in terms of energy resolution and high counting rate capability, in order to operate in the forthcoming high power D and DT campaign. In this work we describe the solutions developed to meet the target requirements (Energy resolution <5% at 1.1 MeV and counting rate capability >500 kHz) which will enable high energy resolution/high count rate gamma-ray spectroscopy measurements in the 19 detectors of the horizontal and vertical camera. In particular, it was necessary to design, develop and realize a new compact gamma ray spectrometer based on a LaBr₃ scintillator crystal (25.4 x 16.9 mm²) coupled to a Silicon Photo-Multiplier. The expected enhanced performance of the upgraded JET gamma ray camera will be presented with an example of the first D plasma data collected in the JET 2018 C38 campaign.

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