Abstract Submitted
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A Novel Stacked Scintillator Detector for Bremsstrahlung Measurements of the Runaway Electron Distribution Function[1] L. STAGNER, Oak Ridge Institute of Science and Education (ORISE), X.D. DU, N.W. EIDIETIS, C. PAZ-SOLDAN, General Atomics — A novel stacked scintillator detector (SSD) has been developed at DIII-D to measure bremsstrahlung radiation produced by runaway electrons. Designed to be interchangeable with the existing Bismuth-Germanate (BGO) scintillating crystal detectors in DIII-D's Gamma Ray Imager's (GRI), the SSD have several improved characteristics compared to the BGO detectors. When running in pulse-height counting mode the BGO detectors provide excellent energy resolution; however, when the incoming flux becomes large, pulse pile makes it difficult to distinguish individual pulses. Additionally, due to the presence of pre-amplifying circuits, the BGO signal can saturate. These problems can be resolved at the cost of energy resolution by running the BGO detectors in current mode. The new SSD recovers a coarse energy resolution while running in current mode by stacking multiple scintillating crystals separated by attenuating material. In this work, we will discuss the design of the SSD and characterize their instrumental response. Additionally, the sensitivity of the detectors to different points in the runaway electron orbit-space (orbit weight functions) will be shown.

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