Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

A new gamma ray imaging diagnostic for runaway electron studies at DIII-D[1] C.M. COOPER, ORAU, D.C. PACE, N.W. EIDIETIS, C. PAZ-SOLDAN, GA, N. COMMAUX, D. SHIRAKI, ORNL, E.M. HOLLMANN, R.A. MOYER, UCSD, V. RISOV, SUNY Buffalo — A new Gamma Ray Imager (GRI) is developed to probe the electron distribution function with 2D spatial resolution during runaway electron (RE) experiments at DIII-D. The diagnostic is sensitive to 0.5 - 50 MeV gamma rays, allowing characterization of the RE distribution function evolution during RE dissipation from pellet injection. The GRI consists of a lead "pinhole camera" mounted on the midplane with 11x11 counter-current tangential chords 20 cm wide that span the vessel. Up to 30 bismuth germanate (BGO) scintillation detectors capture RE Bremsstrahlung radiation. Detectors operate in current saturation mode at 10 MHz, or the flux is attenuated for Pulse Height Analysis (PHA) capable of discriminating up to ∼10k pulses per second. Digital signal processing routines combining shaping filters are performed during PHA to reject noise and record gamma ray energy. The GRI setup and PHA algorithms will be described and initial data from experiments will be presented.

[1]Work supported by the US DOE under DE-AC05-00OR22725, DE-FG02-07ER54917 & DE-FC02-04ER54698.

C.M. Cooper
ORAU

Date submitted: 17 Jul 2015 Electronic form version 1.4