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A Wide-Bandwidth Multichannel Radiometer Diagnostic for Disruptions and Other Transient Phenomena on DIII–D[1] D.S. GRAY, S. LUCKHARDT, D.G. WHYTE, J. ZHANG, Fusion Energy Research Program, UC San Diego, T.E. EVANS, D.A. HUMPHREYS, A.W. HYATT, A.G. KELLMAN, R.L. LEE, J.A. LEUER, P.L. TAYLOR, General Atomics, T.C. JERNIGAN, Oak Ridge National Laboratory — For progress in the understanding of tokamak disruptions, knowledge of the radiant power loss, and its spatial distribution, during the thermal-quench (TQ) and current-quench (CQ) phases is needed. Here we present the design of a fast-timescale ($\sim$ 1 μs) radiometer, making use of X-UV photodiode detectors, to diagnose the TQ and CQ phases of disruptions in DIII–D and to provide a complement to the existing bolometer and SXR diagnostics. The responsivity of these photodiodes is approximately constant for photon energies between 10 eV and 8 keV (with some deviation for longer-wavelength UV and visible radiation). Radiated power densities of the order 3×10^8 W/m^3 ($\sim10^8$ W/m^2 heat flux at the plasma surface) are expected during DIII–D disruptions. Design of the multichord radiometer and results from a single photodetector are presented in this poster.

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T.E. Evans
evans@gav.gat.com
General Atomics

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