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Magnetic and Thermal Energy Flow During Disruptions in DIII–D,[1] A.W. HYATT, R.L. LEE, D.A. HUMPHREYS, A.G. KELLMAN, P.L. TAYLOR, AND THE DIII–D TEAM, General Atomics, J.W. CUTHBERTSON, University of California, San Diego — A plasma disruption results in the rapid loss of stored thermal and magnetic energy. We measure the spatial distribution and temporal evolution of energy flows during disruptions in DIII–D using magnetics, bolometry and toroidally separated infrared video (IRTV) cameras. Bolometer tomography and IRTV data are used to separate divertor heat flux into radiation and conduction components. A Poynting flux analysis based on the poloidal flux, ψ(r,t), generated by the equilibrium reconstruction code EFIT measures the flow of electromagnetic energy into a volume defined by the vacuum chamber inner wall. The measured inflow/outflow of energy from this volume throughout a disruption's thermal and current quench phases will be presented for various types of disruptions: radiative collapse, high beta, VDE, etc. From these measurements we construct an energy balance which accounts for all energy flows to about 10%. We find that a radiative collapse disruption conducts significantly less energy to the divertor than others, and that an accurate energy balance requires toroidally asymmetric heat flux measurements.

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