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Temperature and Density Evolution Measurements and Runaway Production During Disruptions in DIII–D,[1] S. LUCKHARDT, J.W. CUTHBERTSON, J. ZHANG, University of California, San Diego, R.E. STOCKDALE, T.E. EVANS, A.G. KELLMAN, P.L. TAYLOR, General Atomics, D.G. WHYTE, Energie et Materiaux — Disruptions caused by vertical instability, density limit, and argon and neon pellet injection are compared with respect to runaway electron suppression. The electron temperature, density, electric field, and impurity content of the disrupting plasma are critical parameters in the Dreicer runaway formation process with low temperatures favoring the formation of runaways. Our measurements indicate electron temperatures in the range of ∼100 eV in the initial phase of the post-thermal-quench plasma decreasing to the ∼10 eV range near the end of the current quench. We find that runaway production from the Dreicer process is negligible in typical DIII–D cases. In cases where impurity pellets are injected into the plasma, significantly reduced electron temperatures are observed in the post thermal quench phase leading to enhanced values of the runaway production parameter, ϵ=E/E-Dreicer. These plasmas often exhibit electron runaway effects during the current quench phase of the disruption.

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