Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Effect of plasma elongation on disruption runaway electrons[1]
ROBERT GRANETZ, DENNIS WHYTE, GEOFF OLYNYK, MIT PSFC, VALERIE IZZO, UCSD — Studies of runaway electron (RE) populations during disruptions on a number of different tokamaks have shown two distinctly different types of behavior: (a) some machines tend to observe RE's during a significant number of current quenches, and (b) some machines rarely observe RE's during the disruption current quench. Of those that do see runaways, a general trait is that they run circular or low elongation and/or limited discharges (FTU, Tore-Supra, TEXTOR, JT-60U), and conversely, those that don't see runaways tend to run elongated, diverted discharges (C-Mod, DIII-D, ASDEX-U). This suggests that elongation might play a role in RE confinement during disruptions, and recent experiments on DIII-D support this hypothesis. An experiment to test this on Alcator C-Mod uses lower hybrid current drive to generate a strong RE population, and gas jet injection to trigger reproducible disruptions. Behavior of runaways during disruptions in both low elongation and high elongation equilibria are compared. Experimental findings will be presented and compared to NIMROD modeling predictions. Implications for using this technique to enable an extensive research thrust on RE physics and mitigation will be discussed, as will implications for ITER.

[1]Supported by US DoE award DE-FC02-99ER54512.

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Date submitted: 20 Jul 2010 Electronic form version 1.4