Abstract Submitted
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CQL3D-GENRAY Simulations of Suppression of Impurity-Induced Current Quench Using LHCD in C-Mod[1] R.W. (BOB) HARVEY, YU.V. PETROV, CompX, P.T. BONOLI, MIT, S. SHIRAIWA, PPPL, P.B. PARKS, GA — In Alcator C-Mod lower hybrid current drive experiments (LHCD), Reinke [1] has examined discharges which undergo an abrupt thermal quench (TQ) to low Te due to radiation from incoming tungsten flake material. This is simulated using the coupled CQL3D Fokker-Planck/Ampere-Faraday [2] and GENRAY ray tracing codes, based on experimental traces of the background densities, temperatures, and one-turn voltage. Simulations show evolution of a quasilinear plateau on the electron distribution, and with onset of the TQ, a collisional decay of the plateau from lower to higher velocity ($\tau_{slow} \propto v^3$) giving an inverted distribution, and consequently a self-consistent instability of the injected LH waves; this broadens the current profile by edge damping. The effect of broadening is similar to recently-reported MHD TQ healing in DIII-D discharges [3]. The LH C-Mod interpretation further supports a new, hopefully robust, disruption control approach. [1] M.L. Reinke *et al*, Nucl. Fusion 59, 066003 (2019). [2] R.W. Harvey *et al.*, Nucl. Fusion 59, 106046 (2019) [3] X.D. Du *et al.*, Nucl. Fusion 59, 094002 (2019); X. D. Du, Personal communication (2020).

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