Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Burn Control Mechanisms in Tokamaks[1] M.A. HILL, W.M. STACEY, GA Tech — Burn control and passive safety in accident scenarios will be an important design consideration in future tokamak reactors, in particular fusion-fission hybrid reactors, e.g. the Subcritical Advanced Burner Reactor. We are developing a burning plasma dynamics code to explore various aspects of burn control, with the intent to identify feedback mechanisms that would prevent power excursions. This code solves the coupled set of global density and temperature equations, using scaling relations from experimental fits. Predictions of densities and temperatures have been benchmarked against DIII-D data. We are examining several potential feedback mechanisms to limit power excursions: i) ion-orbit loss, ii) thermal instability density limits, iii) MHD instability limits, iv) the degradation of alpha-particle confinement, v) modifications to the radial current profile, vi) "divertor choking" and vii) Type 1 ELMs.

[1]Work supported by the US DOE under DE-FG02-00ER54538, DE-FC02-04ER54698

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Date submitted: 22 Jul 2015 Electronic form version 1.4