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Burn Control Mechanisms in Tokamaks MAXWELL HILL, WESTON STACEY, Georgia Institute of Technology — Burn control and passive safety in accident scenarios will be an important design consideration in future tokamaks, especially those used as a neutron source for fusion-fission hybrid reactors, such as the Subcritical Advanced Burner Reactor (SABR) concept. At Georgia Tech, we are developing a new burning plasma dynamics code to investigate passive safety mechanisms that could prevent power excursions in tokamak reactors. This code solves the coupled set of balance equations governing burning plasmas in conjunction with a two-point SOL-divertor model. Predictions have been benchmarked against data from DIII-D. We are examining several potential negative feedback mechanisms to limit power excursions: i) ion-orbit loss, ii) thermal instabilities, iii) the degradation of alpha-particle confinement resulting from ripples in the toroidal field, iv) modifications to the radial current profile, v) "divertor choking" and vi) Type 1 ELMs.

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