Abstract Submitted
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Modeling for Control of the Current Profile Evolution During the Ramp-Up Phase at DIII-D[1] Y. OU, C. XU, E. SCHUSTER, Lehigh U., T.C. LUCE, J.R. FERRON, M.L. WALKER, D.A. HUMPHREYS, GA — Simultaneous real-time control of the current and pressure profiles can lead to the steady-state sustainment of an internal transport barrier (ITB). It has also been suggested that global current profile control, eventually combined with pressure profile control, can be an effective mechanism for neoclassical tearing mode (NTM) control and avoidance. A key goal in control of an advanced tokamak (AT) discharge is to maintain a safety factor (q) and pressure profiles that are compatible with both MHD stability at high toroidal beta and at a high fraction of the self-generated bootstrap current. Active feedback control of the q profile evolution at DIII-D has been already demonstrated. We report progress towards enabling model-based active control of the current profile during both plasma current ramp-up and flattop phases. Initial results on modeling and simulation of the dynamic evolution of the poloidal flux profile during the ramp-up phase, open-loop control results, and an assessment of control needs are presented.

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