Simulating ITER plasma startup and rampdown scenarios in the DIII-D tokamak

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Abstract. DIII-D experiments have investigated ITER startup scenarios, including an initial phase where the plasma was limited on low field side (LFS) poloidal bumper limiters. Both the original ITER "small-bore" (constant q_{95}) startup and a "large-bore" lower internal inductance (l_i) startup have been simulated. In addition, l_i feedback control has been tested with the goal of producing discharges in ITER within the capabilities of the poloidal field coil set and favorable to the intended mode of operations in the subsequent constant current (flattop) phase. These discharges have been modeled using the Corsica free boundary equilibrium code. High performance hybrid scenario discharges ($\beta_N = 2.8$, $H_{98,y2} = 1.4$) and ITER H-mode baseline discharges ($\beta_N > 1.6$, $H_{98,y2} = 1–1.2$) have been obtained experimentally in an ITER similar shape after the ITER-relevant startup. Studies have been initiated to develop a reliable scenario for exiting the burn phase and ramping down the plasma current in ITER without disruptions.