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Impact of EC location and timing on the stability and performance of the zero torque ITER Baseline Scenario in DIII-D FRANCESCA TURCO, Columbia University, TIMOTHY LUCE, ITER Organization, CRAIG PETTY, General Atomics, JEREMY HANSON, GERALD NAVRATIL, Columbia University, AL HYATT, General Atomics, JOHN FERRON, General Atomics (retired) — Scans of EC deposition at zero input torque in recent ITER Baseline Scenario (IBS) Demonstration discharges show that power deposition in the region of the q=2 surface is prone to causing (not suppressing) 2/1 modes, due to its impact on the local Te_{ped}. The maximum stable Te_{ped} is inversely proportional to li, which points to a first order dependence of the stability on the global current profile (J) shape. The local minimum in J near q=2 is higher later in the shot, when li is lower, and the equilibrium can sustain a higher Te_{ped} without crossing the stability boundary. Local T_e impacts both the bootstrap current and the resistivity, therefore both the outer and inner layer physics, affecting the Δ' and the Δ' critical for instability. An in-shot dynamic scan of EC deposition from core to edge decreases H_{98y2} by 17% and τ_E by 30%, due to loss of heating efficiency. This calls into question the compatibility of direct EC stabilization with achieving ITER's performance goals. 0-D simulations show that the zero torque IBS shots with core ECH project to the ITER goals (Q=10, P_{fus} =550 MW, with heating power P_{heat} =70 MW, compatible with the ITER hardware), and indicate the trade-offs between density, field, pressure and gain.

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