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Plasma Response to n=3 Magnetic Perturbations in Noninductive Hybrid Plasmas in the DIII-D Tokamak[1] R. NAZIKIAN, A. BORTOLON, N. FERRARO, N. LOGAN, PPPL, C.C. PETTY, C. PAZ-SOLDAN, General Atomics, T.L. RHODES, UCLA, R. MOYER, D. ORLOV, UCSD, F. TURCO, Columbia University — 3D magnetic perturbations (MPs) are effective in suppressing Type-I and Grassy ELMs in DIII-D noninductive Hybrid plasmas over a wide range of q95 (5.2-7.5) and beam torque (6 -0.2 Nm) with minimal confinement degradation ($\beta_N \approx 3.2, H_{98} \approx 1.2$). Recent experiments elucidate the role of the plasma response to n= 3 MPs that is responsible for the effectiveness of ELM suppression in this regime. Scans of the n= 3 applied spectrum were performed using the new ASIPP Super Supplies and by comparing the plasma response to even/odd parity and single row I-coil configurations. Even parity is poor at driving plasma response and for ELM suppression, consistent with model predictions. All other coil configurations showed strong amplification by the plasma, $\approx 4x$ larger than for the $\beta_N \approx 1.8$ ITER inductive scenario, consistent with predictions from linear MHD modeling. These results reveal the beneficial role of high beta and elevated q_{95} for the suppression of ELMs by MPs in Advanced Tokamak scenarios.

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