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[ ] Theory [X] Experiment

The Role of the m/n=3/2 Tearing Mode in the Hybrid Scenario,* P.A. Politzer and the DIII-D Team, *GA* – The hybrid scenario has been proposed as a robust operating scenario for high performance operation of ITER. Understanding the physics of the hybrid regime will allow more confident implementation. In these plasmas, J(0) is lower and q(0) is higher than in comparable conventional plasmas. A key feature in DIII-D hybrids is an m/n=3/2 NTM. This island structure is associated with the reduction ($q_{95}\leq 4$) or elimination ($q_{95}\geq 4$) of sawteeth. Decreasing the sawtooth amplitude reduces or eliminates a trigger for the deleterious m/n=2/1 NTM, which limits beta in the conventional H-mode scenario. The effect of the 3/2 mode on sawteeth has been shown using localized ECCD (≤50 kA) to enhance or suppress the mode amplitude. With co-ECCD the mode is suppressed and sawteeth appear. With counter-ECCD the 3/2 amplitude increases and small pre-existing sawteeth are suppressed. A variety of physical mechanisms may be involved in the regulation of q(0) and the sawteeth by the 3/2 mode. Because the stationary state always has q(0) close to one, it is likely that the observed 2/2 component of the 3/2 mode is playing a role.

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