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Category Number and Subject:

[**X**] Theory [ ] Experiment

The 3/2 Magnetic Island and Its Effect on the Central Tokamak Region,* M.S. Chu, V.S. Chan, M. Choi, L.L. Lao, P.A. Politzer, H.E. St John, A.D. Turnbull, *GA,* D.P. Brennan, *MIT* – In the hybrid discharge scenario in DIII-D, the central plasma evolves into a quasi-steady state without sawtooth. The central safety factor (q) is pegged close to 1 and correlates with the development of a rotating 3/2 magnetic island [1]. The causal relationship between the 3/2 island and the non-sawtoothing of the discharge is investigated. Equilibria modeling the discharge with different central q are analyzed using the PEST-III stability code. The 3/2 island is found to develop a 2/2 side-band with increasing amplitude as the central q approaches 1. This near resonant Alfvén wave propagates with enhanced phase speed relative to the background plasma. With sufficient phase speed, the 2/2 side-band could drive currents which impedes the further decrease in q to trigger the sawtooth. The central 2/2 side-band does not lead to appreciable enhanced trapping of the plasma; but does modify the trajectory of the trapped particles and lead to additional transport.

[1] P.A. Politzer, et al., 32nd EPS Conf. on Plasma Physics, Tarragona, Spain (2005).

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[ ] Oral [x] Poster