

**Abstract Submitted for the Forty-Eighth Annual Meeting  
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Category Number and Subject: 5.6.2. DIII-D Tokamak

Theory     Experiment

**Modification of Sawteeth Periods By Trapped Fast Ions in DIII-D,\*** M. Choi, V.S. Chan, M.S. Chu, L.L. Lao, and A.D. Turnbull, *GA* – The main auxiliary heating methods for ITER are neutral beam and ion cyclotron wave heating. Sawtooth physics is very important in optimizing the heating efficiency for ITER. This requires understanding of the interaction between fast ions and fast Alfvén wave (FW) on MHD stability. Experimentally, the DIII-D discharges have demonstrated strong acceleration of deuterium beam ions above the injected beam energy from measurements of enhanced neutron emissions during FW heating. Theory predicts that high pressure from fast ions in the center of plasma may act as a stabilizing kinetic effect on ideal internal kink mode. However, the DIII-D experimental results showed that sawteeth characteristics strongly depend on a combination of plasma and wave conditions. We apply a Monte-Carlo orbit code (ORBIT-RF) and ideal MHD code (GATO) to model existing DIII-D experiments and explore the triggering and stabilization mechanisms for sawteeth. The analytical model by Bussac and Porcelli will be compared with NOVA-K calculations.

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