

Abstract Submitted
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Spatial variation of density fluctuation during sawtooth oscillations in DIII-D¹ S. BOSE, W. FOX, Princeton Plasma Physics Laboratory, D. LIU, A. GOODMAN, Princeton University, Z. YAN, G. MCKEE, University of Wisconsin, H. JI, S. JARDIN, N. FERRARO, Princeton Plasma Physics Laboratory, V. IGOCHINE, Max Planck Institute for Plasma Physics, Y. ZHU, UC-Davis — Sawtooth oscillations are internal relaxation events in a tokamak which lead to a rapid drop of core electron temperature. A significant question for sawtooth oscillations is the short crash time, which, in the traditional Kadomtsev model, is related to how fast reconnection can occur to re-arrange the magnetic field. Several possible competing mechanisms have been proposed for the fast crash, including the two-fluid effects near the reconnection layer, plasmoid instability, and interchange instability. To understand the role of these processes we have measured the plasma density evolution during sawtooth oscillations using the Beam-Emission Spectroscopy diagnostic (BES). Our analysis of BES data obtains 2-D images of plasma density near the sawtooth inversion layer. The results show large intensity variations from the 1/1 rotating magnetic structure, suggesting $\delta n/n$ may be as high as 0.2. Comparison of the 2D image of density variation near the inversion layer for a number of sawtooth events having 0.5 and 1.5T toroidal field are presented. We discuss the implication of these results on the existence and nature of magnetic reconnection during sawteeth.

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