

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Sawtooth Instability in the Compact Toroidal Hybrid¹ J.L. HERFINDAL, D.A. MAURER, G.J. HARTWELL, D.A. ENNIS, S.F. KNOWLTON, Auburn University — Sawtooth instabilities have been observed in the Compact Toroidal Hybrid (CTH), a current-carrying stellarator/tokamak hybrid device. The sawtooth instability is driven by ohmic heating of the core plasma until the safety factor drops below unity resulting in the growth of an $m = 1$ kink-tearing mode. Experiments varying the vacuum rotational transform from 0.02 to 0.13 are being conducted to study sawtooth property dependence on vacuum flux surface structure. The frequency of the sawtooth oscillations increase from 2 kHz to 2.8 kHz solely due to the decrease in rise time of the oscillation, the crash time is unchanged. CTH has three two-color SXR cameras, a three-channel 1mm interferometer, and a new bolometer system capable of detecting the signatures of sawtooth instabilities. The new bolometer system consists of two cameras, each containing a pair of diode arrays viewing the plasma directly or through a beryllium filter. Electron temperature measurements are found with the two-color SXR cameras through a ratio of the SXR intensities. Impurity radiation can drastically affect the electron temperature measurement, therefore new filters consisting of aluminum and carbon were selected to avoid problematic line radiation while maximizing the signal for a 100 eV plasma.

¹This work is supported by U.S. Department of Energy Grant No. DE-FG02-00ER54610

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Date submitted: 24 Jul 2015

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