

Abstract Submitted
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Observations of ELM Magnetic Precursors and Harmonic Oscillations in NSTX¹ F. KELLY, Unaffiliated, E. FREDERICKSON, R. BELL, K. TRITZ, H. TAKAHASHI, PPPL, R. MAINGI, ORNL, NSTX COLLABORATION — Recent experiments on NSTX have shown $n=1$ dominant and $n=2$ mode ELM magnetic precursors with mode frequency in the 30 to 90 kHz range. The growing magnetic oscillations measured with the NSTX high- n Mirnov diagnostic occurred simultaneous with the onset of the increase in fast $D\alpha$ signal. These bursts of dominantly $n=1$, some $n=2$ and fewer higher modes resemble the predictions of a model simulation of ELMs by T. Evans in which a feedback amplification mechanism causes explosive growth of the separatrix topology driven by thermoelectric currents in flux tubes connecting the divertor plates. The $n=1$ mode remained dominant as wall recycling was reduced with lithium conditioning and $n=3$ RMP was applied, suggesting the trigger mechanism remained the same. Sufficient lithium suppressed ELMs and made the occurrence of low-frequency, low- n Harmonics Oscillations (HOs) more frequent. The HOs are consistent with modes localized in the edge with the frequency of the $n = 1$ harmonic near the rotation frequency of the edge plasma.

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