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Characteristics of ELM precursors on NSTX PHILIPP RIDHA, University of Munich, JONATHAN MENARD, PPPL, DAN STUTMAN, KEVIN TRITZ, Johns Hopkins University, NSTX RESEARCH TEAM — The precursor characteristics of Edge Localized Modes (ELMs) on NSTX were analyzed with Mirnov and USXR diagnostics in terms of toroidal mode number, growth rate, oscillation frequency, growth times before crash, and edge localization. Mode identification is especially difficult for most ELMs studied, as the precursor growth rates are often comparable to the oscillation period. Details of the mode identification process will be described. The Mirnov diagnostic does not tell whether the ELM is edge localized or not, thus the USXR array was used to discriminate between the edge and core plasma using an analysis of the X-ray emission with different metallic filters (Ti $0.4\mu m$ - E $>$ 100eV, Be $10\mu m$ - E $>$ 500eV, Be 100 μm - E $>$ 1.2keV). Using the titanium filter, a strong correlation between Mirnov and USXR data during an ELM crash was observed. Analysis of the USXR data using a constrained tomographic inversion shows relative USXR fluctuation amplitudes from ELM precursors in the range of 1% to 5%. This analysis combined with an edge displacement model provides an estimate of the transient boundary displacements for typical ELMs of $<$ 5 mm.

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