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**Dynamics of ELM filaments during the crash on NSTX** MATE LAMPERT, AHMED DIALLO, STEWART ZWEBEN, Princeton Plasma Physics Laboratory — Edge localized modes (ELMs) are routinely observed in H-mode plasma regimes of the National Spherical Torus Experiment (NSTX). Due to the rapid temporal evolution of this instability only diagnostics with high temporal and spatial resolution can provide a detailed insight into its dynamics. Gas-puff imaging (GPI) at NSTX can provide adequate 2D measurement of fast magnetic field aligned fluctuations (e.g. ELM filaments) in the scrape-off layer and at the plasma edge with 2.5us temporal and 1cm optical resolution. A novel analysis tool was developed to estimate the frame-by-frame velocities and structural parameters of the ELM filaments from GPI measurements. These methods were applied on 2010 NSTX H-mode discharges to characterize the dynamics of the ELM crash. The analysis revealed that the average ELM filament on NSTX has a peak radial velocity of 4km/s outwards and a peak poloidal velocity of 10km/s in the ion diamagnetic direction. The sizes of the ELM filaments were found to be similar to the filaments of the normal background turbulence. However, right at the ELM crash, their shape was found to be different, approximately circular. The ELM filament was found to onset 25us before the ELM crash time linearly accelerating radially along its path.

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