Fast Imaging of ELM Structure in DIII-D *

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ELMs are a possible concern for ITER because of the possible erosion from the impulsive heat and particle flux. ELMs deposit high particle and heat flux to the divertor of tokamaks, and recent probe [1] measurements show that a significant fraction of the particle flux in an ELM reaches the first wall. Here ELMs are studied using high temporal (up to 26 kHz) and spatial resolution (256x256) imaging measurements of the boundary of the DIII-D tokamak during H-mode discharges. Using CIII and D_α optical filters, ELMs are seen to have a filamentary structure with filament widths ranging from 2–5 cm. During the explosive growth phase of an ELM, the filaments move rapidly radially outward at a velocity of 500–1000 m/s while rotating toroidally. The ELM filaments interact with the first wall in a poloidally-localized region within 10 cm of the midplane. Using statistics from multiple ELMs, the toroidal mode number *n* is measured and compared with peeling-ballooning theory.

[1] J.A. Boedo, et al., J. Nucl. Mater. **337-339**, 771 (2005).

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