

**Abstract Submitted for the Forty-Ninth Annual Meeting  
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Category Number and Subject: 5.6.2. DIII-D Tokamak

Theory     Experiment

**Modeling of Perturbation Magnetic Field Based on Scrape-Off Layer Currents (SOLCs) During ELMs in DIII-D,\***  
H. Takahashi, E.D. Fredrickson, *PPPL*; and M.J. Schaffer, *GA* – The poloidal perturbation magnetic field ( $B_{\delta B}$ ) measured by the Mirnov diagnostic at the peak of ELMs in H-mode discharges on the DIII-D tokamak exhibits idiosyncratic features in its poloidal variation: the field peaks in the divertor, and is larger (“anti-ballooning”) and opposite in sign on the inboard side in comparison with the outboard side. A model, developed for calculating  $B_{\delta B}$  consistent with measured scrape-off layer current (SOLC), reproduces these idiosyncratic features. A narrow magnetic structure was also observed by the Mirnov diagnostic at the outboard mid-plane in some ELMs, which appeared to be qualitatively similar to filaments reported earlier in DIII-D [1] and NSTX [2]. The SOLC-based model also reproduces such a filament structure.

[1] E.J. Strait, et al., *Phys. Plasmas* **4**, 1783 (1997).

[2] R. Maingi, et al., *Phys. Plasmas* **13**, 092510 (2006).

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