

**Abstract Submitted for the 50th Annual Meeting  
Division of Plasma Physics  
November 17–21, 2008, Dallas, Texas**

Category Number and Subject:

Theory     Experiment

**Relationships Between ELM Period and Scrape-Off-Layer Current (SOLC) Density at Divertor Tiles in DIII-D,\*** H. Takahashi, E.D. Fredrickson, *PPPL*, M.J. Schaffer, *GA*, J.G. Watkins, *SNL* — The current spike from the electrical break-down of the SOL plasma sheath at the divertor tiles as the ion saturation current ( $I_{\text{sat}}$ ) density falls toward the thermo-electrically-driven SOLC has been suggested [1] as a mechanism involved in ELM triggering process. Currents flowing in the SOL plasma are limited to ion-saturation current density at the sheath until the driving potential results in sheath breakdown. Density pump-out, following the ELM-produced SOL density rise, provides a robust mechanism of generating a cyclical phenomenon by reducing the ion saturation current density toward SOLC values. The present work, based mainly on Langmuir probe measurements, reports on investigations of the quantitative relationship between SOLC and  $I_{\text{sat}}$  densities at the ELM onset time as well as how they influence the length of inter-ELM period.

- [1] H. Takahashi, et al., 32<sup>nd</sup> EPS Conf. on Control. Fusion and Plasma Phys., Tarragona, Spain (2005).

\*Work supported in part by the US DOE under DDE-AC02-76CH03073, DE-FC02-04ER54698, and DE-AC04-94AL85000.