

Abstract Submitted
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ELM Trigger Model: Sheath Breakdown Caused by Thermoelectrically Driven SOL Current in ELM Precursor Phase¹ H. TAKAHASHI, E.D. FREDRICKSON, Princeton Plasma Physics Laboratory, M.J. SCHAFFER, N.H. BROOKS, T.E. EVANS, G.L. JACKSON, L.L. LAO, GA, M.E. AUSTIN, U. Texas-Austin, J.G. WATKINS, SNL — The breakdown of the sheath at the interface of the SOL plasma and divertor tiles, through which thermoelectrically driven scrape-off-layer current (SOLC) flowing along open field lines enters the tokamak structure, is investigated [1] in DIII-D as a possibly causal element in the ELM triggering process. Sheath breakdown may occur when the ion saturation current density (j_{sat}) at the sheath falls to the SOLC current density, increasing the potential drop across the sheath. The limiting j_{sat} varies cyclically through the ELM cycle, reaching a minimum, as the SOL density is pumped out, just before the ELM crash. The increased SOL current following breakdown may contribute toward destabilizing MHD modes. Evidence for sheath breakdown is sought from measurement by the SOLC and Langmuir probe diagnostics.

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