Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Dependence of the Heat Flux Width on the Connection Length in DIII-D[1] M.A. MAKOWSKI, C.J. LASNIER, V.A. SOUKHANOVSKI, Lawrence Livermore National Laboratory, A.W. LEONARD, T.H. OSBORNE, T.W. PETRIE, P.B. SNYDER, General Atomics — The heat flux width characterizes the scale length of peak power deposition in the divertor. The total heat flux width, $\lambda_{int} \approx \lambda_q + 1.74S$, has contributions from the scrape-off layer itself, characterized by the quantity λ_q, and from the private flux region, characterized by a Gaussian-like width, S. Most work to date has focused on the physics of λ_q, with the essential finding that it depends approximately inversely on the plasma current. Here, the emphasis is on the S parameter and, in particular, its dependence on the connection length, L_{conn}. Data from high X-point discharges ($L_{conn} \sim 30$ m) have been used to extend the DIII-D heat flux width database beyond discharges with a standard divertor configuration ($L_{conn} \sim 20$ m). Snowflake divertor discharges ($L_{conn} > 40\,\mathrm{m}$) will also be analyzed to further extend the range of L_{conn}. Preliminary results indicate that S increases with Lconn, consistent with S being determined by a diffusive process. This result has important implications for advanced divertor designs as it demonstrates that long connection lengths increase the heat flux width.

[1]Supported by the US DOE by LLNL under DE-AC52-07NA27344 and the US DOE under DE-FC02-04ER54698 and DE-FG02-95ER54309.

Mike Makowski
Lawrence Livermore National Laboratory

Date submitted: 12 Jul 2014 Electronic form version 1.4