Abstract Submitted
for the DPP00 Meeting of
The American Physical Society

Sorting Category: 6.1.0 (Experimental)

Thermal Diffusivities in DIII-D Show Evidence of Critical Gradients[1] D.R. BAKER, C.M. GREENFIELD, J.C. DEBOO, T.C. LUCE, C.C. PETTY, K.H. BURRELL, General Atomics, B.W. STALLARD, LLNL, DIII-D TEAM — The ion and electron thermal diffusivities ($\chi_{i,e}$) in DIII-D discharges exhibit a strong nonlinear dependence on the measured temperature gradients. In L-mode discharges with low toroidal rotation, χ_i, has an approximate heavyside function dependence on R/L_{T_i}. When R/L_{T_i} is less than a critical value χ_i is very small. When R/L_{T_i} is about equal to the critical value, χ_i increases rapidly. χ_e has a somewhat similar dependence on the parameter $\Xi \equiv a/L_{T_e} - (2/3)(a/L_{n_e}) - 1.6$. When Ξ is <0.0, then χ_e is small and when Ξ is >0.0, χ_e increases linearly with Ξ. This type of dependence is consistent with the predictions for transport which is dominated by ion and electron temperature gradient modes and is a strong indicator that these modes are the main contributors toward L-mode transport in DIII-D. When strong rotational shear is present, the dependence of the diffusivities on the gradients is changed. This change is consistent with the physical picture, that when the E×B shearing frequency is greater than the maximum linear growth rate of the modes as calculated without shear, then the modes are stabilized and the transport is reduced.

[1]Under US DOE Contracts DE-AC03-99ER54463 and W-7405-ENG-48.

D.R. Baker
baker@fusion.gat.com
General Atomics

[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: 10th Oral presentation in DIII-D Session (to follow Ernst)

Date submitted: July 12, 2000 Electronic form version 1.4