

Core Transport Barriers in DIII-D Discharges with Off-Axis ECH*

M.E. Austin¹, K.W. Gentle¹, C.C. Petty², T.L. Rhodes³ and L. Schmitz³

¹University of Texas, Austin, Texas USA

²General Atomics, P.O. Box 85608, San Diego, CA 92186-5608 USA

³University of California, Los Angeles, California USA

In DIII-D discharges with off-axis ECH, long-lasting hollow or “bat-eared” T_e profiles are often observed. The bat-eared shape is due to a region of low transport just inside of the heating location, as evidenced by heat pulse propagation and transport code calculations. The transport barrier is near the $q=1$ surface as determined by the sawtooth inversion radius. Interestingly, the barrier is only seen in the case where the ECH causes a transition to H-mode; if the discharge stays in L-mode, no bat-ears T_e profile forms. Transport code simulations of the T_e time history show that a factor 10 reduction in χ_e at the $q=1$ surface at the H-mode transition is required to match the experiment. The details of the different cases and other experimental observations are discussed.

*Work supported in part by the U.S. Department of Energy under DE-FG03-97ER54415, DE-FC02-04ER54698 and DE-FG02-08ER54984.