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**Thermal Transport in NCS Plasmas with Counter  
Neutral Beam Injection**<sup>1</sup>

B.W. STALLARD, T.A. CASPER, Lawrence Livermore National Laboratory, C.M. GREENFIELD, K.H. BURRELL, P. GOHIL, J. LOHR, C.C. PETTY, General Atomics, E. SYNAKOWSKI, Princeton Plasma Physics Laboratory, M.E. AUSTIN, University of Texas, G.R. MCKEE, University of Wisconsin, C.L. RETTIG, T.L. RHODES, L. ZENG, University of California, Los Angeles — Recent experiments in DIII-D have investigated internal transport barrier (ITB) formation with neutral beams injected in the counter-current direction, assisted by early ECH during current ramp up. For counter injection the  $v_{\text{tor}}B_{\text{T}}$  term for radial force balance adds to the  $\nabla p$  term to determine  $E \times B$  flow shear. Compared to ITB plasmas with co-current injection, characteristics with counter injection at similar beam power are: (a) broader profiles of  $T_{\text{I}}$ ,  $T_{\text{e}}$ ,  $n_{\text{e}}$ , and  $\omega_{\text{tor}}$  within a larger barrier radius, (b) reduced profile gradients in the barrier region, and (c) about a factor of 2 higher  $Z_{\text{eff}}$  ( $\sim 4$ ) from the carbon impurity. In this paper profile evolution and results of transport analysis will be compared with co-injection plasmas.

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Prefer Oral Session  
 Prefer Poster Session

B.W. Stallard  
stallard1@llnl.gov  
Lawrence Livermore National Laboratory

Special instructions: DIII-D Poster Session 1, immediately following JC DeBoo

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