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A Theoretical and Experimental Investigation into Energy Transport in High Temperature Tokamak Plasmas[1] D.P. SCHISSEL, J.E. KINSEY, J.C. DEBOO, C.M. GREENFIELD, T.C. LUCE, C.C. PETTY, R.E. WALTZ, General Atomics, B.W. STALLARD, LLNL, FOR THE DIII–D TEAM — In the design of next step fusion devices the energy confinement time ($\tau_{\rm E}$) has been identified as a critical parameter. Efforts to predict $\tau_{\rm E}$ in future machines has centered around three different techniques: statistical analysis of global energy confinement data, a dimensionless physics parameter similarity method similar to aircraft wind tunnel experiments, and modeling of cross-field turbulence driven energy transport. Early statistical work proved quite accurate in predicting future machine performance. Valuable insight into energy transport has been obtained in wind-tunnel like experiments involving experimental data from the international fusion community. Recent advances in theoretical modeling have increased our understanding of the underlying physics that determines global confinement. New experiments using a modulated heat source and varying the ratio of electron to ion temperature have allowed detailed comparisons to theories. A discussion of the three techniques will be presented.

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☐ Prefer Oral Session
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