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Application of Empirically Derived MHD Metrics in Current Drive and Transport Analysis of NCS Discharges in DIII–D,[1] H.E. ST. JOHN, J.C. DEBOO, C.M. GREENFIELD, D.P. SCHISSEL, General Atomics, B.W. STALLARD, Lawrence Livermore National Laboratory — A recent change in the computational paradigm used in the ONETWO transport code greatly improves our ability to analyze time (and space) dependent experimental measurements from DIII–D. The availability of time evolving resolved profiles, particularly the MSE diagnostic, make possible sufficiently accurate self consistent equilibrium fits on time scales much less than the energy confinement time. Accordingly ONETWO was modified so that geometry and inductively driven source terms which arise due to plasma motion can be supplied externally on an arbitrary time scale. The very computationally intensive MHD/transport cycle is thus eliminated without loosing the information due to the time variation of important parameters. We have applied this method to transient DIII–D NCS discharges to determine the ohmic and non-inductive current evolution and to obtain the most accurate resistivity profiles possible, since they are derived in a manner entirely consistent with experimental measurements.

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