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Parametric Study of Anomalous Thermal, Particle and Momentum Transport in Tokamak Plasmas[1] C. WILSON, T. RAFIQ, A.H. KRITZ, Lehigh University, A.Y. PANKIN, Tech-X Corp. — A new tool is developed to obtain experimental, predictive, and interpreted values from the TRANSP/PTRANP code in order to study the parameter dependence of transport models. This tool is used to investigate the parameter dependence of the new Multi-mode anomalous transport model 8.1 (MMM8.1). A number of scans are carried out and the parameters chosen are those typical for DIII-D discharges. A stiffness study reveals that large values of shear flow and low values of magnetic shear lead to reduced stiffness and reduced thermal diffusivity as well as to an increase in the temperature gradient threshold. In addition, collisionality and temperature gradient scans indicate that the transport associated with the ITG/TEM modes decrease with large electron collisionality while transport associated with DRIBM diffusivity components increase with collisionality. In contrast, in the temperature gradient scan carried out, the behavior observed is that the transport associated with ITG/TEM modes increase with increased temperature gradient and the DRIBM transport decreases. The anomalous poloidal momentum diffusivity is found to be smaller than the toroidal momentum diffusivity. Additional scans carried out include density gradient, q, plasma beta, and plasma elongation. Results from the scans can be used to identify conditions for achieving optimal tokamak discharge performance.

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Arnold Kritz
Lehigh University

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