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Derivation and Physics Basis of Multi-Mode Anomalous Transport Module MMM8.1[1] TARIQ RAFIQ, ARNOLD KRITZ, Lehigh University, JAN WEILAND, Chalmers University of Technology Sweden, ALEXEI PANKIN, Tech-X Corp. — Derivation of Multi-Mode anomalous transport module version 8.1 (MMM8.1) is presented. The MMM8.1 module is advanced, relative to MMM7.1, through the inclusion of peeling ballooning modes, dependence of turbulence correlation length on flow shear, electromagnetic effects in the toroidal momentum diffusivity and the option to compute poloidal momentum diffusivity. The MMM8.1 includes contributions from ion temperature gradient, trapped electron, kinetic ballooning, peeling ballooning, collisionless and collision dominated MHD modes, electron temperature gradient modes and drift resistive inertial ballooning modes. In derivation of the MMM8.1, effects associated with collisions, fast ion dilution, impurity dilution, non-circular flux surfaces, finite beta, and Shafranov shift are included. Advances in the MMM8.1 module result mainly from advances in the Weiland model. The MMM8.1 can be used to compute thermal, particle, toroidal and poloidal angular momentum transport. The fluid approach which underlies the derivation of MMM8.1 is expected to reliably predict, on an energy transport time scale, the evolution of temperature, density and momentum profiles in plasma discharges for a wide range of plasma conditions.

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