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Ion heat transport in improved confinement MST plasmas ZICHUAN XING, MARK NORNBERG, DANIEL J. DEN HARTOG, SANTHOSH KUMAR, JAY K. ANDERSON, University of Wisconsin-Madison — Ion power balance in improved confinement (PPCD) plasmas in MST is dominated by electron collisional heating balanced by charge exchange transport. Neoclassical effects on ions in the RFP are inherently small and PPCD plasmas have reduced turbulence and stochasticity. Thus PPCD plasmas provide a good starting point for a transport model developed to account for collisional equilibration between species, classical conductive energy transport, and energy loss due to charge exchange collisions. This model also allows a possible noncollisional anomalous term to be isolated for study, and correlations between residual magnetic fluctuations during PPCD plasmas and anomalous heating and transport will be investigated. Recent modeling with DEGAS2 Monte Carlo neutral simulation suggests higher core neutral temperature than previously estimated with more simplistic assumptions. However, the working model does not fully account for the electron density increase in the core during PPCD, which is higher than expected from classical particle transport, and neutral and impurity ionization. Other possible mechanisms are considered and analyzed, including more complex impurity charge-state balance and pinch effects. Work supported by the US DOE. DEGAS2 is provided by PPPL.

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