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Neoclassical Calculations with Momentum Conservation Using the PENTA Code JEREMY LORE, ORNL/ORISE, D.A. SPONG, A. BRIESEMEISTER — The PENTA code calculates neoclassical radial and parallel flows of heat and particles, including the effects of collisional momentum conservation, for arbitrary toroidal geometries. As an input, PENTA uses transport coefficients calculated using a pitch angle scattering (PAS) collision operator, for example from the DKES code. In this sense PENTA acts as a momentum correction technique to transport quantities calculated from the PAS transport coefficients, which are often used in stellarator transport analyses. PENTA has recently been upgraded to account for arbitrary ion impurity species, and to include multiple methods of momentum correction for comparison and benchmarking. For non-(quasi)symmetric configurations, the radial electric field is calculated from the nonambipolar particle fluxes. For (quasi)symmetric devices PENTA recaptures intrinsic ambipolarity, demonstrating its applicability to both 2D and 3D geometries. Momentum correction has been shown to have a significant effect on the calculated parallel flows in the HSX stellarator.

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