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Neoclassical transport in density pedestals with non-trace impurities[1] STEFAN BULLER, ISTVAN PUSZTAI, Chalmers University of Tech., MATT LANDREMAN, University of Maryland — We study neoclassical transport in steady-state density pedestals with non-trace impurities using the Eulerian δf code PERFECT, with an emphasis on radially global effects and the effects of impurities. To properly describe transport in a tokamak pedestal, radial coupling must be included, which strongly affects the transport. We find that radial coupling reduces the pedestal heat flux compared to local predictions. Furthermore, the influence of the pedestal persists several orbit widths into the core. The electron flux is significant in the pedestal, and global neoclassical transport is not intrinsically ambipolar. Thus, the impurity flux is not simply opposing the ion flux. The resulting radial current gives a torque that is balanced by a non-negligible radial transport of toroidal momentum. The effective Prandtl number is comparable to typical turbulent values in the core (0.1–0.3), and is sensitive to the impurity content. Global effects have a strong contribution to the poloidal flows of low-Z ions, which give rise to larger in-out flow asymmetries.

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