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Kinetic effects in a tokamak pedestal: ion flow, ion heat transport, and bootstrap current[1] PETER J. CATTO, MIT Plasma Science and Fusion Center, FELIX I. PARRA, MIT Nuclear Science and Engineering and PSFC, GRISHA KAGAN, Los Alamos National Laboratory, MATT LANDREMAN, MIT Plasma Science and Fusion Center, JEFF PARKER, Princeton Plasma Physics Laboratory, ISTVAN PUSZTAI, Chalmers University of Technology and Euratom-VR Association — We consider the effects of a finite pedestal radial electric field on ion orbits using an approach that properly determines the localized portion of the ion distribution function in the banana regime in the small aspect ratio limit. We then solve the modified kinetic equation to retain finite $\mathbf{E}\times\mathbf{B}$ drift departures from flux surfaces by a procedure allows a clear distinction between transit averages and flux surface average. The rapid variation of the poloidal ion flow coefficient as well as the electrostatic potential can modify previous evaluations of the ion particle flow in a flux surface, the radial ion heat flux, and the bootstrap current in the banana and plateau regimes for a subsonic pedestal.

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