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Kinetic Analysis of the Collisional Layer M. ABAZORIUS, F. I. PARRA, University of Oxford, F. MILITELLO, CCFE — To understand plasma behaviour in the scrape-off layer, we need to know the boundary conditions for the plasma and electromagnetic fields near a divertor. At the boundary, in the direction normal to the wall, there are four length scales of interest, the Debye length λ_D, the ion gyroradius ρ_i, the projection of the collisional mean free path in the direction normal to the wall L_N and the device size L. Assuming that the plasma near the divertor satisfies $\lambda_D \ll \rho_i \ll L_N \ll L$, we can split the plasma-wall boundary into three layers[1]. At distances of order ρ_i from the wall the plasma is collisionless and the distribution is far from Maxwellian. At distances much greater than L_N from the wall, Braginskii fluid equations are used to model the plasma, since collisionality is high and the distribution is close to Maxwellian[2]. We focus on the collisional layer of width L_N that connects these two regions. We use a Galerkin method to numerically solve the ion drift kinetic equation in one spatial dimension, with the full Fokker-Planck collision operator, and the quasineutrality equation with adiabatic electrons.

[1]K-U Riemann, **J. Phys. D: Appl. Phys.** 24:493, 1991
[2]P Ricci et al., **PPCF** 54:124047, 2012

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