

Abstract Submitted
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The effect of magnetic flux expansion on plasma sheath/presheath Z.H. GUO, X.Z. TANG, LANL, H. BERK, UT-Austin — Significant magnetic flux expansion can help spread the plasma heat load over a greater area of tokamak divertor plate. It also appears in the expander of an axisymmetric magnetic mirror, which for its favorable magnetic curvature, helps stabilize the global interchange modes in the central cell. For a weakly collisional plasma, the flux expansion introduces a mirror force accelerating the electron and ion flows downstream, which likely induces an ambipolar parallel electric field. This is in addition to the conventional presheath electric field which accelerates the ion to satisfy the Bohm criteria near the wall. We perform kinetic simulations in two spatial and three velocity dimensions to understand (1) the role of mirror force in the parallel and perpendicular thermal energy transfer, and (2) the combined role of mirror-acceleration and parallel electric field on the parallel flow acceleration in the presheath and sheath. The detailed sheath/presheath plasma profiles and the ambipolar electric field will be investigated. Worked supported by OFES.

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