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Current and potential distribution in a divertor with toroidally-asymmetric biasing of the divertor plate D.D. RYUTOV, R.H. COHEN, Lawrence Livermore National Laboratory, G.F. COUNSELL, P. HELANDER, Culham Science Centre — Toroidally-asymmetric biasing of the divertor plate may increase convective cross-field transport in SOL and thereby reduce the divertor heat load. Experiments performed with the MAST spherical tokamak generally agree with a simple theory of non-axisymmetric biasing. However, some of the experimental results have not yet received a theoretical explanation. In particular, existing theory seems to overestimate the asymmetry between the positive and the negative biasing. Also lacking a theoretical explanation is experimentally observed increase of the average floating potential in the main SOL in the presence of biasing. We attempt to solve these problems by accounting for the closing of the currents (driven by the biasing) in a strong-shear region near the X-point. We come up with a picture which, at least qualitatively, agrees with these experimental results. Work performed for the US DOE by UC LLNL under contract W-7405-Eng-48; work at Culham jointly funded by the UK Dept. of Trade and Ind. and Euratom.

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