

Abstract Submitted
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Kinetic simulation of Plasma Flows in the Pedestal/Scrape-off region S. KU, C.S. CHANG, New York University, M. ADAMS, Columbia University, CPES TEAM¹ — We have obtained from the edge PIC code XGC-1, for the first time, comprehensive kinetic macroscopic flow solutions in the pedestal/scrape-off region. As indicated by many experiments [1], the simulation shows negative electrostatic potential in the H-mode layer where a strong plasma pedestal exists, and a positive potential in the scrape-off plasma. The simulation also shows formation of the co-current flow in the scrape-off layer. The flow in a steep pedestal shoulder region is always in the co-current direction, indicating a co-rotation source for the core plasma. However, the parallel flow in the vicinity of the separatrix appears sensitive to the neutral density, making the flow shear to be stronger at lower neutral density. Another significant new physics found from XGC is the existence of the global ExB convective flow pattern in the scrape-off region, which may have an important implication to the divertor design.

[1] B. Labombard, et al., Nucl. Fusion 44, 1047 (2004)

¹SciDAC Fusion Simulation Prototype Center for Plasma Edge Simulation

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