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**Simulations of turbulence reduction by the bias-induced flows in the Helimak**[1] BO LI, Massachusetts Institute of Technology, BARRETT ROGERS, Dartmouth College, PAOLO RICCI, CRPP-EPFL, KEN GENTLE, University of Texas at Austin, AMITAVA BHATTACHARJEE, University of New Hampshire — Global fluid simulations of interchange turbulence are presented for the Helimak in which the open field lines are helices on a surface of constant radius. The three-dimensional simulation is based on an electrostatic two-fluid model that evolves the full plasma density, the electric potential, the electron temperature, and the parallel velocities. In the grounded no-bias case, we find that interchange instabilities produce radially elongated ExB velocity eddies and turbulent radial transport in the bad-curvature region. The plasma potential profiles produce the equilibrium radial electric fields and vertical EXB flows. Application of a bias voltage in the radial direction changes the global structures of plasma potential and flow velocity. Both negative and positive bias are studied. The sheared vertical EXB flows induced by the bias limit the radial extent of the turbulent eddies in the bad curvature region, and thus limit the radial cross-field transport.

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