Sheared flow dynamics in edge turbulence*

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Simulations with the Lodestar Scrape-Off-Layer Turbulence (SOLT) code have studied saturation mechanisms for edge turbulence (e.g. sheared poloidal flows and profile flattening) [1, 2]. In this 2D turbulence code, source terms for particles and heat are balanced by the turbulent transport of particles, energy and momentum across the edge and SOL. The combined effects of the Reynold's stress and sheath potential terms result in the development of sheared flows in the binormal (approximately poloidal) direction. This process is studied for electrostatic curvature-driven interchange turbulence. Because the simulation allows full profile evolution, a sharp transition is observed from saturation by sheared flows to saturation by profile flattening as the turbulence drive (e.g. initial pressure gradient) increases [2]. In the present work, we study the dynamics of the sheared flows in the simulation. The magnitude of the sheared flow is limited as the curvature-drive increases, suggesting that the Kelvin-Helmholtz instability may be playing a role. The physics of the sheared flows will be discussed in both the weak and strong gradient limit.

1. D. A. Russell, J. R. Myra, and D. A. D'Ippolito, Phys. Plasmas **16**, 122304 (2008).
2. D. A. D'Ippolito, J. R. Myra, and D. A. Russell, Bull. APS **54**, 324 (2009), paper UP8-65.

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