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ExB-Shear Effects on Magnetic-Flutter Diffusion of Electron-Drift Trajectories in ITG Turbulence[1] A.M. DIMITS, W.M. NEVINS, E. WANG, LLNL, J. CANDY, General Atomics, C. HOLLAND, UC San Diego — Magnetic-field stochasticity arises due to microtearing perturbations, which can be driven linearly [1] or nonlinearly [2], even at very modest values of the plasma beta. The resulting magnetic-flutter contribution may or may not be a significant component of the overall electron (particle and thermal) transport. Initial investigations [3] of the effect of ExB shear on electron-drift magnetic-flutter diffusion coefficient $D_{\rm edr}(r,{\rm v}_{||})$ using perturbed magnetic fields from GYRO simulations of ITG turbulence show two interesting results: 1) an absence of any peak in $D_{\rm edr}(r,{\rm v}_{||})$ at values of the "resonant" parallel velocity, ${\rm v}_{||}$, at which the ExB shear negates the magnetic shear, and 2) a significant increase in $D_{\rm edr}(r,{\rm v}_{||})$ for electrons with ${\rm v}_{||}$ surprisingly far from the resonant velocity. We explore these effects both through a more detailed quantification of the displacement and decorrelation rates of the orbits, as a function of parallel distance, and through a simplified model of electron drift motion in a poloidally localized turbulent magnetic field. Furthermore, we argue that a correct model will have ExB shearing of the perturbed magnetic field structures themselves, and we extend our investigations to include this effect.

[1] W. Guttenfelder, et al., Phys. Plasmas **19**, 056119 (2012);
[2] E. Wang, et al., Phys. Plasmas **18**, 056111 (2011);
[3] A. M. Dimits, et al., 2014 TTF Meeting.

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