A new paradigm for suppression of gyro-kinetic turbulence by velocity shear

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Abstract. The shear in the mean field velocity Doppler shift is shown to suppress the amplitude of electric potential fluctuations by inducing a shift in the peak of the radial wavenumber spectrum. An analytic model of the process shows that the fluctuation spectrum shifts in the direction where the velocity shear is linearly destabilizing but that nonlinear mixing causes a re-centering of the spectrum about a shifted radial wavenumber at reduced amplitude. A model for the nonlinear spectrum is used in a quasilinear calculation of the transport that is shown to accurately reproduce the suppression of transport.

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