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A Model For The Poloidal Angle Dependence Of The Saturated Potential Fluctuation Spectrum Of Flux Tube Gyrokinetic Turbulence Simulations[1] GARY STAEBLER, JEFF CANDY, General Atomics - San Diego, NICOLA BONANOMI, Max Planck Institute for Plasma Physics, Garching, Germany — The time average intensity of electric potential fluctuations from a gyrokinetic turbulence simulation in tokamak geometry is three dimensional in space: the Fourier transform spectrum, of poloidal (k_y) and radial (k_x) wavenumbers, and the poloidal angle (θ). Examination of the poloidal variation of the intensity spectrum shows that there is always a peak at zero radial wavenumber ($k_x = 0$). The spectrum of the zonal potential ($k_y = 0$) is found to be almost independent of the poloidal angle and symmetric in k_x. Away from the outboard midplane there is a second peak at the zero of the local total radial wavenumber $k_r = k_x + k_y \hat{s}\theta$. The second peak location depends upon the sign of the poloidal angle and is not periodic. A model of both peaks added together provides a reasonable fit to the 3D spectrum if the poloidal variation of the magnetic field and radial gradient metric are taken into account. An overall Gaussian envelope is needed to fit the poloidal variation of the intensity peaks. This envelope is close to the envelope of the most unstable linear eigenmode at each poloidal wavenumber. The application of these results to the TGLF quasi-linear transport model will be discussed.

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