ITER and reactor core turbulence is **challenging** to simulate gyrokinetically

- Extensive **GYRO** low-$k$ simulations
- Turbulence is **weak**, closer to stability threshold than DIII-D plasmas
- Energy fluxes often **bursty** or can collapse (see green shaded region)
- Nonlinear **zonal-flow** physics important, exhibiting **Dimits-shift** phenomenon
- Introduce new reactor **benchmark** cases to **recalibrate** TGLF for this regime
- ITER fusion power increases **40%** with modified TGLF
- **Multiscale** simulations ultimately required (see Holland IAEA talk).