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Measurement of residual turbulence in ITBs and explaining the high-k bursts

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NSTX Research Forum
PPPL, Room B-252
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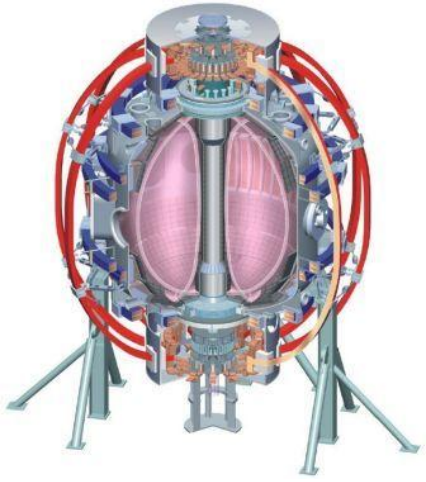
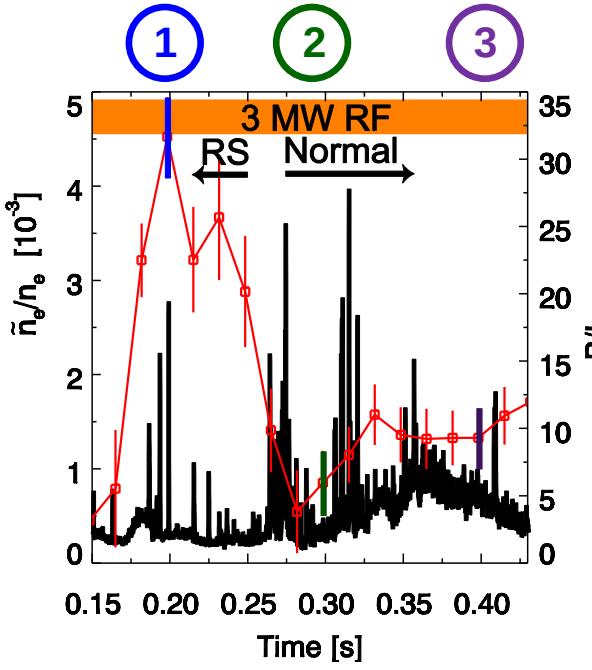
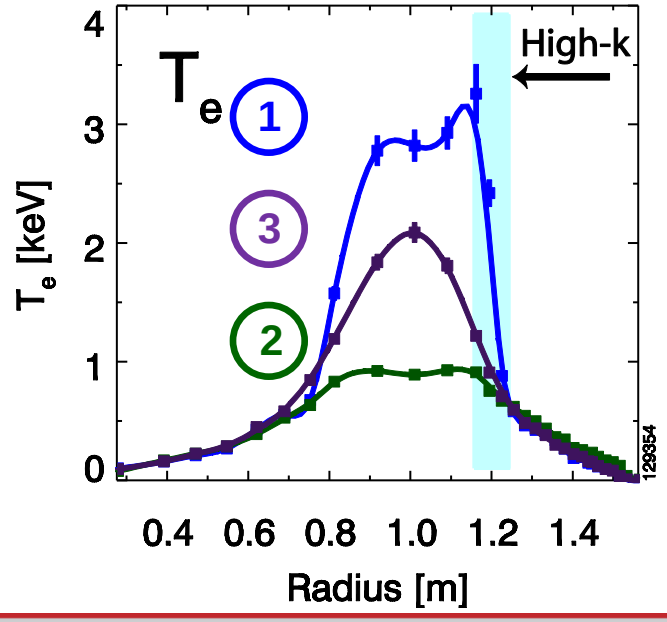


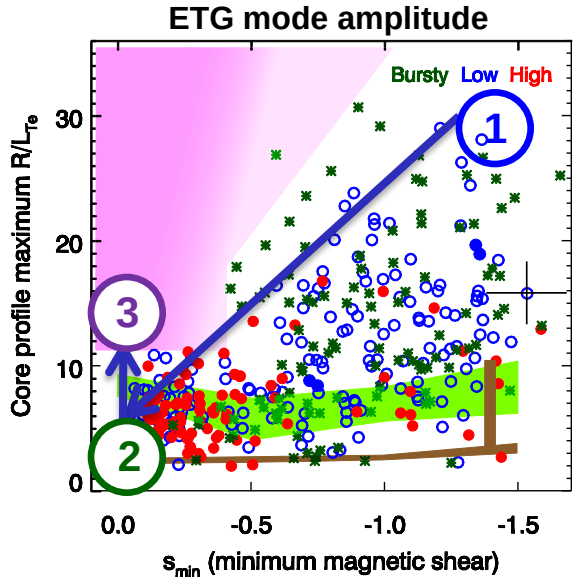
Reversed shear e-ITBs suppresses thermal transport at supercritical ETG gradients

1. Intermittent, short duration **bursts** of ETG observed during RS phase
   - Average ETG mode amplitude low, T_e gradient well above ETG critical
2. A series of large amplitude, closely spaced in time bursts of ETG collapses T_e profile
   - Magnetic shear becomes zero/positive due to anomalous current redistribution
3. T_e profile can only be reheated to ETG critical gradient at zero shear
   - ETG mode amplitude grows to a moderate continuous level



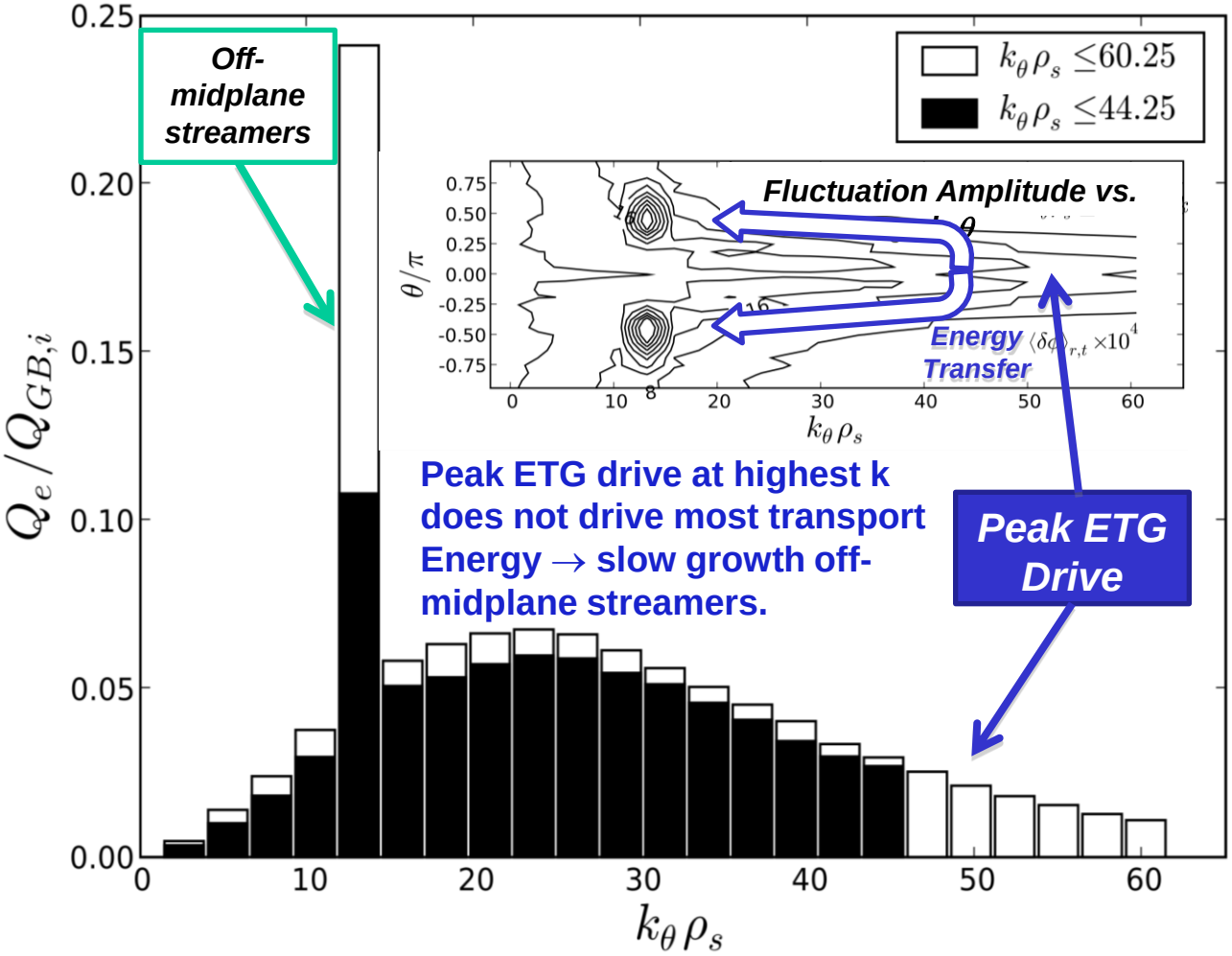


Yuh et al., PRL 106,055033 (2011)

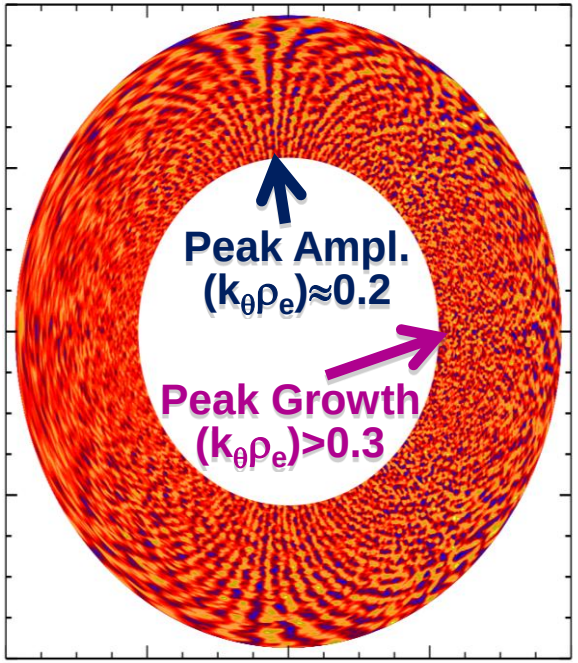


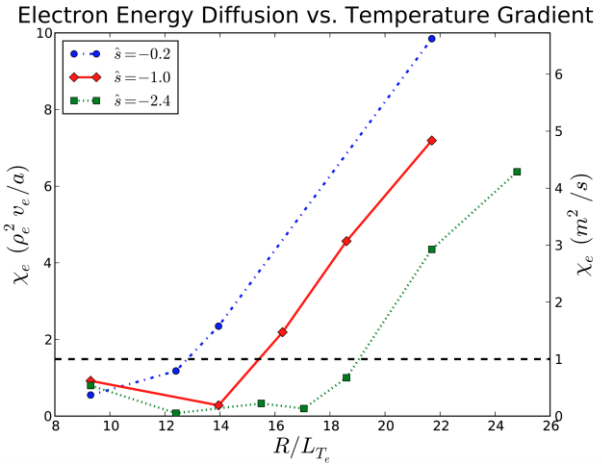
NL GYRO Results Shows Off-Midplane Streamers Responsible for Significant Residual Transport

Time-Averaged Heat Flux vs. Toroidal Mode



Fluctuation Amplitude NSTX RS e-ITB flux tube





Peterson et al., PRL to be submitted

XP Proposal – Measure fluctations using all available diagnostics in e-ITBs, compare midplane to off-midplane

- New diagnostics available since 2008
  - BES and high-k both have off-midplane capability
- Compare residual fluctuations during RS, high gradient bursts on and off-midplane
- Measure as function of R/L_{Te} by varying RF power