The power spectrum of turbulent fluctuations in NSTX

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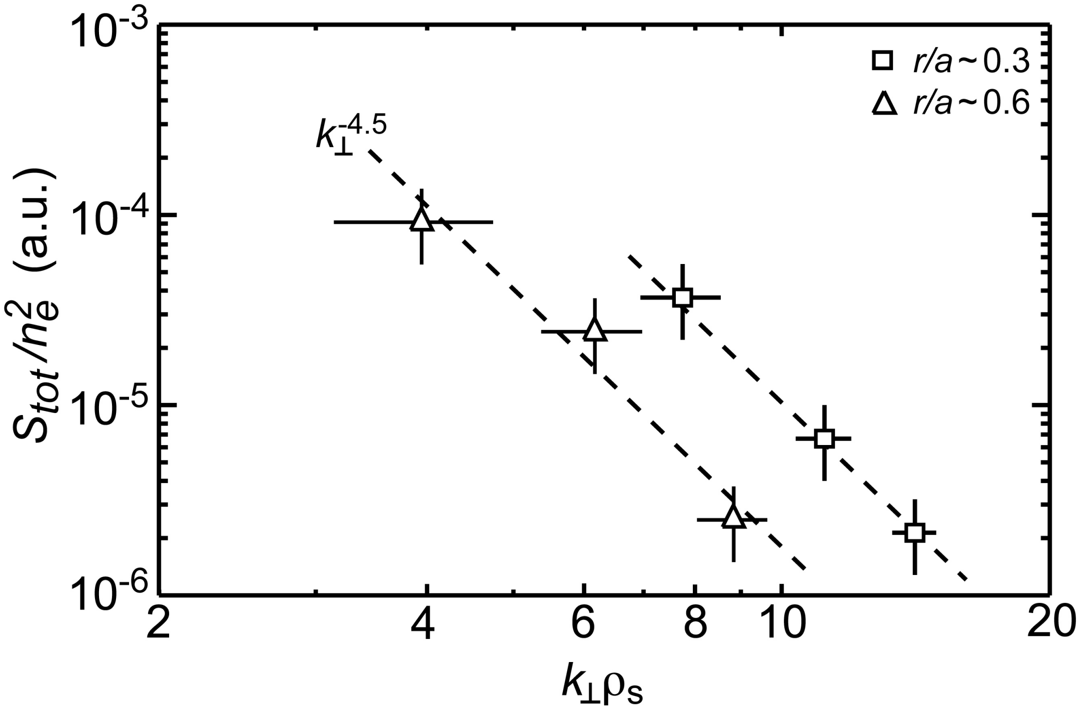
- *This XP follows up on last year's XP-821, where the dependence of the power spectrum of fluctuations on the radial wave number was measured*
- *Results showed spectra with the power law $(k_\perp \rho_s)^{-4.5}$*



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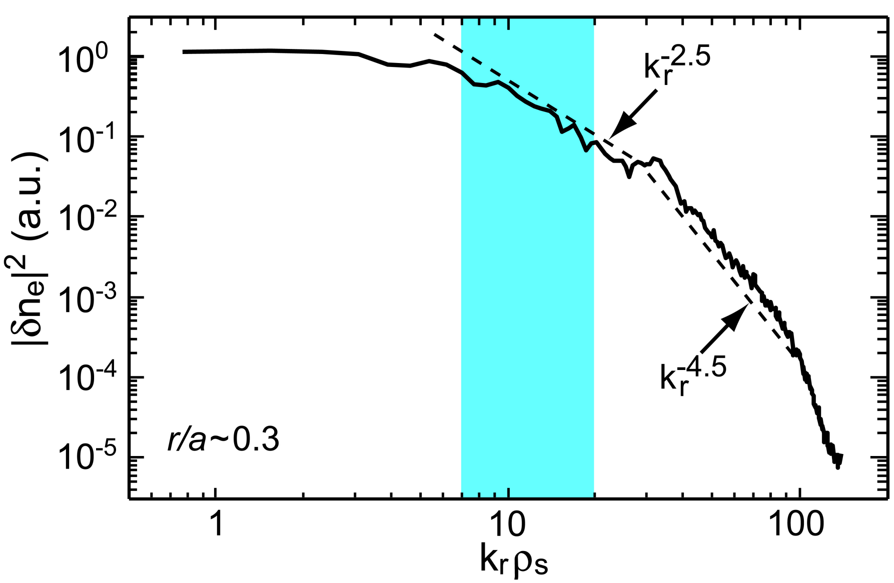
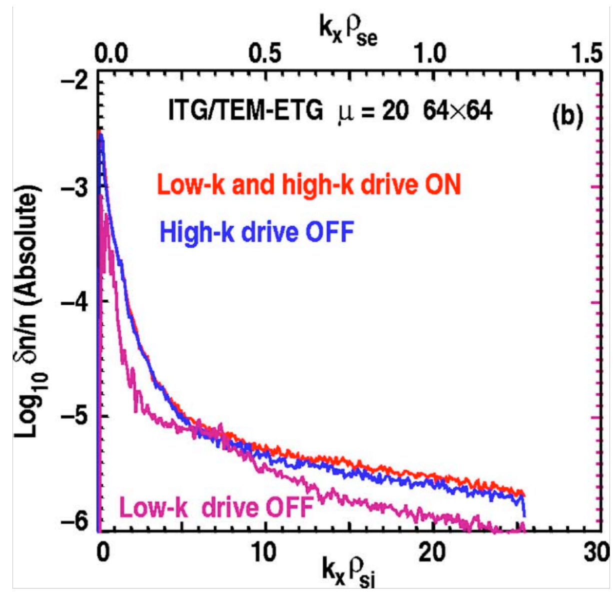
- *A power law for the spectrum of turbulent fluctuations is consistent with numerical results from both GYRO and GTS. However, experimental and numerical results disagree completely on the power exponent.*

GTS



GYRO



- *In addition, the numerical spectra differ at low values of $k_\perp \rho_s$, with GYRO showing a sharp increase and GTS a wide plateau*

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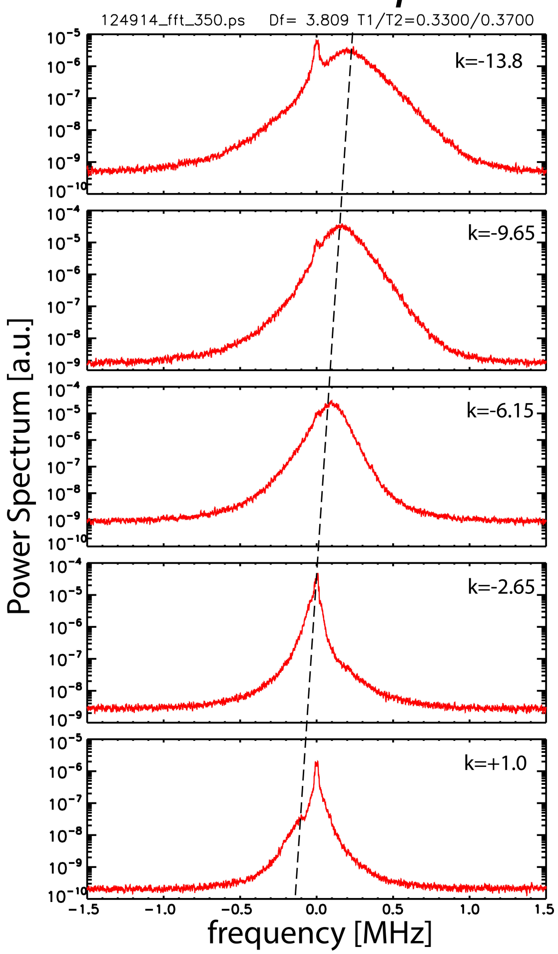
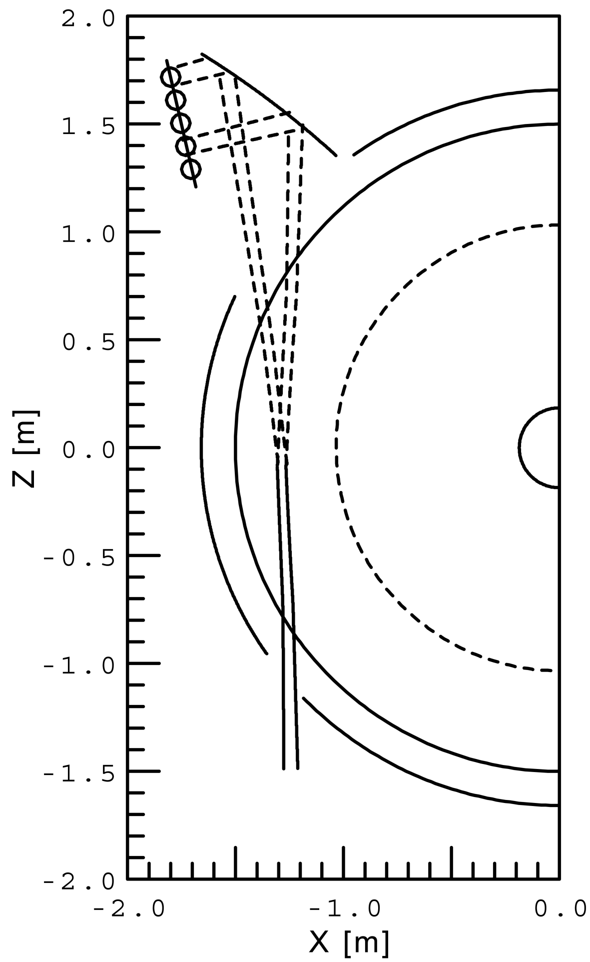
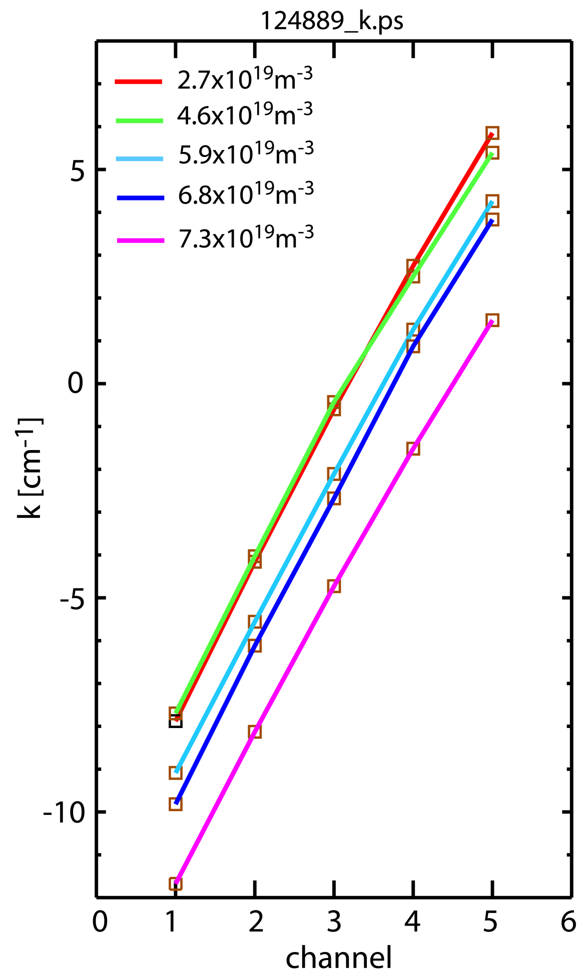
- *The goal of the present XP is to extend to smaller values the range of wave numbers of measured fluctuations*
- *Measurements in NBI plasmas, where the Doppler shift from the toroidal plasma rotation should allow the separation of scattered signals from those of spurious radiation*







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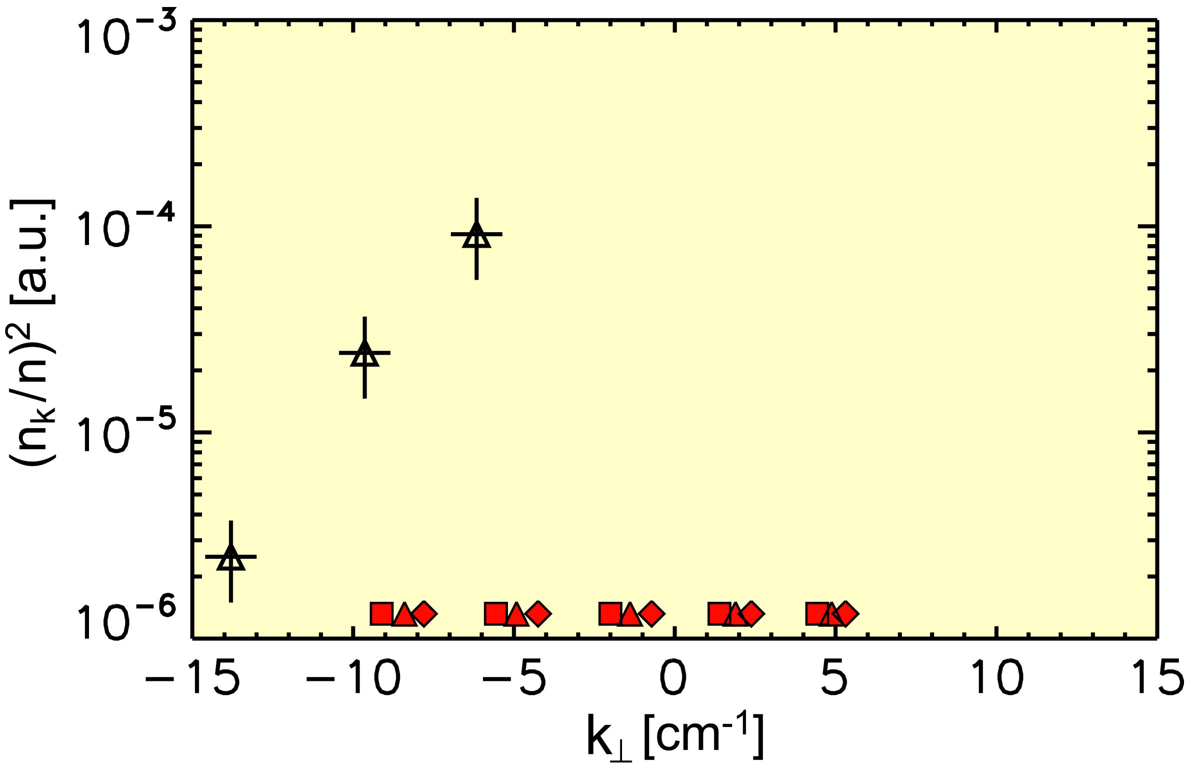
- *Wave number scan with rotation of collection mirror*



The power spectrum of turbulent fluctuations in NSTX

- *Plasma Conditions:*
  - *Deuterium with B_T =5.5 kG, I_p=700 kA, nL* ≤ $5x10^{19}$ m^{-3}
- *NBI Conditions:*
  - *Sources A and B (90 kV)*
- *Scattering Setting:*

Configuration	#1	#2	#3
Launching-X	91	91	91
Launching-Z	96	96	96
CM-angles	86/232	86/231	86/230
Ch. 1-angles H/V	89.0/90.6	90.9/90.8	92.8/90.9
Ch. 2-angles H/V	89.4/90/4	91.4/90.6	93.4/90.7
Ch. 3-angles H/V	89.3/90.5	91.4/90.6	93.4/90.6
Ch. 4-angles H/V	88.7/90.3	90.7/90.4	92.7/90.5
Ch. 5-angles H/V	87.9/90.1	89.9/90.2	91.9/90.3