

# Edge Zonal Flows vs. B (XP#1067)

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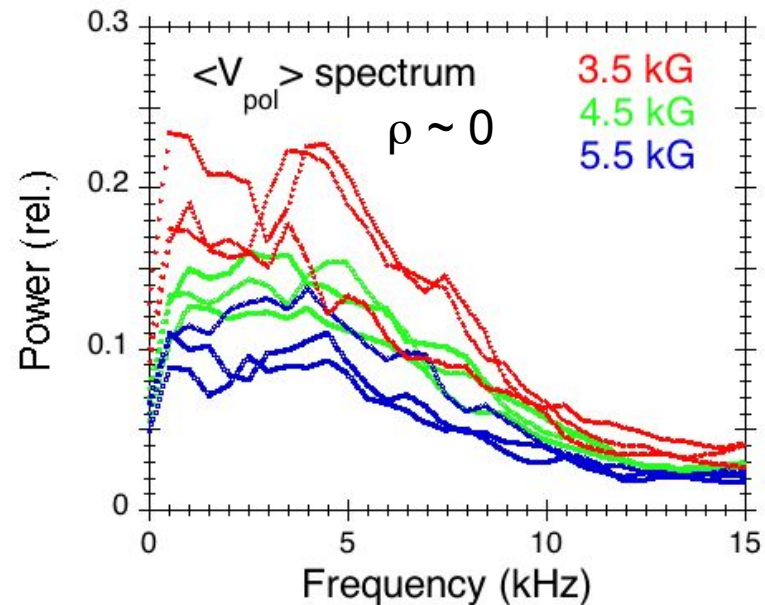
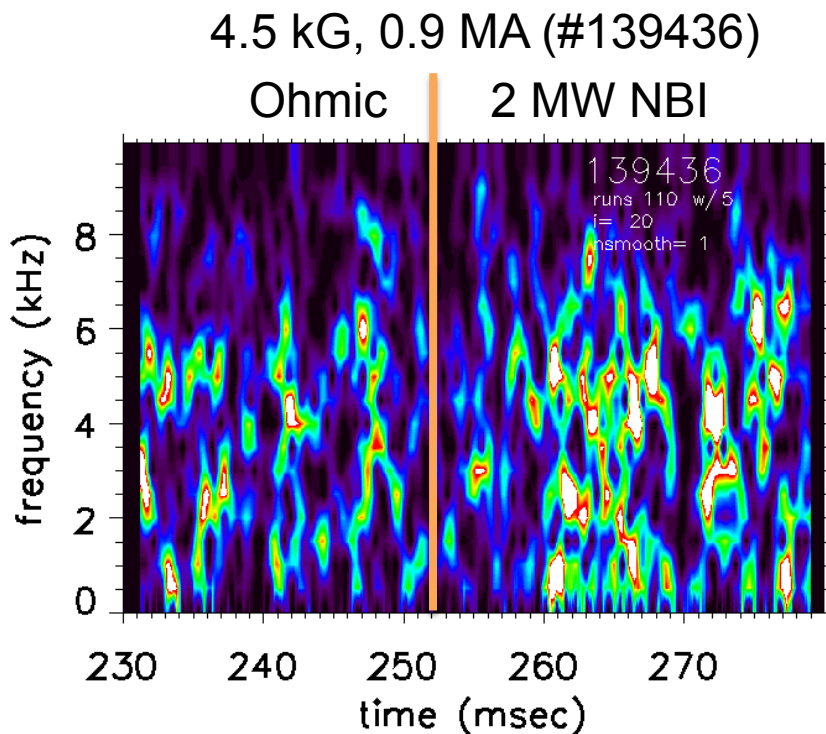
NSTX Results Review Nov. 30-Dec. 1, 2010

XP Goal: find scaling of edge zonal flows with B and NBI  
vary B=3.5-5.5 at constant q(a), NBI ~ 0-3 MW  
expected  $f \sim (T_e + T_i)^{1/2}$  for GAMs

XP Result: spectra were broadband in range  $f \leq 15$  kHz  
spectra were roughly independent of B & NBI  
spectra are roughly in calculated GAM range

# Zonal Flow Spectra vs. Time vs. B

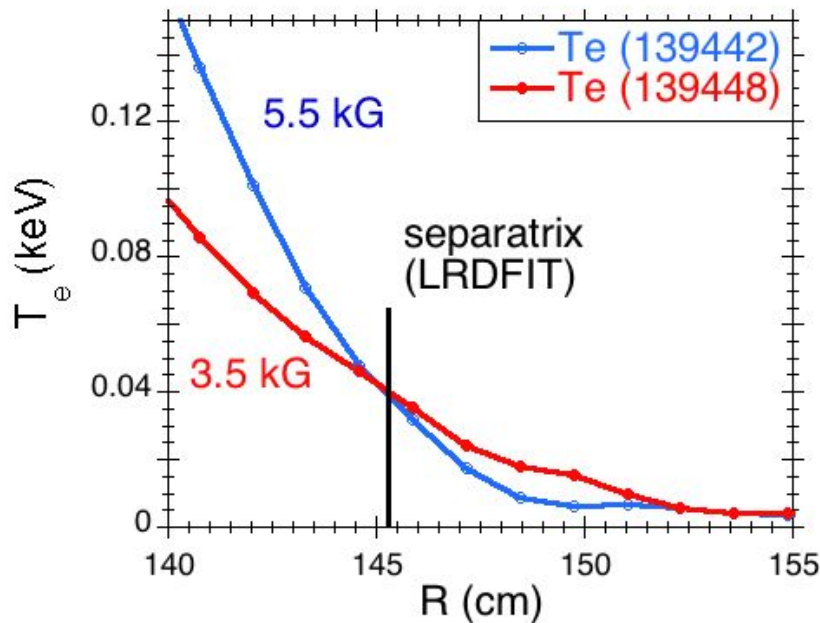
- Spectra are more broadband than seen in other cases
- No obvious B field dependence of zonal flow spectra
- No obvious NBI dependence of zonal flow spectra



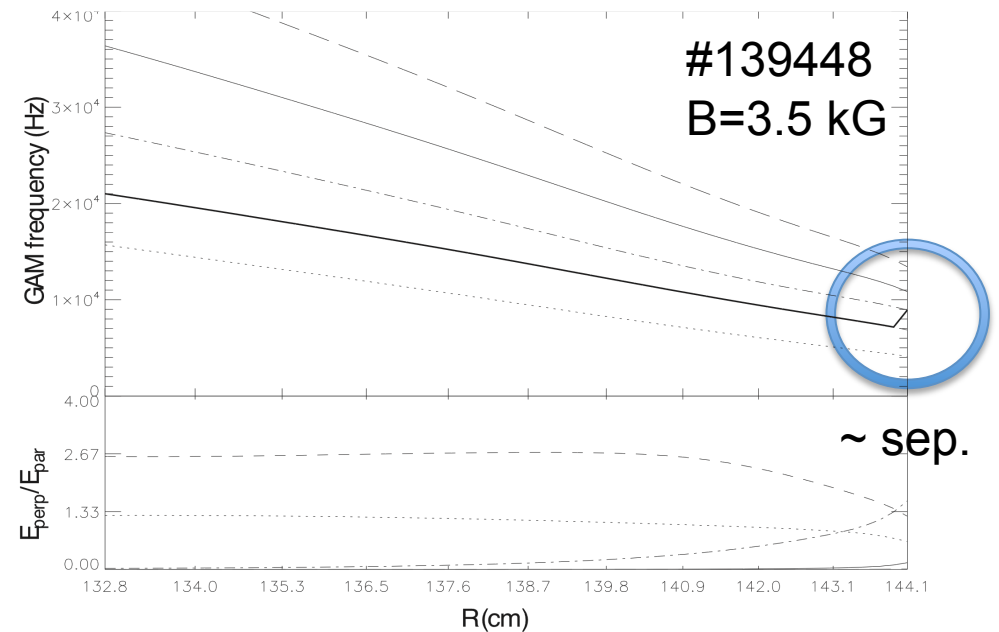
# Calculated GAM spectrum (R. Hager, IPP)

- Local GAM frequency varies with radius  $f \sim (T_e + T_i)^{1/2}$
- Calculated GAM spectrum near separatrix  $f \sim 5-15$  kHz
- But observed zonal flow spectra  $\sim$  constant vs. radius !

typical edge  $T_e$  profiles vs. R



typical GAM spectra vs. R



## Some Analysis Plans

- Construct database of zonal flow frequency  $f_{zf}$  (average) vs. edge  $T_e$  to check for GAM-like trend:  $f_{zf} \sim T_e^{1/2}$
- Construct database of zonal flow amplitude vs. GPI turbulence amplitude to check for ‘predator-prey’ type interaction expected from zonal flow theory
- Evaluate radial propagation of edge zonal flows in GPI, compare to theory (Hager & Hallatschek PoP 2009)
- Calculate nonlocal and nonlinear influences on GAM spectrum and compare to observed NSTX spectra (e.g. Hallatschek EPS 2010)