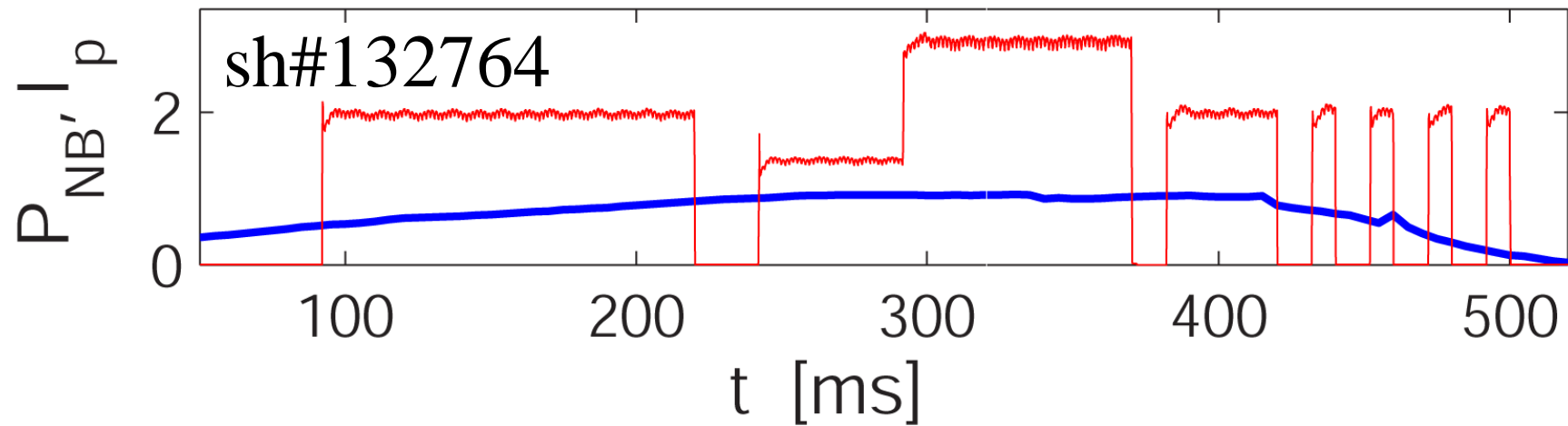


XP-916: TAEs studies in L-mode, center-stack limited deuterium plasmas

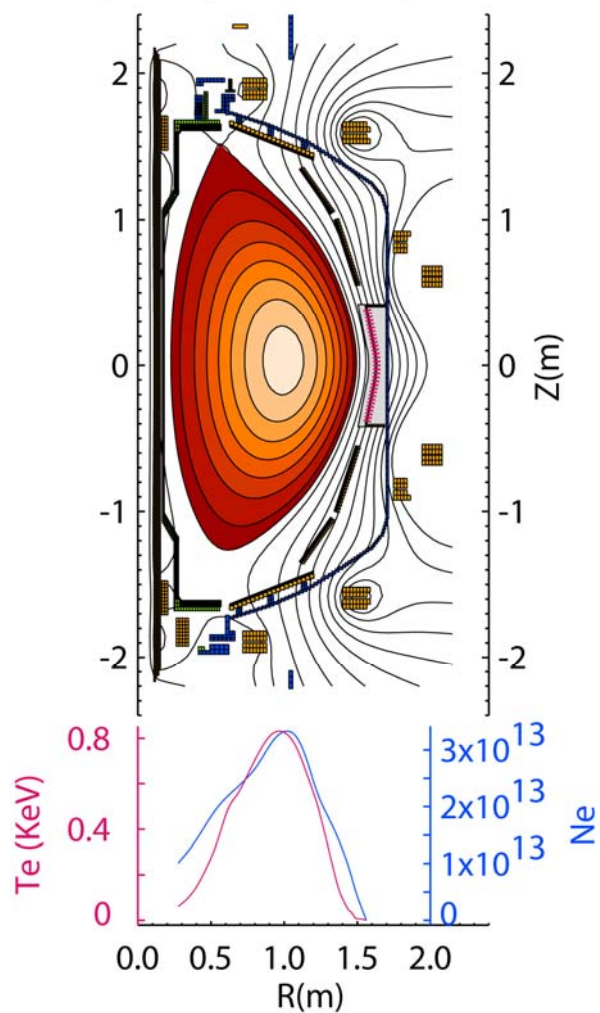
M. Podestà, N. Crocker, D. Darrow, E.
Fredrickson, G. Fu,
N. Gorelenkov, W. Heidbrink, S. Kubota, D. Liu,
S. Medley, K. Tritz

Summary of day#1

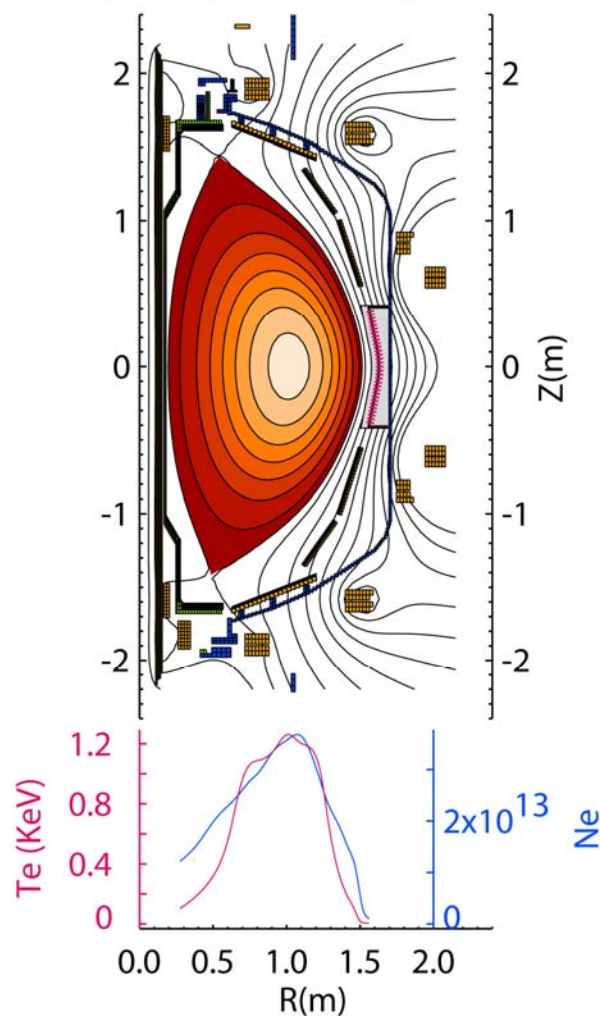
- Good scenario with CS-limited, L-mode plasma achieved
 - $B_{\text{tor}}=5.5\text{kG}$, $I_p=0.9\text{MA}$, $n\sim 3.2\times 10^{19}\text{m}^{-3}$ @ 300ms
 - TAEs and avalanches reproduced
 - Can be improved for day#2 (push plasma harder on center-stack)
- Time window with zero plasma rotation obtained through $n=3$ braking with $\sim 1\text{kA}$ SPAs current
- NB power scan (almost) completed for reference scenario
 - 1-2 shots at very low P_{NB} (sources B&C @65kV) missing
- Toroidal field scan more difficult than expected
 - Hard to avoid low-f modes at 4.5kG, didn't even try $B_{\text{tor}}=3.5\text{kG}$
- Density scan to be completed (problems with glow system)



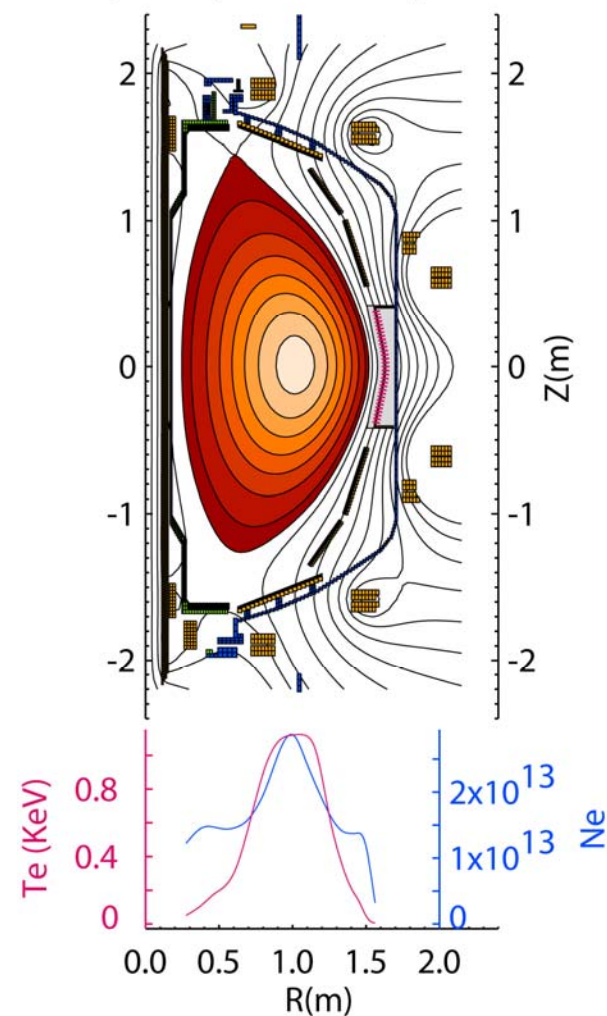
from \EFIT02, Shot 132764, time=250ms

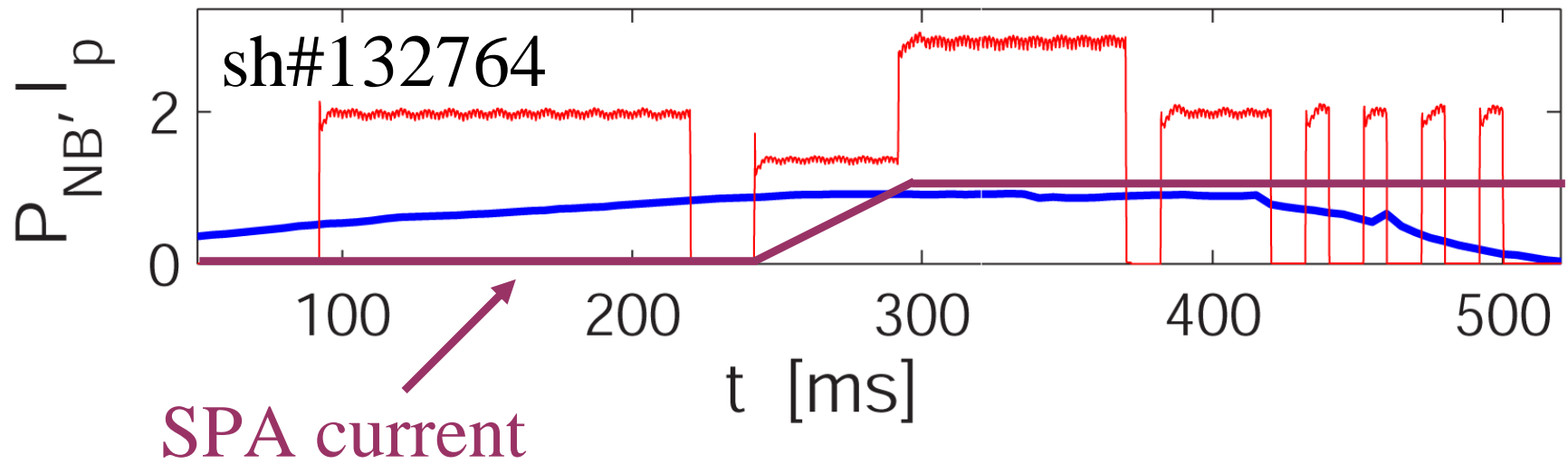


from \EFIT02, Shot 132764, time=310ms

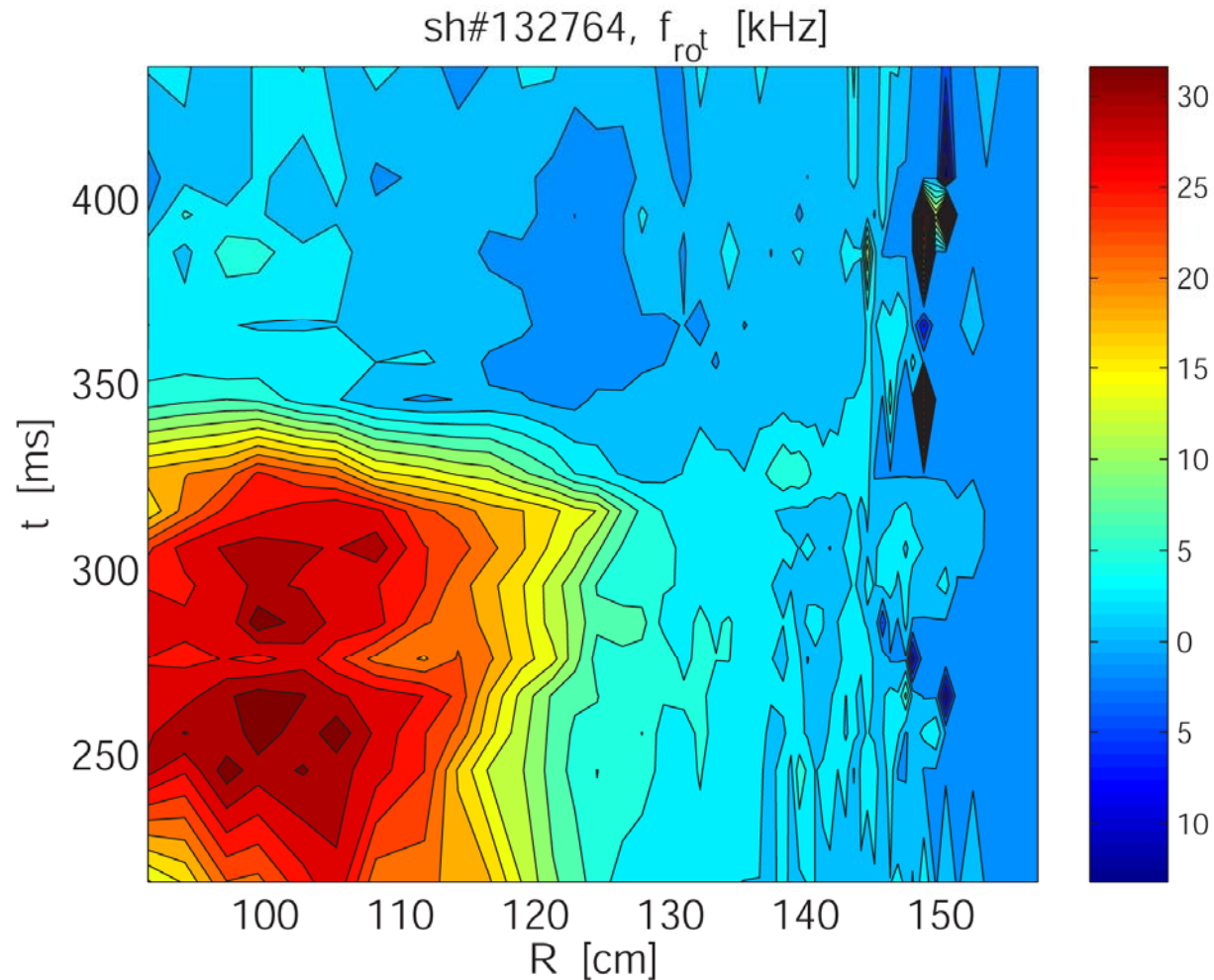


from \EFIT02, Shot 132764, time=360ms

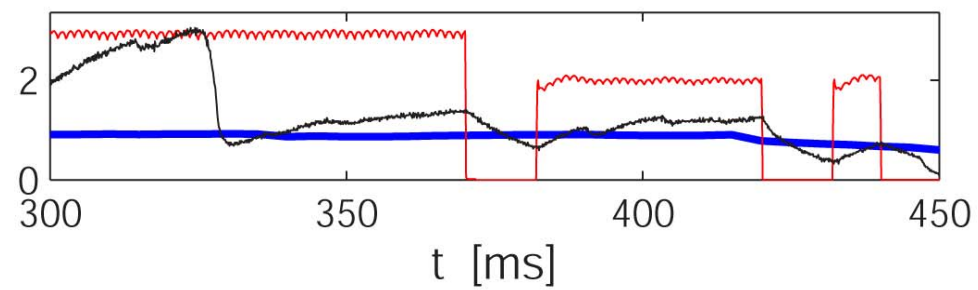
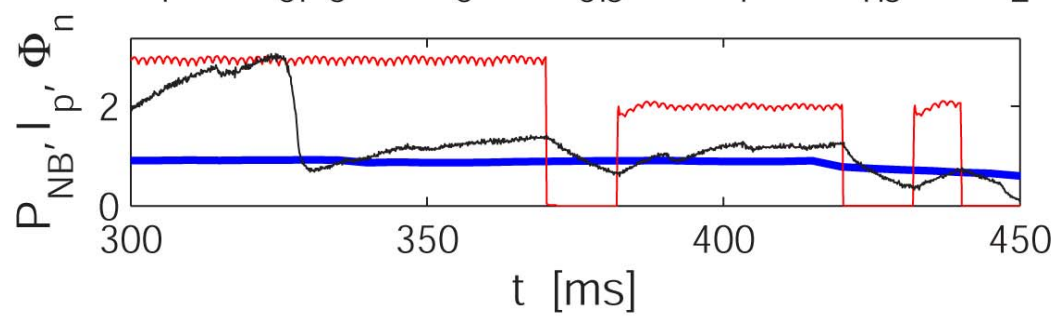
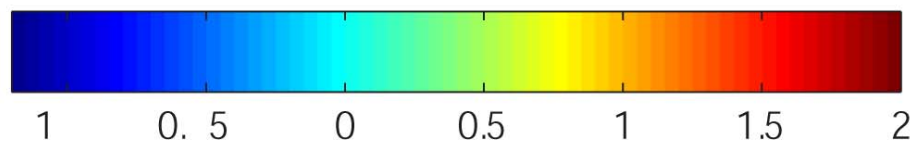
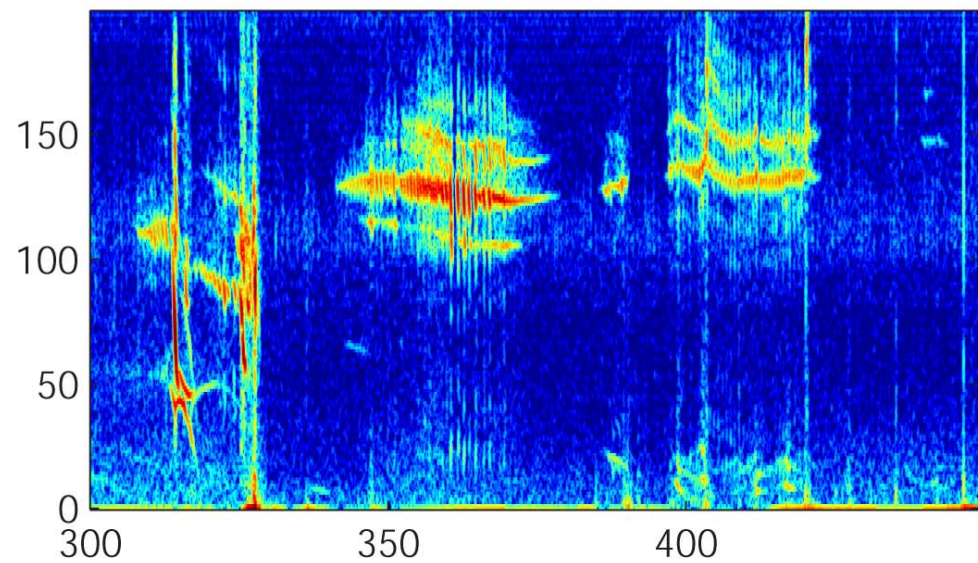
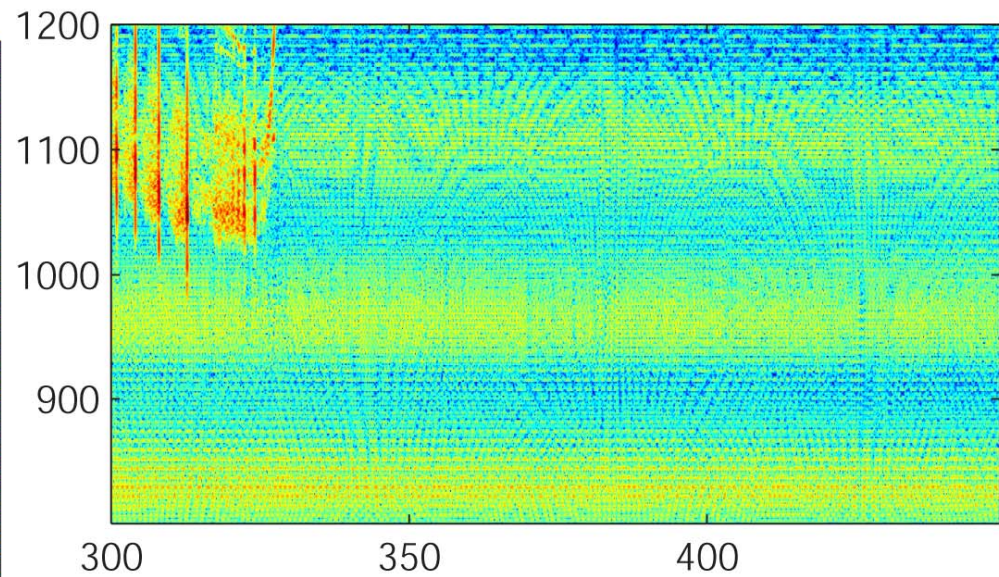
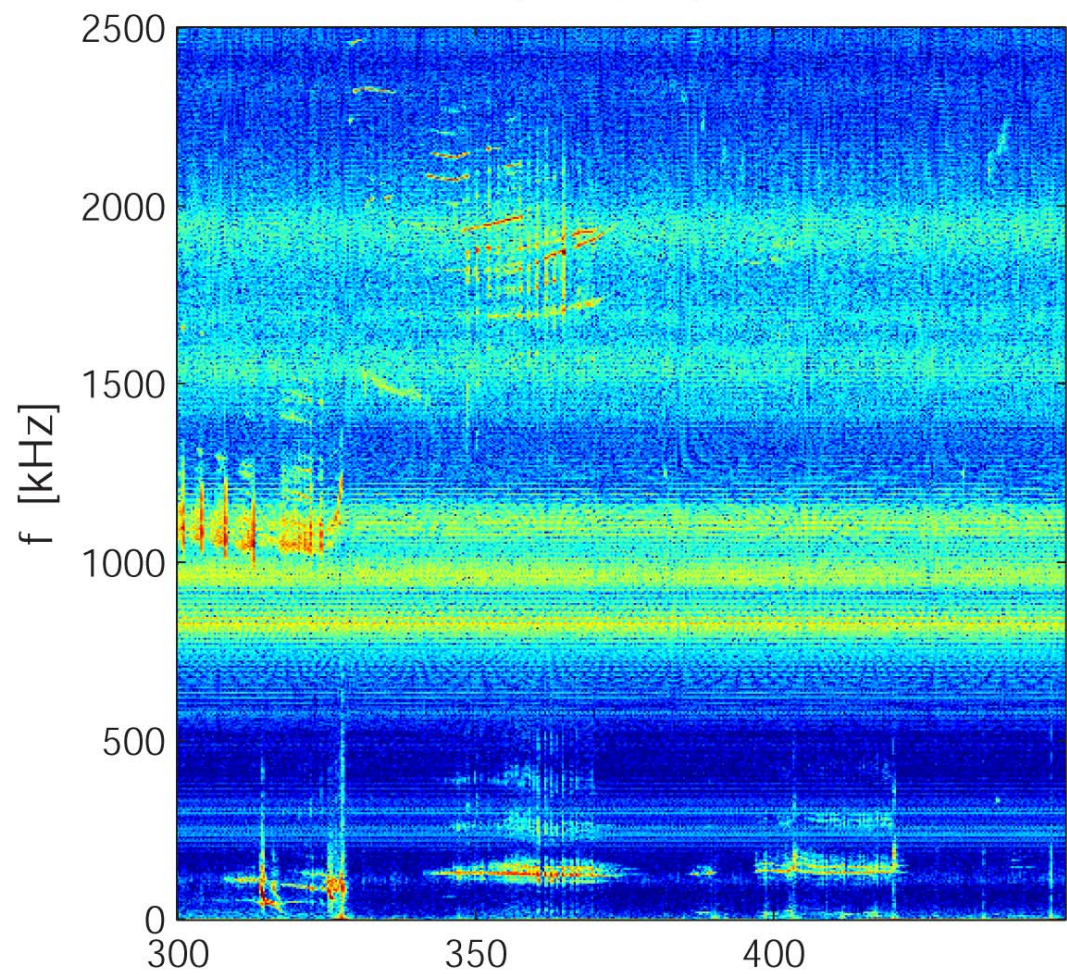




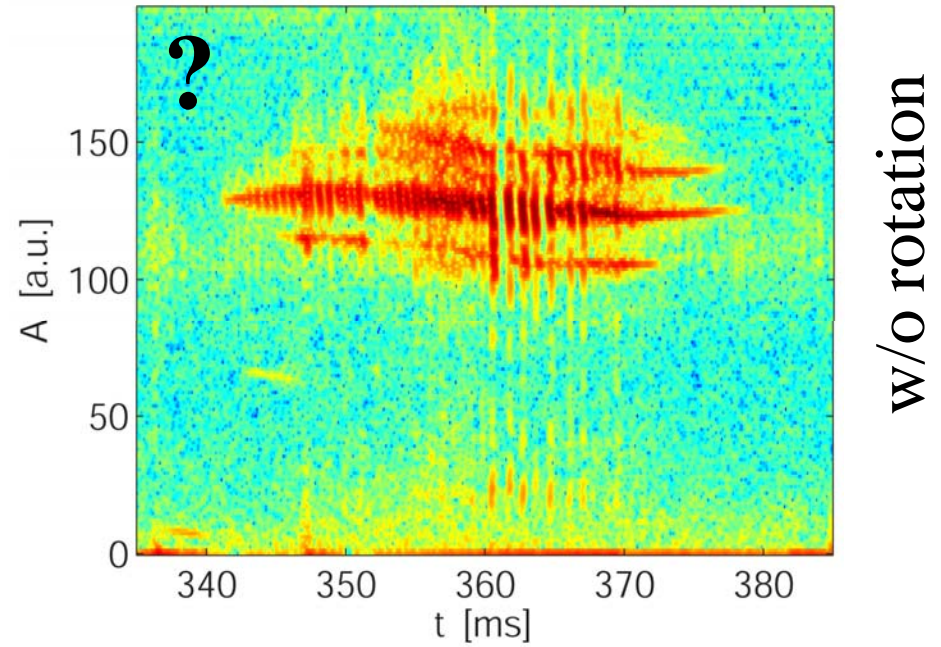
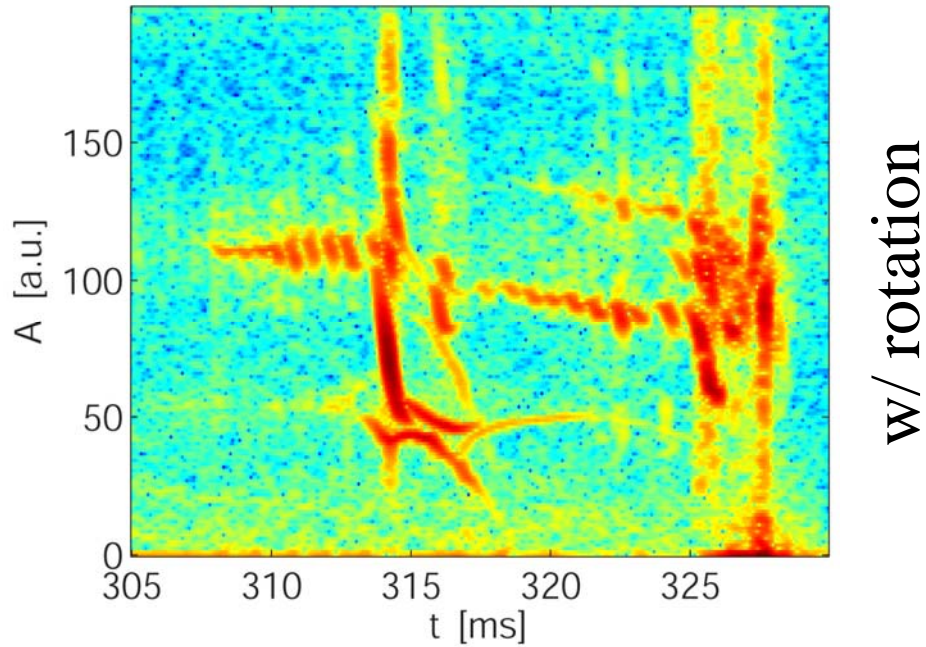
- $n=3$ braking ON at 300ms
 - Ramp-up starts at 240ms
- Plasma rotation reduced to ~ 0 with 1kA of SPAs current



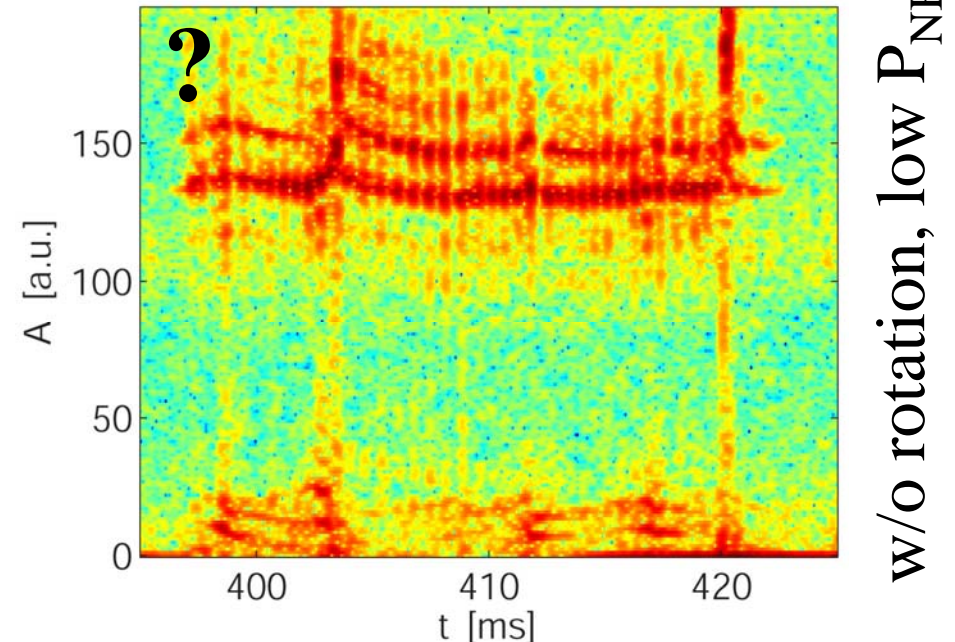
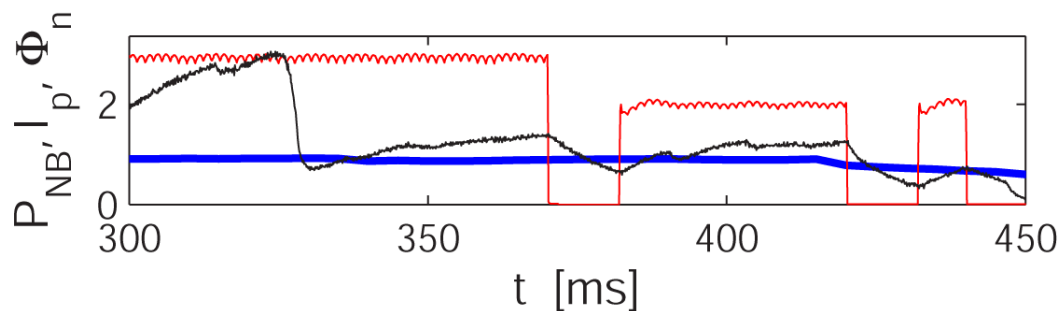
sh#132764



TAEs & avalanches successfully reproduced

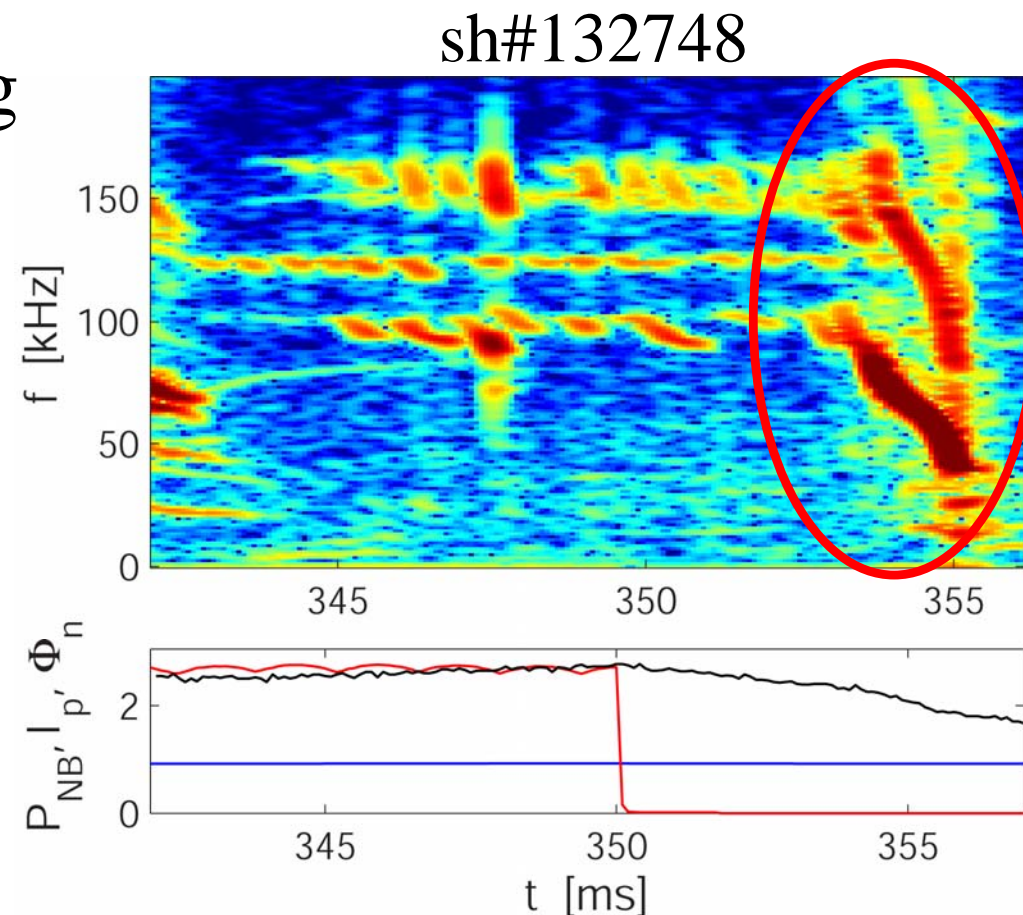


- Multiple scenarios w/ TAE activity; different NB power, f_{rot} , density, q , ...



Possible improvements for day#2

- Get more stationary CS-limited configuration
- Refine scan of SPAs current (strength of $n=3$ braking), to get “scan” of AEs’ gap width?
- Introduce NB notches during TAE phase to slow down dynamics of avalanches?
 - Easier to diagnose (no FIDA)
 - Identify which portion of phase space is involved in avalanches?
- Extended run day needed?



Excellent diagnostic coverage

- NPA & ssNPA (but 2 channels picked up high noise)
- sFLIP (most of the shots)
- FIDA
- Neutrons

- Magnetics
- Reflectometer, SXR (mode structure)
- MSE, MPTS, CHERS