

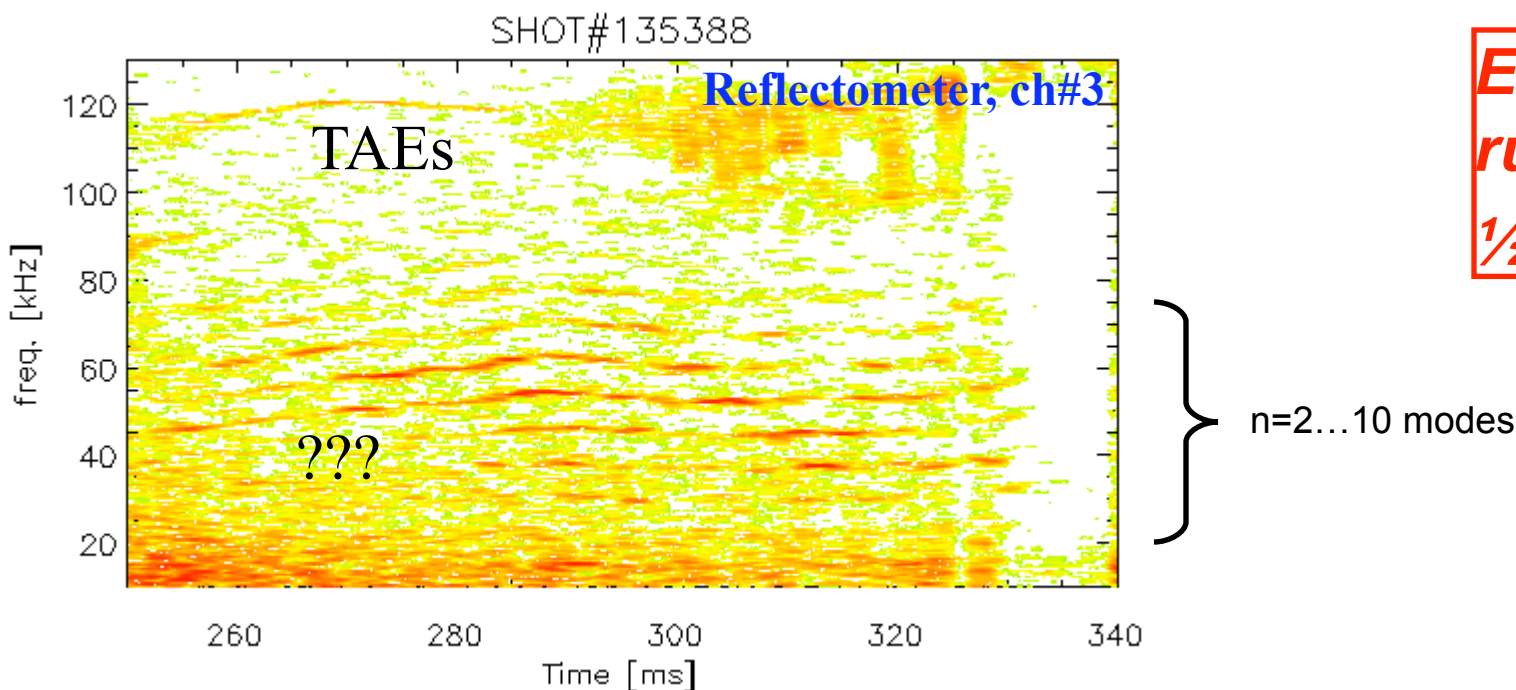
Proposals for NSTX Run 2010

Wave-particle interactions group

M. Podestà

1. Characterize low-frequency Alfvénic modes
[ITPA EP-2 on fast ion transport by AEs]
2. Effect of HHFW on plasma rotation
[FY2010 milestone R10-2: RF heating and current drive]
3. HHFW absorption on fast ions
[FY2010 milestone R10-2: RF heating and current drive]

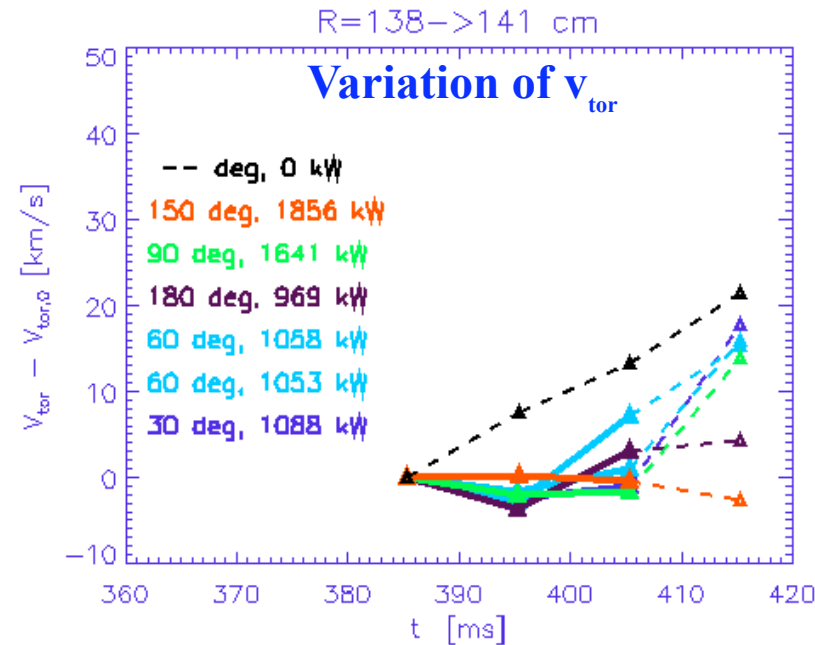
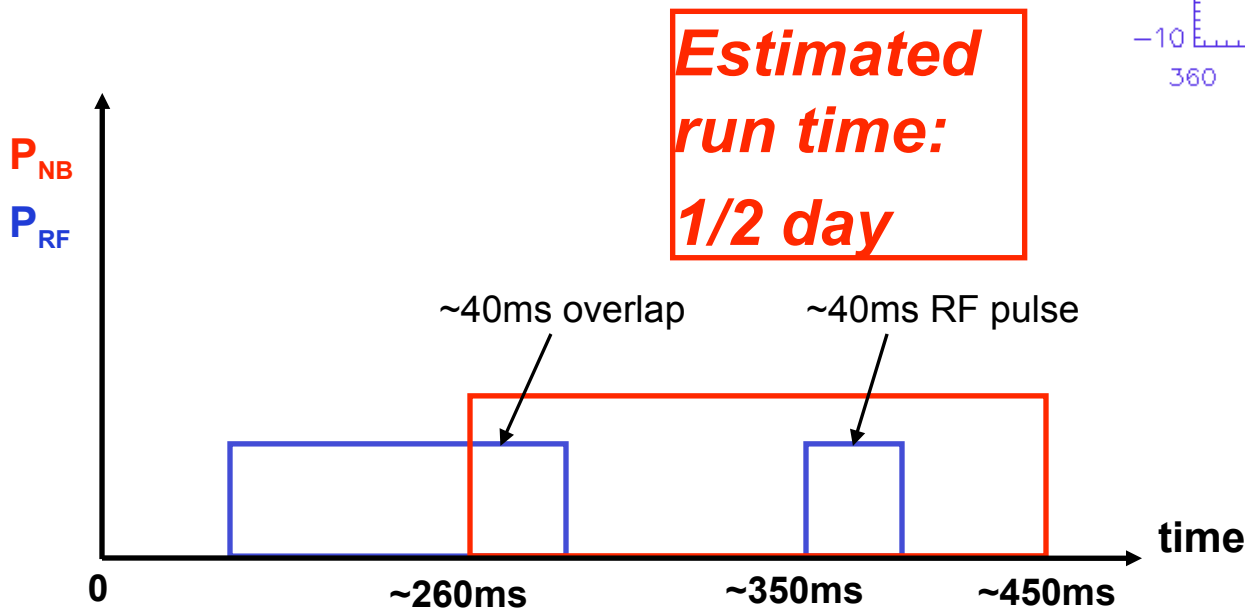
1. Characterize low-frequency AEs



- Goal: characterize low-f modes observed during 2009 TAE XP
 - Long-lasting, no frequency sweep (BAAEs), barely visible on magnetics (kink-like modes)
 - Extrapolated frequency (rough model!) slightly <0 in *rotating plasma frame*
 - “Toroidal-flow induced” AEs? Other?
- Use BES and upgraded reflectometer to reconstruct fine structure
- Use SPAs to affect rotation (may require some development time)

2. Effect of HHFW on plasma rotation (Podestà/R. Bell)

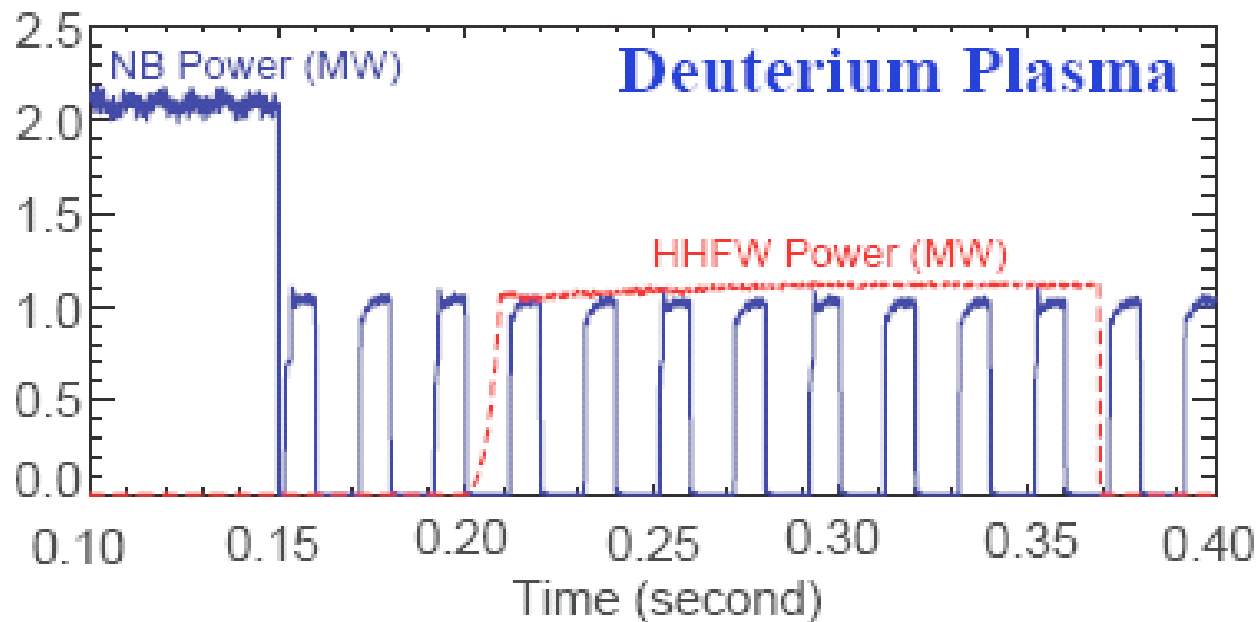
- Edge toroidal rotation seems to “lock” during HHFW
 - See G. Taylor’s APS invited ’09
- Rotation “freed-up” when RF stops
- Phase and RF/NB power dependence still unclear



- Perform systematic scan of RF phase, RF power and NB power

3. HHFW absorption on fast ions (Podestà/Heidbrink)

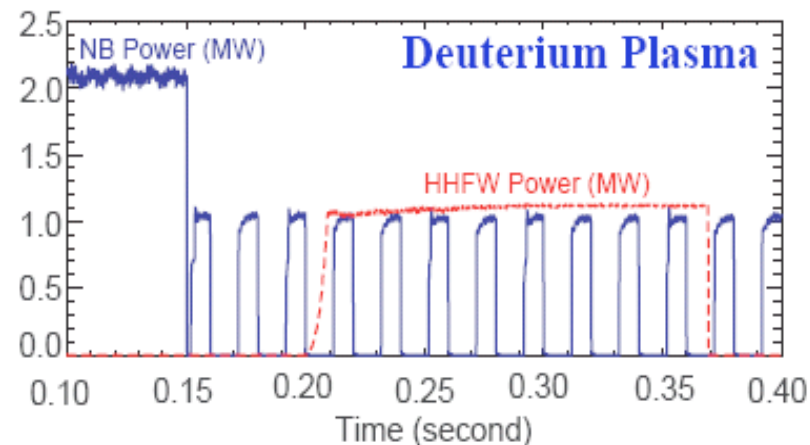
- RF absorption on fast ions degrades efficiency of HHFW heating/CD during NB injection
- Little/no information available so far on *how much* RF power goes into fast ion channel (compared to other loss channels)
 - Dependence on RF phase, edge conditions, fast ion energy, ... ?
 - Fast ion diagnostics and RF codes now available for successful XP



3. HHFW absorption on fast ions (Podestà/Heidbrink)

- Plan: start from 2008 scenario (e.g. shot#128739)

- Source A “blips” for q-profile
- Low average NB power to avoid MHD
- 10ms ON/ 20 OFF modulation
- Constant RF power, 200->400msn



- Scan RF phase, NB voltage
- Change edge conditions (outer gap?)
 - Edge losses vs. fast ion absorption
- Move to 1 steady NB source+RF
 - Add blips with second NB source
 - Look at evolution (space/energy) of fast ions

***Estimated run time:
1 day for full scans
1/2 day minimum***