

# Carbon sources and edge transport in NSTX

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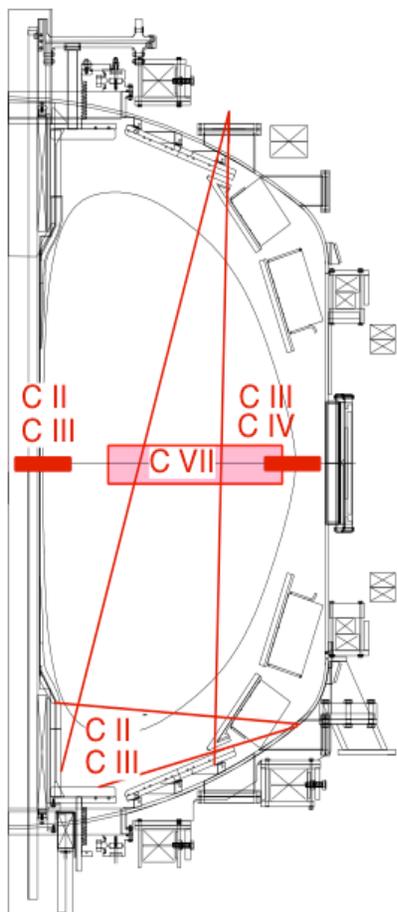
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## Carbon sources and edge transport

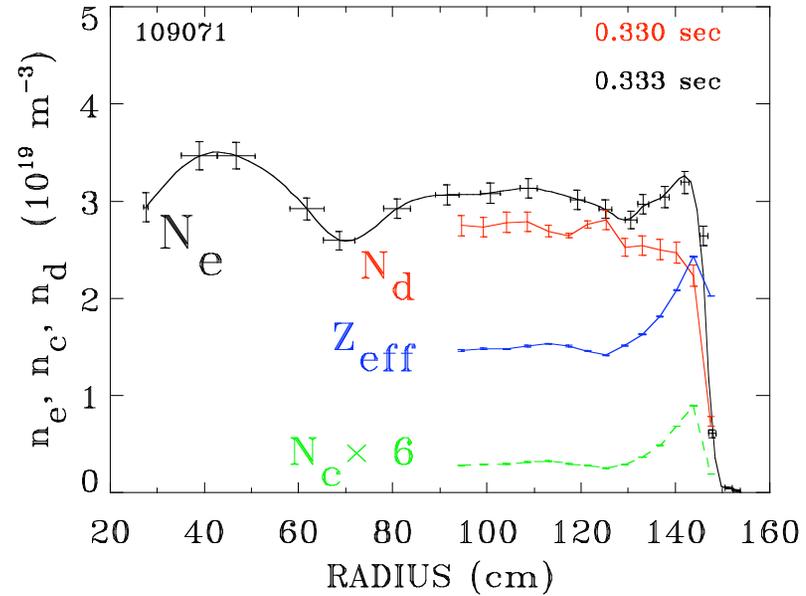
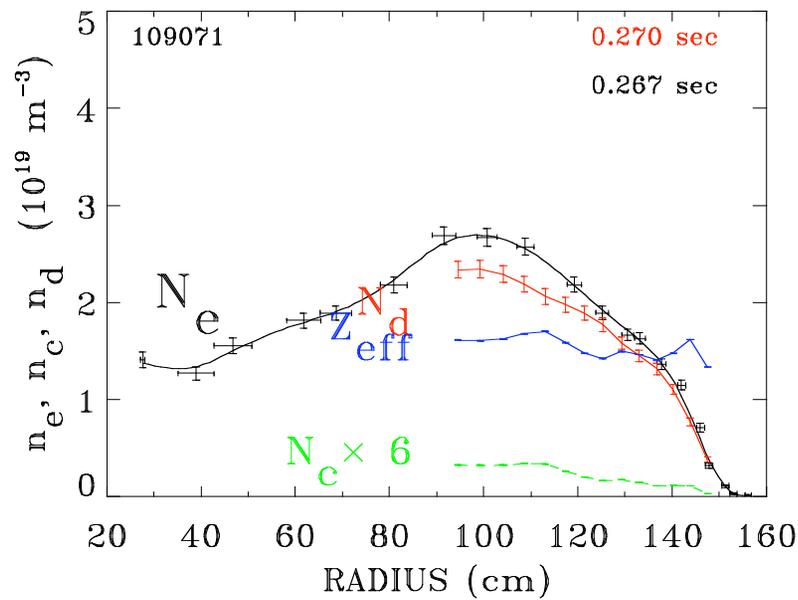
- Identify sources and sinks under various conditions (LSN, DN,  $P_{in}$ , L-mode, H-mode, NBI-heated, HHFW-heated,  $B_t$ ) - low. & up. divertor, center-stack, outer wall
  - Understand prevailing mechanisms from  $t=0$  and in steady-state
- Understand imp. transport within fluid formulation
- Connect to edge turbulence measurements
- Need to execute 1 day “carbon” XP + “piggyback” data to baseline carbon density vs wall conditioning
- Take advantage of unique NSTX diagnostic capabilities
- Benchmark codes (UEDGE, BOUT, TRANSP)
  
- XP would produce baseline for future lithium exp’ts

## Diagnostic capabilities

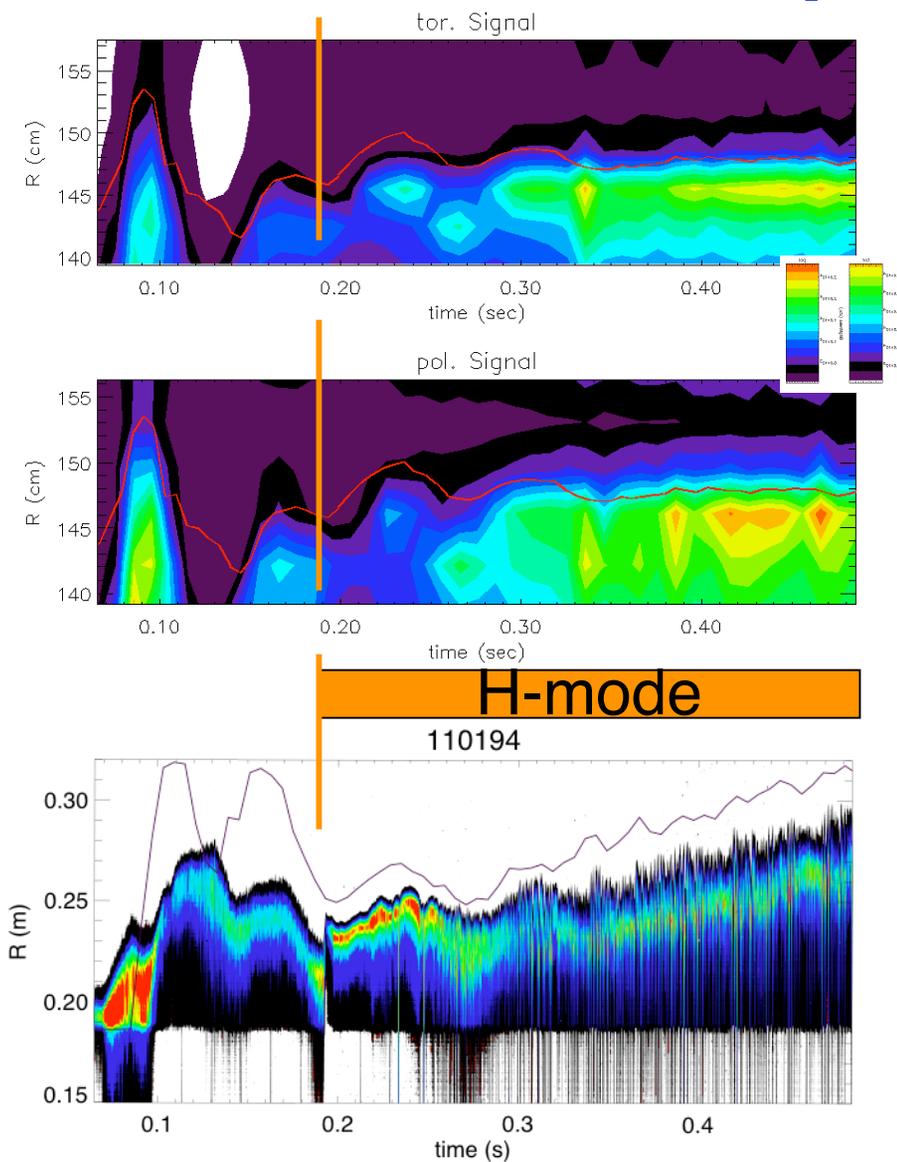


- CHERS ( $n_C$ ,  $Z_{\text{eff}}$ ,  $n_i$ )
- ERD (C III, C IV)
- Divertor cameras (D□, C II, CIII, He II)
- Midplane cameras (D□, C II, CIII, He II)
- MPTS, reflectometry
- Edge probes (UCSD, ORNL/PPPL)
- Spectroscopy
- EFIT03 (mag. + kin. + rot.)

# Core $n_i$ , $n_C$ , $Z_{\text{eff}}$ are routinely measured in NBI heated plasmas



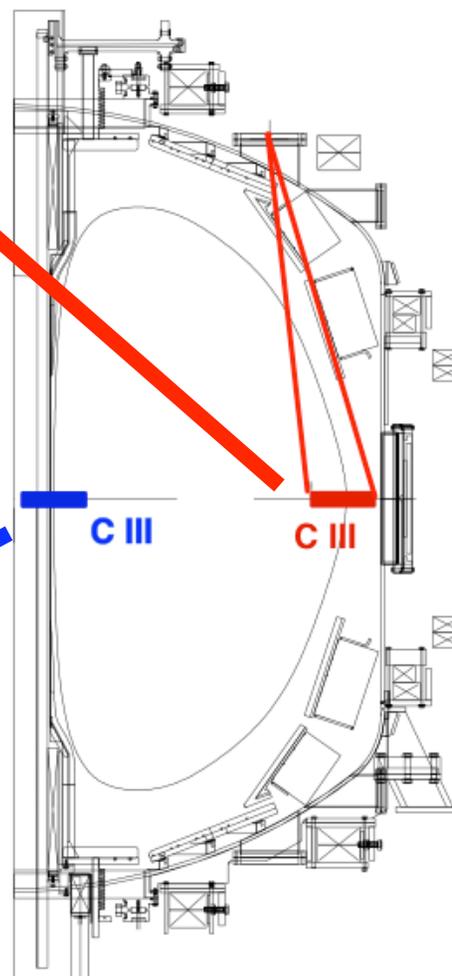
# In-out C III asymmetry in H-mode (?)



Inboard CCD: D $\alpha$ , He II, C II, C III  
 ERD: C III, C IV (pol., tang.)

ERD

CCD



# Backup: Inboard CIII brightness

