

XP 620

Shear profile effects on
core high-k turbulence

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Background

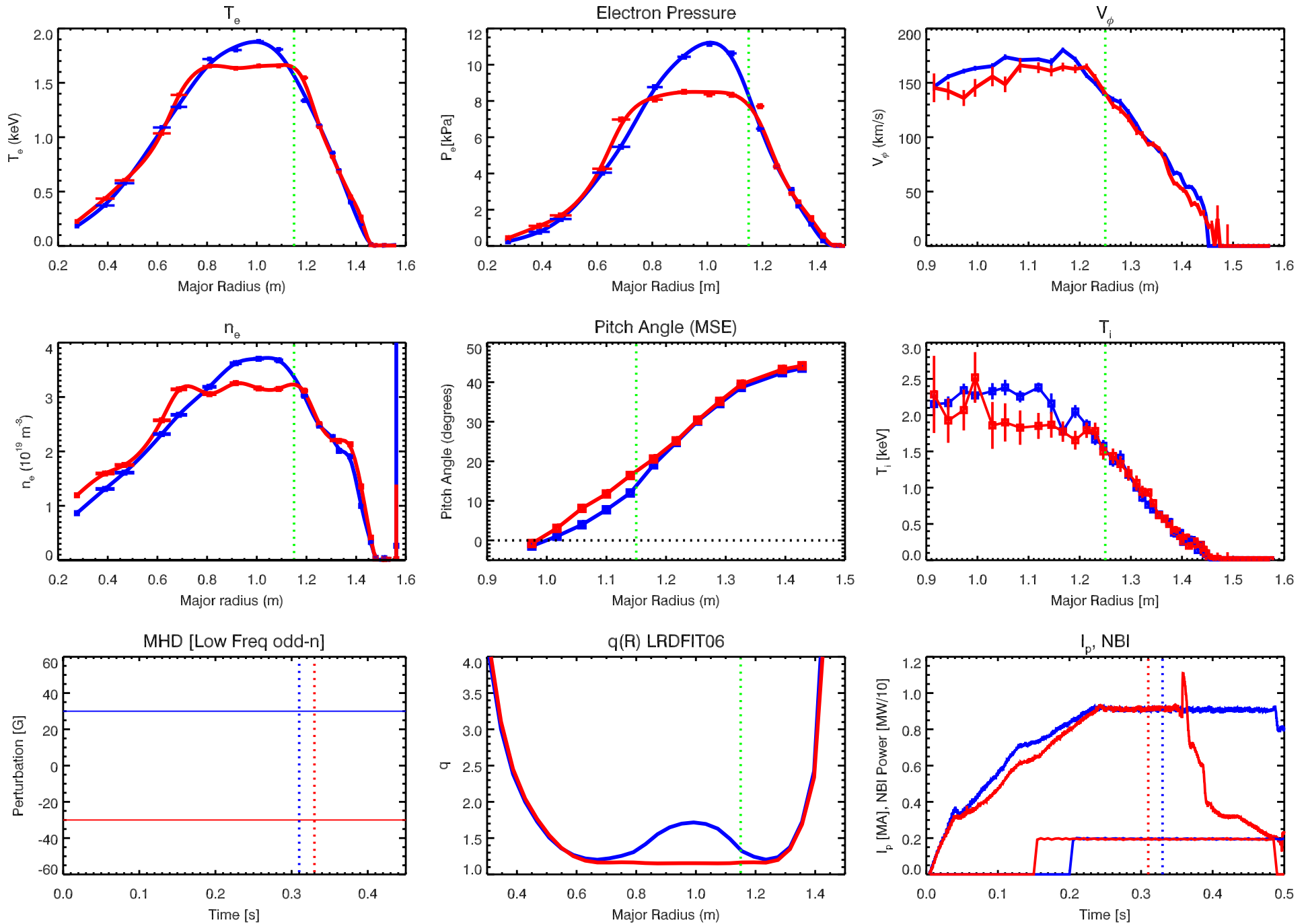
Reverse shear (RS) discharges exhibit **improved electron confinement** compared to similar conventional shear (CS) discharges.

Improved electron confinement may be due to **reduced ρ_e -scale fluctuations** and **ETG turbulence suppression**.

The high-k scattering system can measure ρ_e -scale fluctuations with **spatial and k-space resolution** at up to **five discrete values of k_{\perp}** .

Steerable optics can position the scattering region **throughout the outboard minor radius**.

XP610 Reversed Shear L-Modes 121040@330ms (Blue), 121034@310ms (Red)



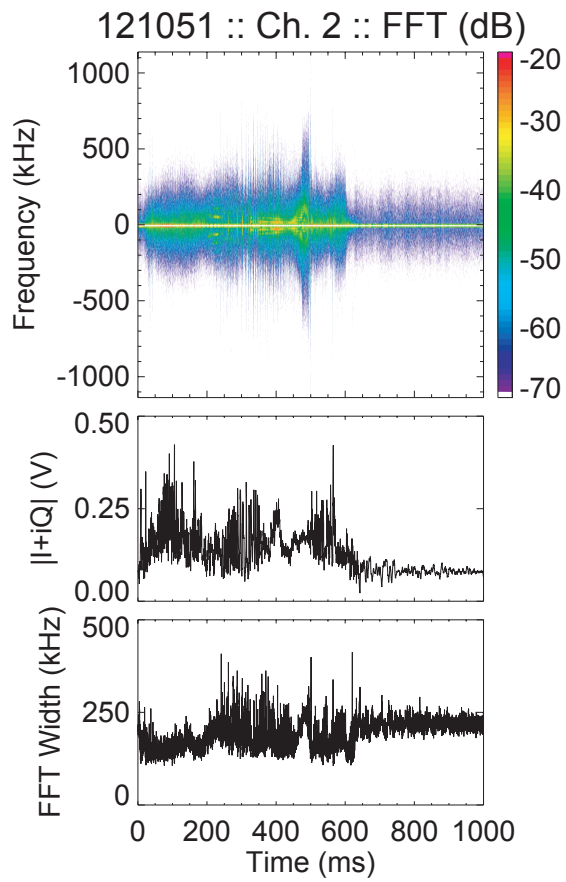
Objective

Utilize the high-k scattering system to measure ρ_e -scale fluctuations in **RS** and **CS** discharges.

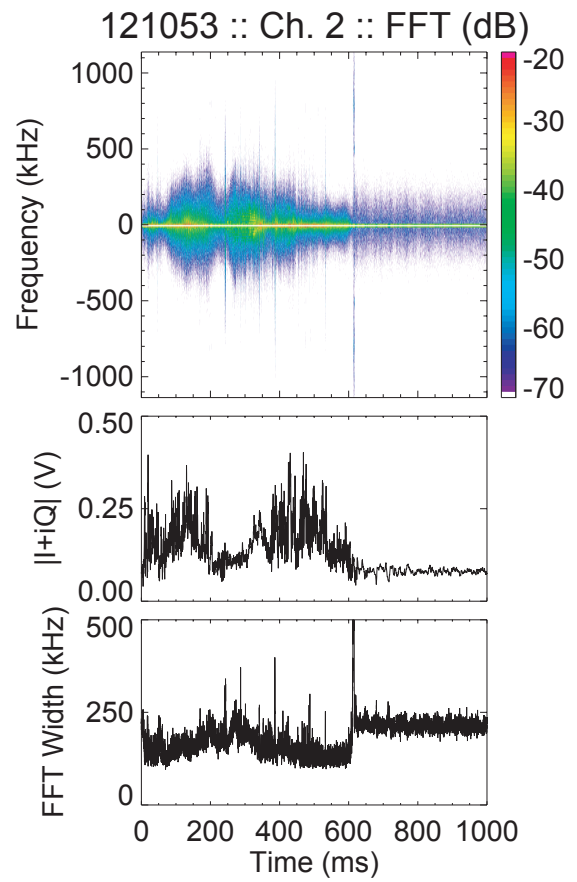
Measure fluctuations both **inside and outside** the “ T_e knee”.

$R_{\tan} \approx 125 \text{ cm}$
outside “Te knee”

RS



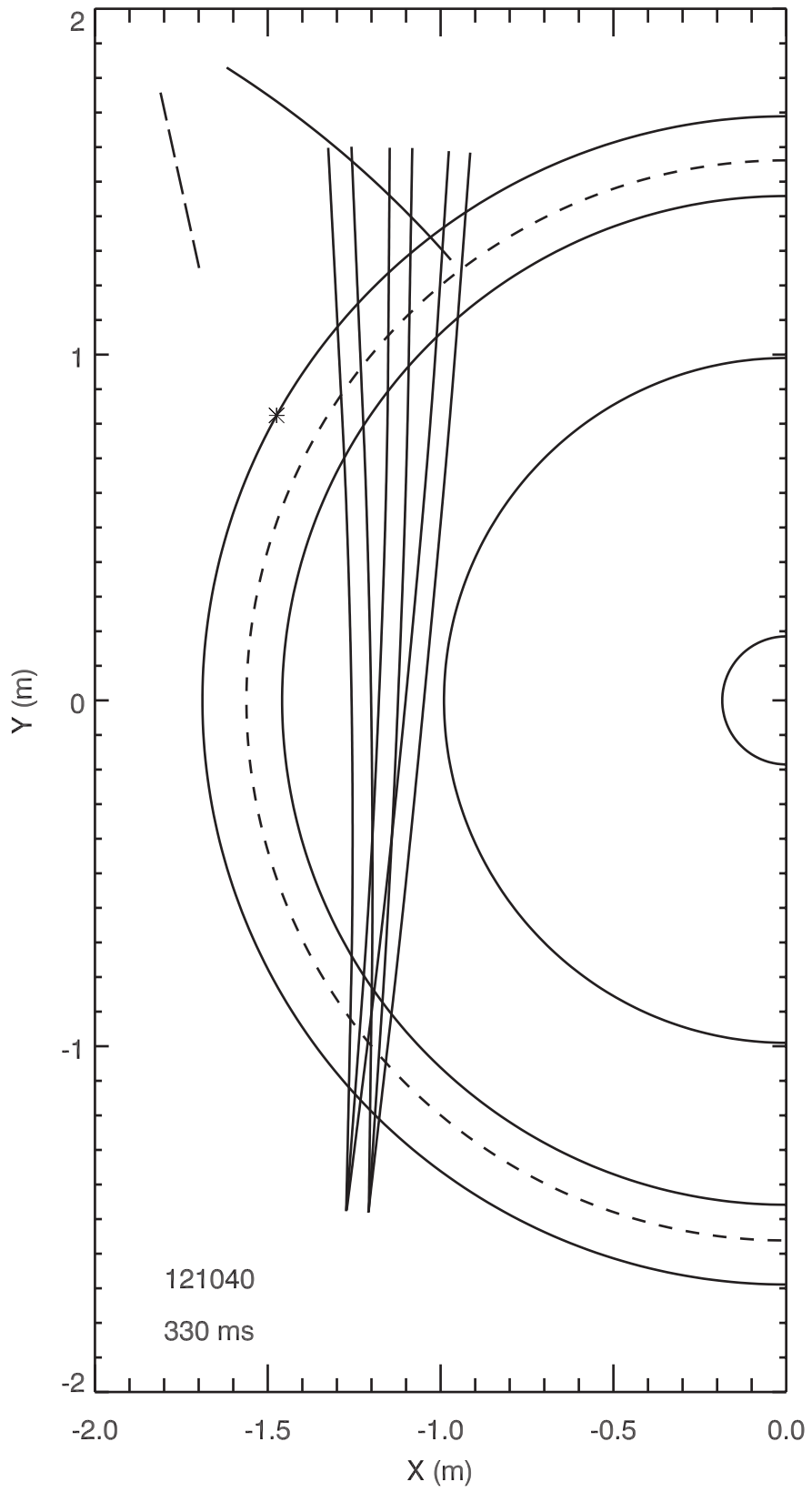
CS



Shot Matrix

	CS	mild RS	RS
$R_{\text{tan}} = 108 \text{ cm}$	×2	×2	×2
$R_{\text{tan}} = 115 \text{ cm}$	×2	×2	×2
$R_{\text{tan}} = 122 \text{ cm}$	×2	×2	×2

Note: Two controlled accesses required to reposition high-k system.



Prerequisites

- RS/CS scenario development
(XP 610, F. Levinton et al.)
- Establish real space and k-space alignment of high-k system
(XMP 44, D. Smith et al.)
- Develop probe beam positions that protect detection electronics