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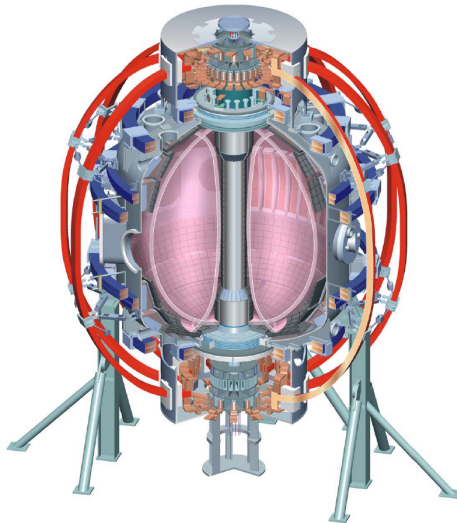
XP-610: Study of Transport with Reversed Shear in NSTX

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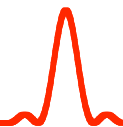


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Status of Proposal XP522



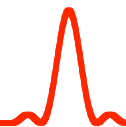
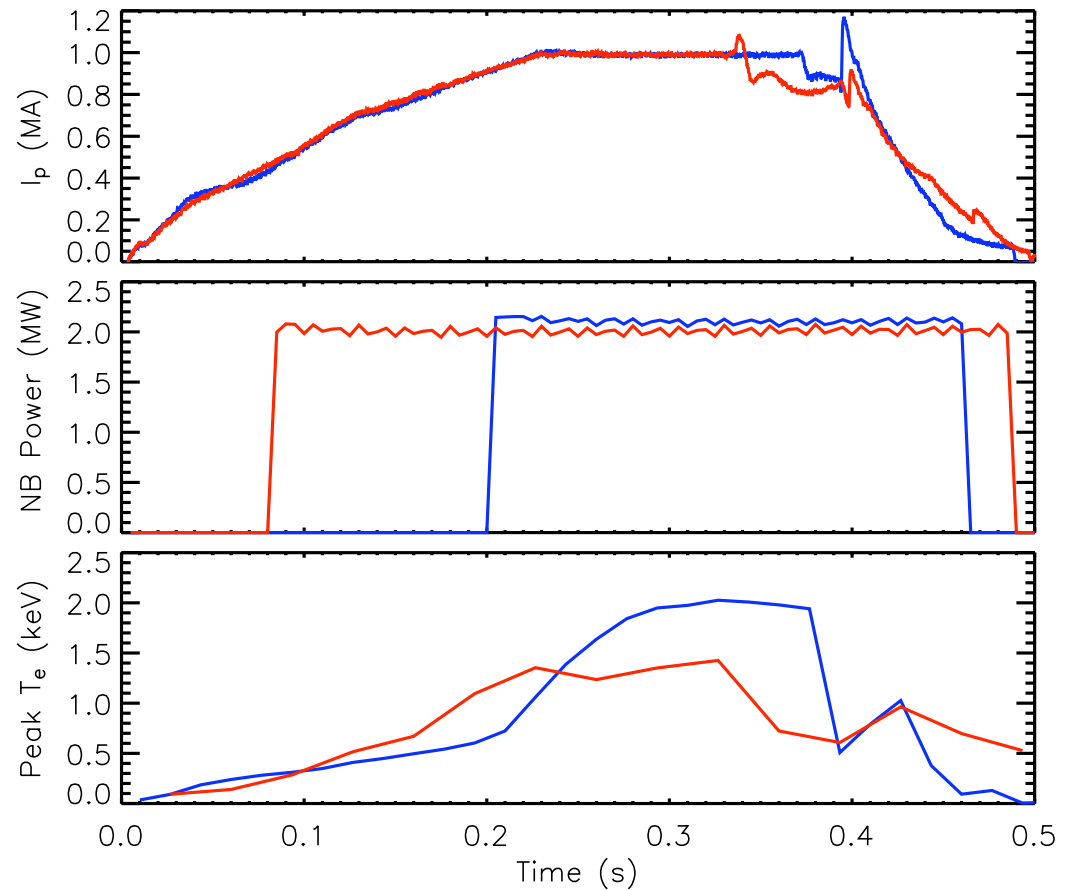
- Completed part of XP-522
 - ➔ Developed startup scenario.
 - ➔ Achieved high T_e with reversed shear.
 - ➔ Have some comparison cases.
 - ➔ Transport appears to change with magnetic shear.



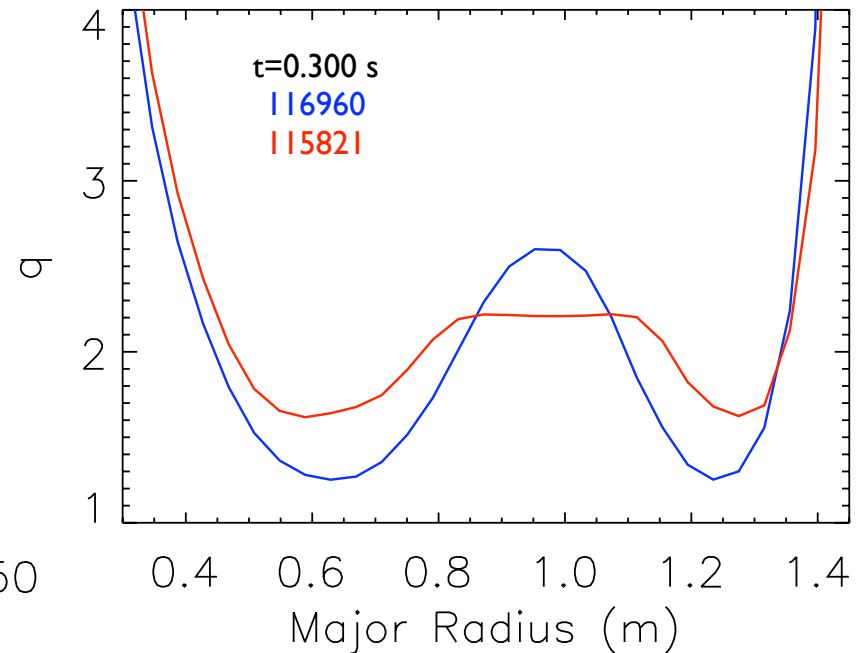
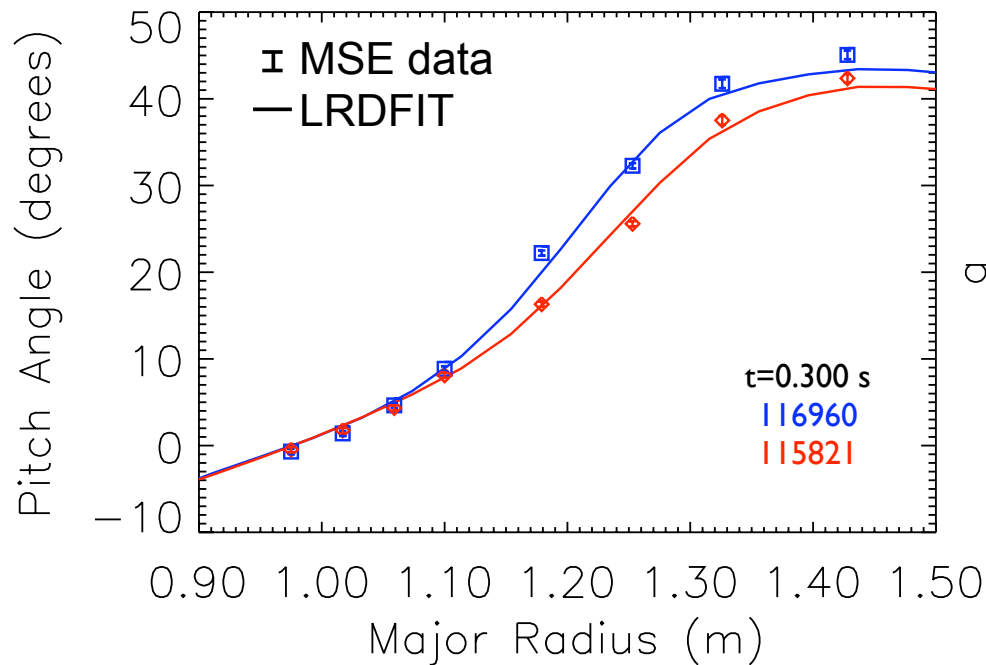
Transport Dependence on Varying Magnetic Shear



- Development of robust reversed shear startup.
- Varied I_p ramp rate, NBI timing, plasma shaping, and gas fueling.
- Plasma is L-Mode and MHD quiescent.

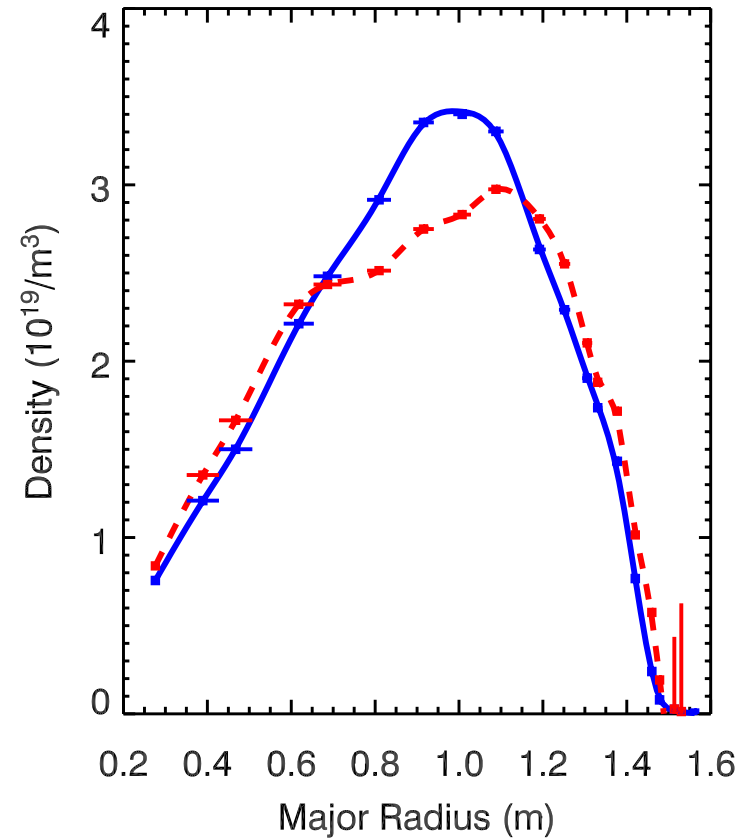
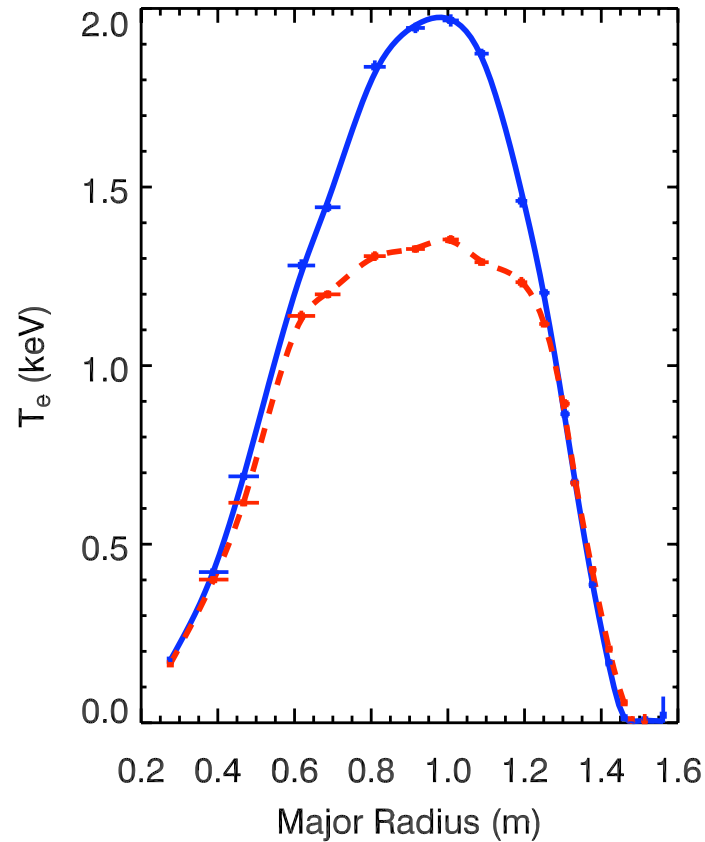


q-profiles Developed with Varying Magnetic Shear



- Variation of pitch angle and q -profile with NBI timing.
- q -profiles from equilibrium reconstruction with LRDFIT.

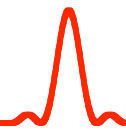
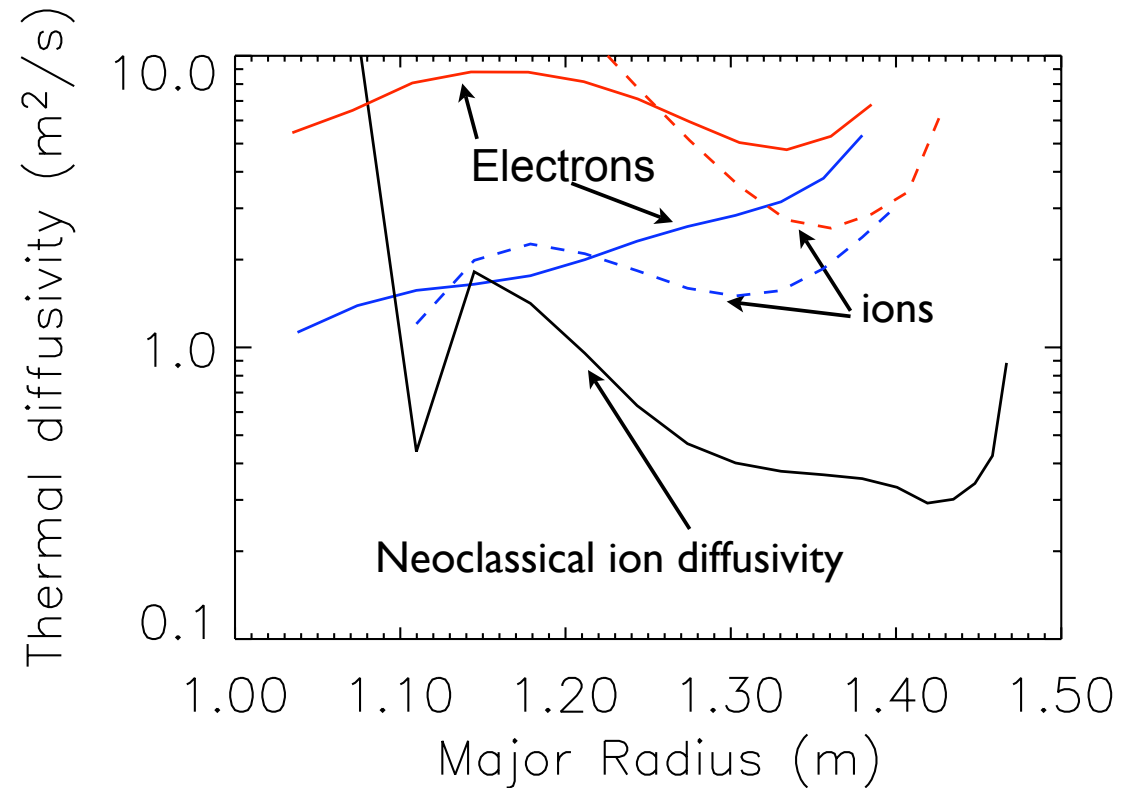
Discharge with Larger Reversed Shear has Higher Electron Temperature



Larger Reversed Shear Case has Better Transport



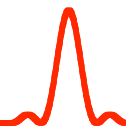
- Blue curves, with larger reversed shear region, have lower electron and ion thermal diffusivities.



Proposed XP for 2006 Run Campaign



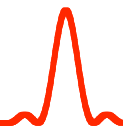
1. Extend range of magnetic shear in transport studies. Develop monotonic q-profile comparison.
2. Higher toroidal field: Can we achieve higher T_e and longer duration?
3. Take the L-mode (CS limited) high T_e case into H-mode.
 - Utilize new diagnostic capability; High-k scattering and additional MSE channels.
 - Expected run time: 2-3 days



XP-610 Run Plan



1. L-mode reversed shear at 4.5 kG. (20 shots)
 - a. Reproduce 116960. (4 shots)
 - b. Repeat 115821. (2 shots)
 - c. Approaches to develop monotonic q-profile:
 - i. Vary NBI-A timing: 0.04, 0.25, 0.275 seconds. (5 shots)
 - ii. NBI-A at 0.2 and NBI-B at 0.04, 0.08, 0.12 seconds for 50-100 ms to induce early magnetic reconnection. (6 shots)
 - iii. Slower current ramp. I_p flattop at 0.275 seconds, NBI-A start at .295 seconds. (3 shots)



XP-610 Run Plan



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2. L-mode reversed shear at 5.5 kG. (10 shots)
 - a. Reproduce 116960 at higher field. (5 shots)
 - b. Repeat 1b above. (2 shots)
 - c. Repeat most successful approach in 1c. (3 shots)

 3. H-mode development. (15 shots)
 - a. Move inner gap about 2 cm off CS at 0.2 seconds. Use CS gas to induce H-mode (116982). (5 shots)
 - b. Vary timing of inner gap movement. (0.2-0.25 s). (5 shots)
 - c. Add NBI-B at 0.3 seconds. (5 shots)
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