XP223 observations relevant to anomalous ion heating

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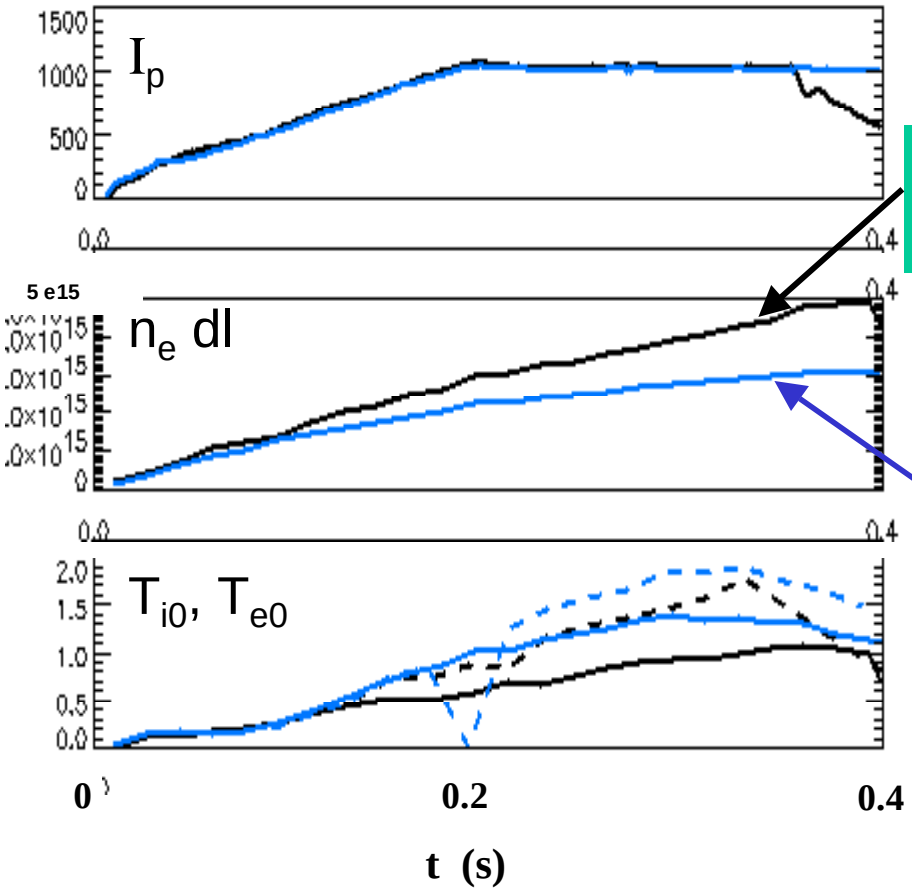
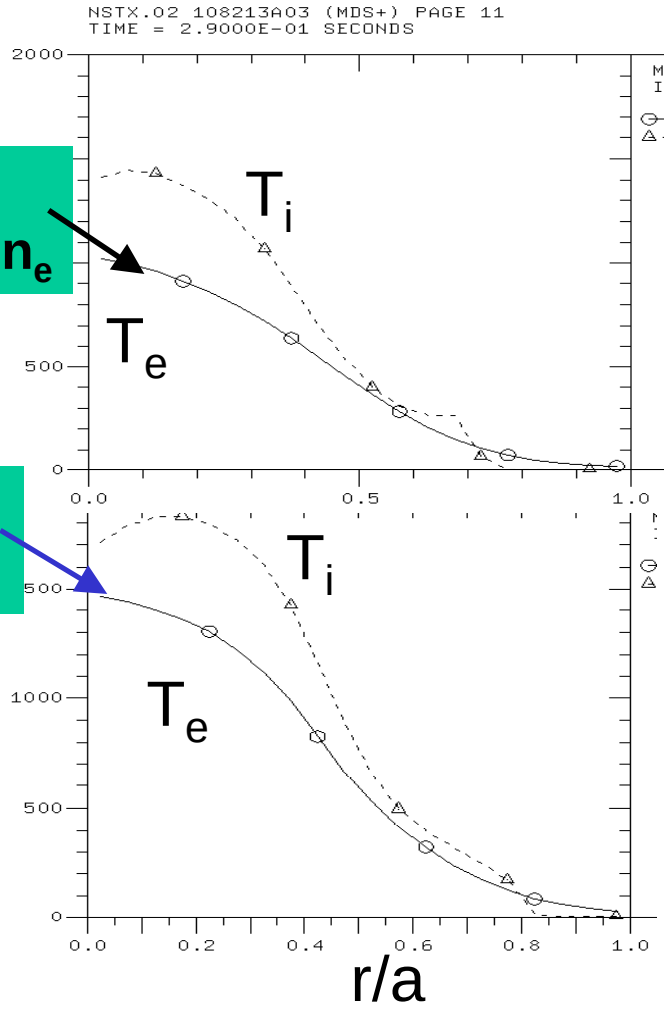
Electron temperature increase seen at low n_e



108213 'normal' n_e

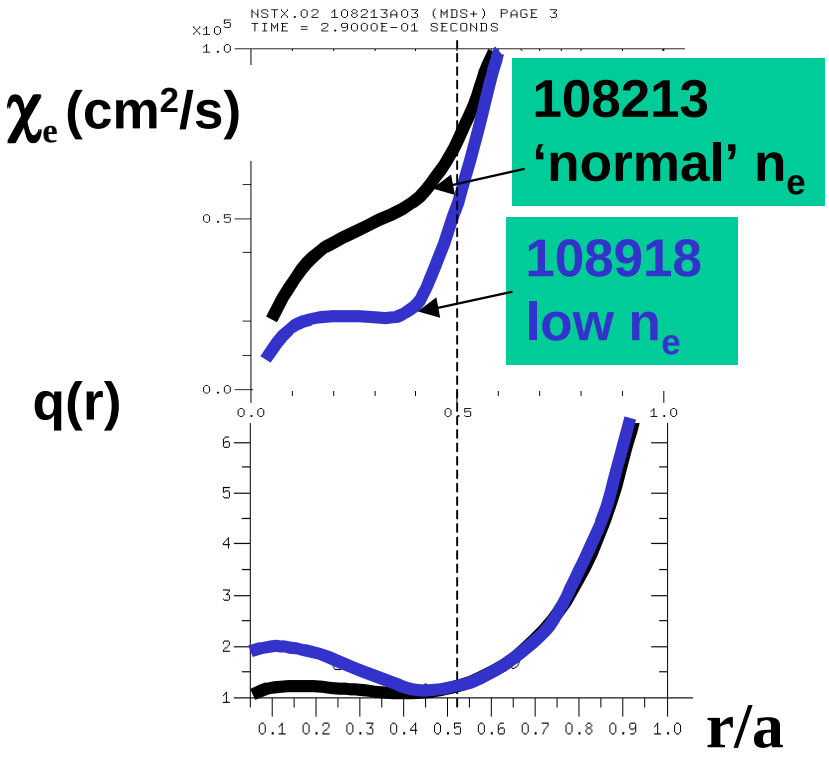
108918 low n_e

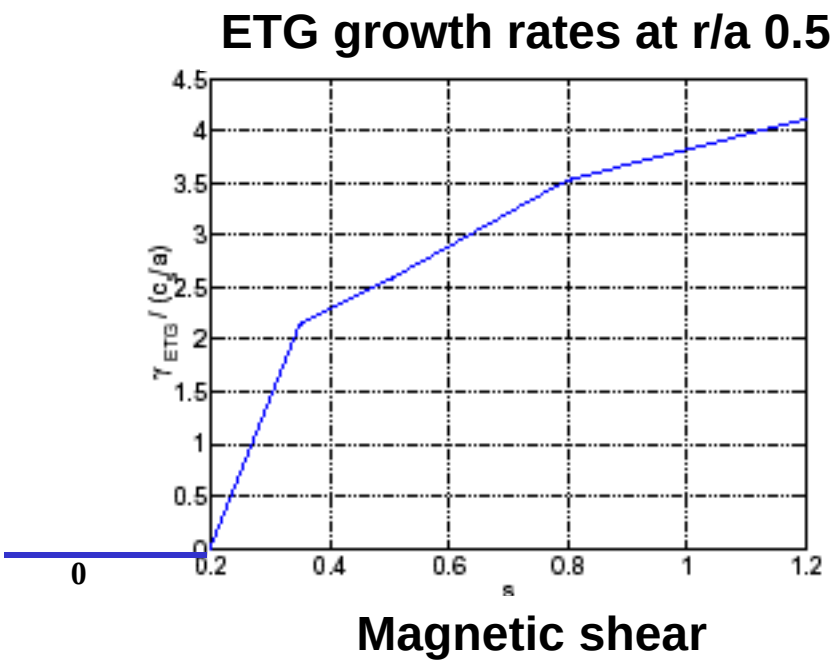
experimental temperatures



- **Electron confinement improves while Ion confinement remains good**

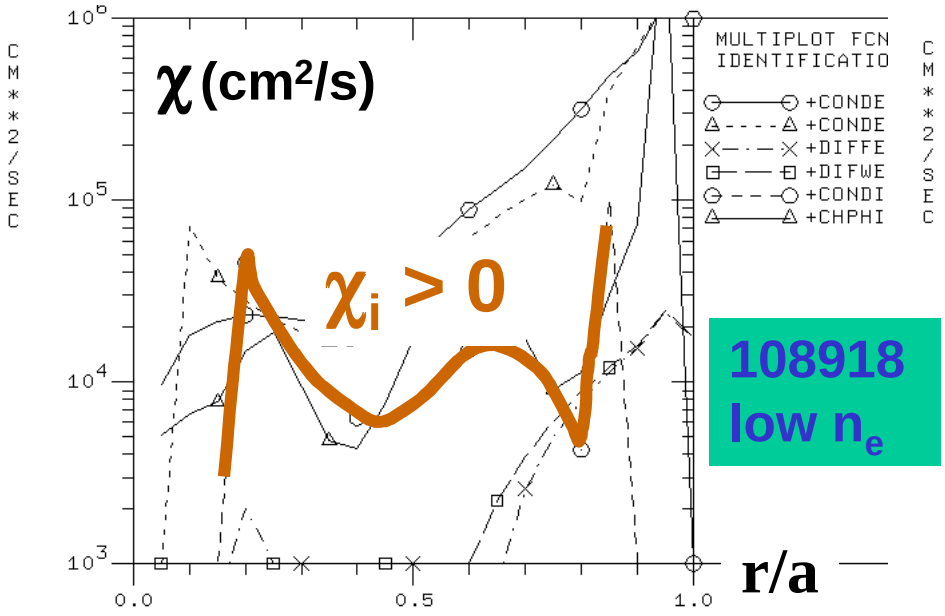
TRANSP and USXR data suggest shear reversal



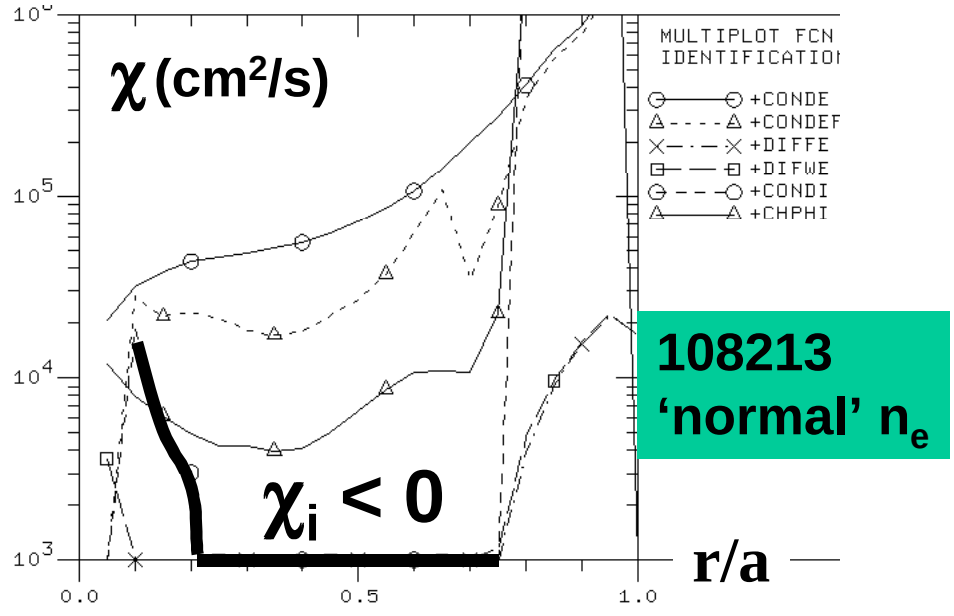


- Region of reduced electron transport ~ coincides with region of negative/low shear predicted by TRANSP (magnetic diffusion)
- Off-axis USXR reconnections may also suggest reversal
- Microstability predicts ETG turbulence suppressed in these shots

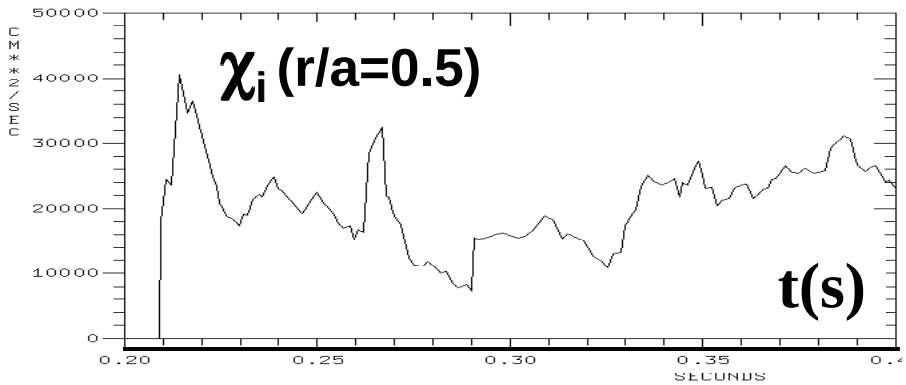
Anomalous ion heating seems reduced at low n_e/rs

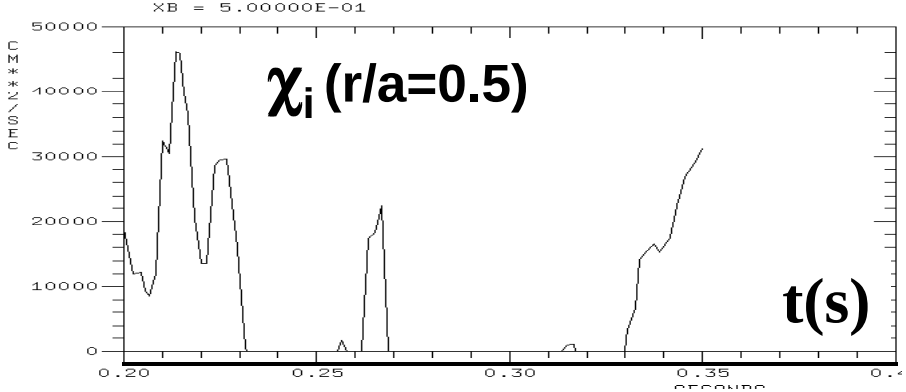


108918
low n_e



108213
'normal' n_e





- Power balance seems to work in low n_e shots ($\chi_i \approx$ neoclassical)
- Reduced anomalous ion heating with reduced electron transport

Support for Jon Menard's 'ETG ion heating' theory

- Strong ETG activity predicted by GS2 in 'normal density' shots
- ETG as drive for e^- transport supported by beta scaling in XP223
- Improved e^- confinement likely arises from ETG reduction
- Reduced anomalous ion heating with reduced ETG activity would significantly support Jon's theory
- Shots with/without CAEs in XP223 do not show this correlation with anomalous ion heating