Further LP Analysis for Cryopump Calculations: Electron temperature in the far-SOL

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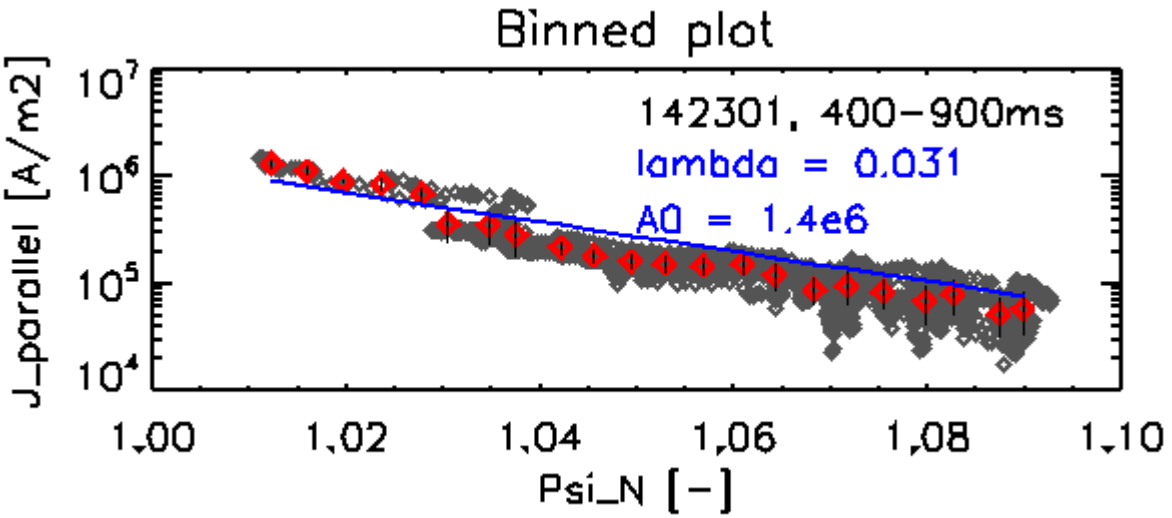
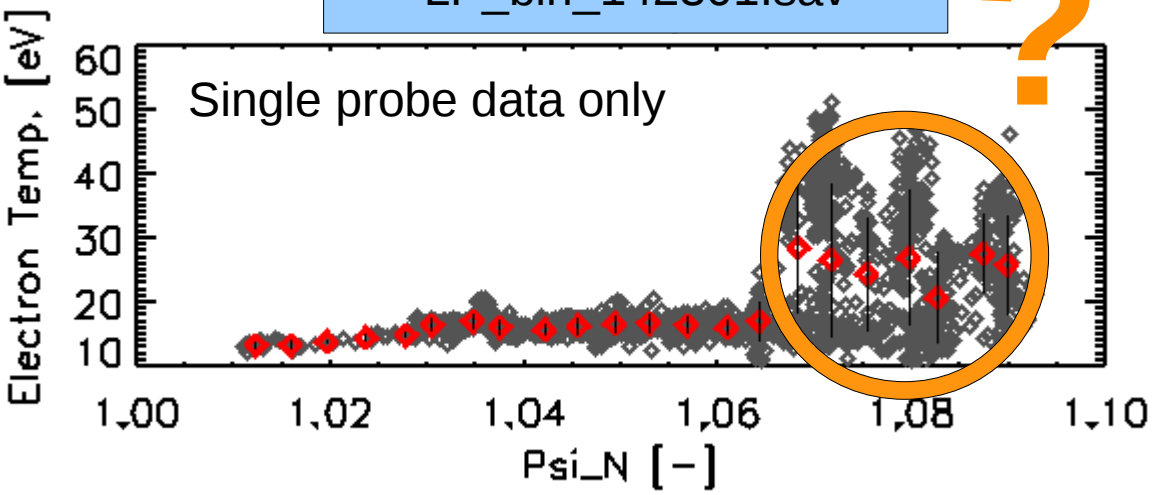
Question: What is correct Te on “model” cryo shot 142301?

- Single probe analysis sent previously contains Te array data
  - Te calculated from classical interpretation
  - This typically **over-estimates** Te if it is off
  - May actually be “ok” in low density regions
- Shows large scatter after PsiN~1.065
  - Are these Te calculations real?

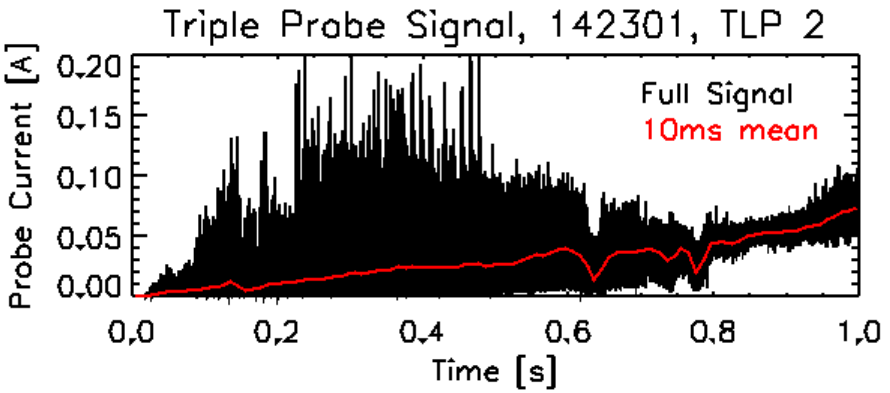


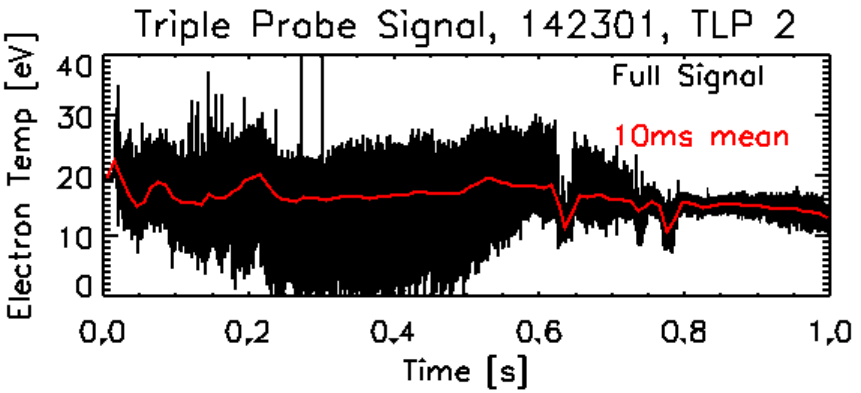
Data already available in:
LP_bin_142301.sav



Turbulence is common problem for single probe interpretation

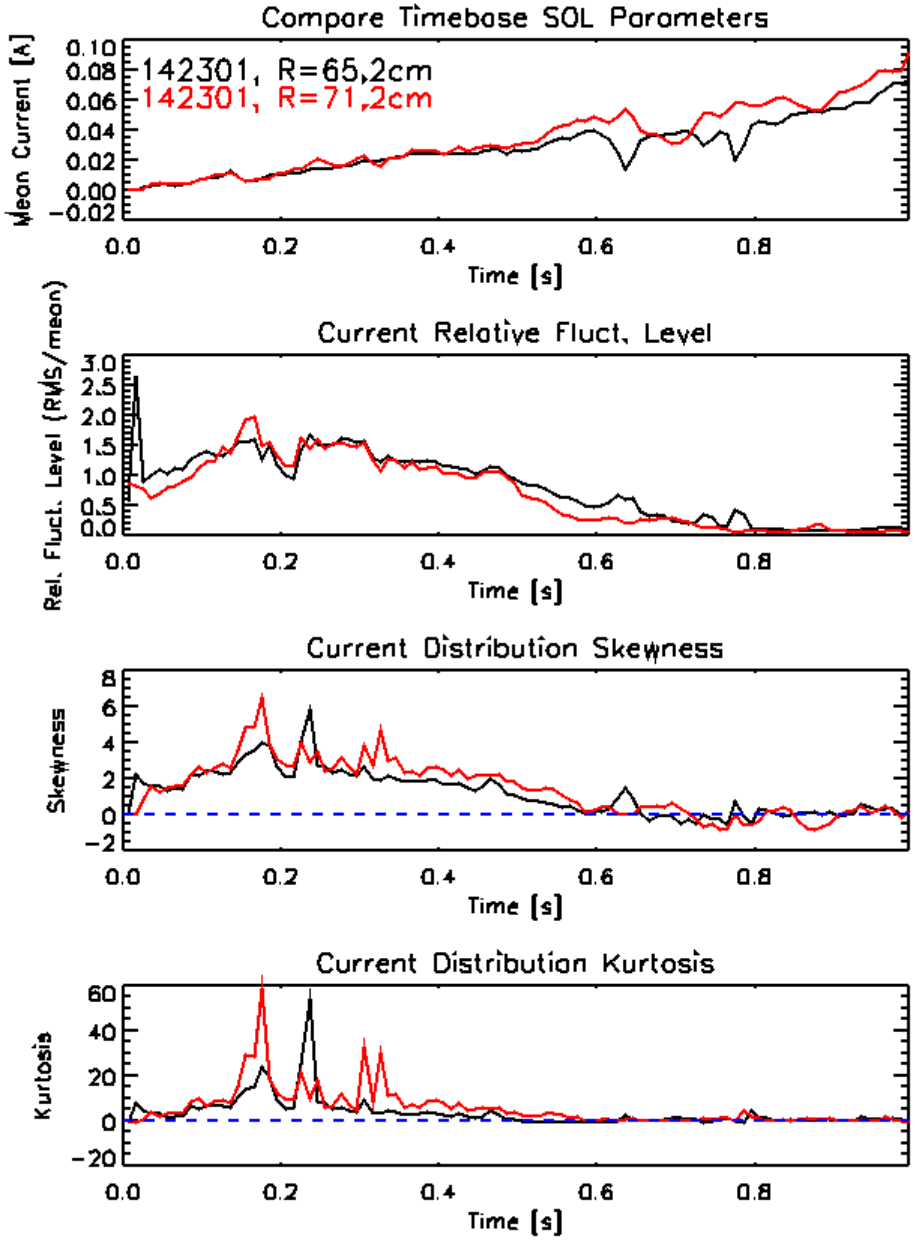
- Triple probes utilize constant bias to capture transients
  - Provide equivalent Te calculation as classical analysis
  - See Jaworski, RSI, 2010 for more detail
- Strong fluctuations seen on probes for this discharge (probe at 66cm)
  - Fluctuations decrease to smaller levels after 0.6s
  - Is this intrinsic to plasma or temporal evolution?





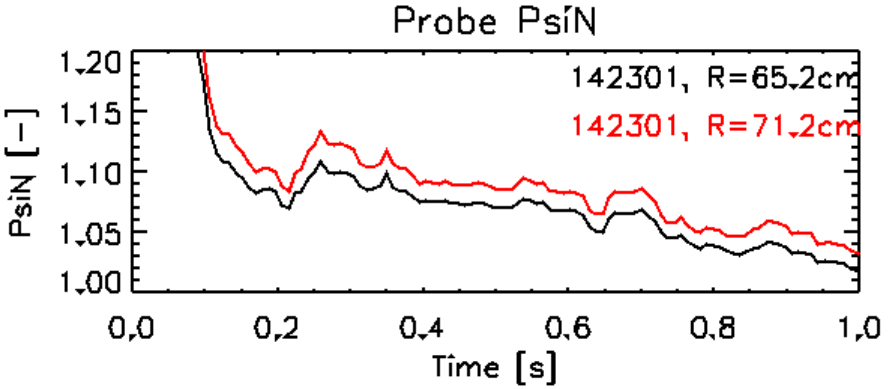
Comparison of two probes shows similar evolution in time

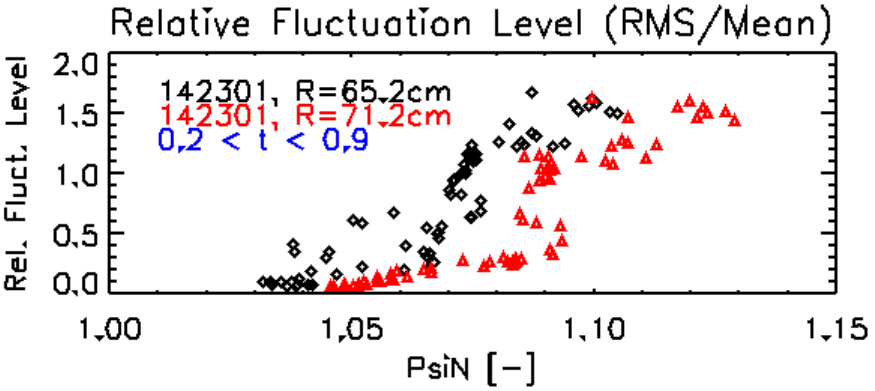
- Two TLPs compared at different radii
  - Fluctuations analyzed within 10ms moving window
  - RMS, skew, kurtosis calculated for all data within 10ms window (2500 data points ea.)
- Similar evolution found for both locations

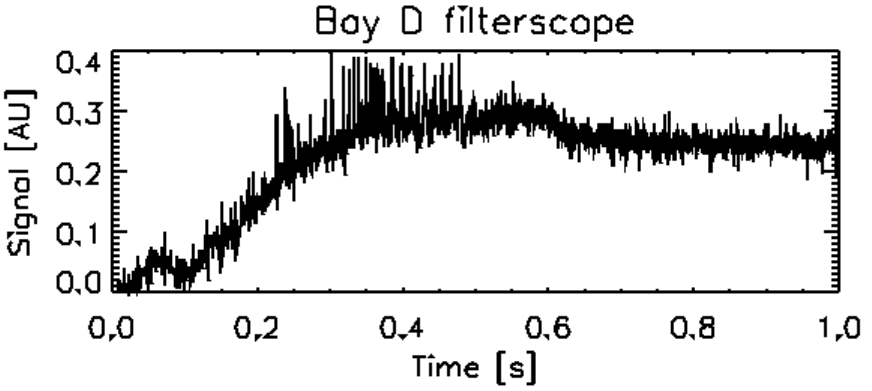


Comparison on magnetic surfaces indicates temporal effect, not position

- PsiN calculated for both probes from EFIT02
- Shift in relative fluctuation level is shifted for the probes
  - Indicates it occurs at the same time, as opposed to same magnetic surface
- D-alpha filterscope seems also to show change in temporal characteristics
  - Fluctuations strong around 0.4s
  - Similar to behavior seen on TLPs







Estimate for classical Te is ~15eV for the far-SOL

- Triple probe Te indicates 15eV from 1.04<PsiN<1.13
- Corresponds to single probe Te in non-turbulent portion of discharge
  - Large scatter in single probe data beyond PsiN~1.065 is probably due to fluctuations
- Still based on classical interpretation, but should provide upper-bound for simulations
- Jpara calculation not as affected as Te, can use previous relation