Signals from ISTP-001
April 11-13, 2005

Preliminary Assessment

C Neumeyer

98 Shots Performed for ISTP and for Magnetics Calibration

4/11/05	115037	5kA TF Only
4/11/05	115038	5kA TF Only
4/11/05	115039	Software Glitch
4/11/05	115040	5kA TF Only
4/11/05	115041	Sofware OC
4/11/05	115042	5kA TF Only
4/11/05	115043	5kA TF Only
4/11/05	115044	10kA TF Only
4/11/05	115045	10kA TF Only
4/11/05	115046	10kA TF Only
4/11/05	115047	10kA TF Only
4/11/05	115048	10kA TF Only
4/11/05	115049	TDS 182 TF 26.7kA
4/11/05	115050	TDS 183 TF 37.8kA
4/11/05	115051	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115052	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115053	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115054	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115055	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115056	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115057	TDS 184 TF 37.8kA & OH +/-12kA Attempt
4/11/05	115058	TDS 185 TF 37.8kA & PF1AU/L Attempt Positive Feedback
4/11/05	115059	TDS 185 TF 37.8kA & PF1AU/L Attempt Trip on Weak Side OC
4/11/05	115060	TDS 185 TF 37.8kA & PF1AU/L Attempt OK but reversed waveform polarity and TF trip
4/11/05	115061	TDS 185 TF 37.8kA & OK but trip at end (OT?) Fixed TF Halmar
4/11/05	115062	TDS 186 TF 37.8kA & PF1B OK
4/11/05	115063	TDS 187TF 37.8kA & PF2U/L OK
4/11/05	115064	TDS 188 TF 37.8kA & PF3U/L OK
4/11/05	115065	TDS 189 TF 37.8kA & PF5 OK
4/11/05	115066	OH Only (Trip, for info gathering)
4/11/05	115067	PF1AU/L only
4/11/05	115068	PF1AU only
4/11/05	115069	PF1AL only
4/11/05	115070	OH Only (Trip, for info gathering)
4/11/05	115071	OH Only (Trip, for info gathering)
4/11/05	115072	PF1b Only
4/11/05	115073	PF2U Only
4/11/05	115074	MG 4kV Test
4/12/05	115075	No Shot
4/12/05	115076	OH Only, no MDS+
4/12/05	115077	No Shot
4/12/05	115078	No Shot
4/12/05	115079	No Shot
4/12/05	115080	TDS 190 46.2kA TF Only
4/12/05	115081	TDS 191 53.4kA TF Only
4/12/05	115082	TDS 191 53.4kA TF Only
4/12/05	115083	TDS 191 53.4kA TF Only
4/12/05	115084	TDS 191 53.4kA TF Only
4/12/05	115085	TDS 191 53.4kA TF Only
4/12/05	115086	TDS 191 53.4kA TF Only

Hold Point

4/12/05	115087	TDS 191 53.4kA TF Only
4/12/05	115088	TDS 191 53.4kA TF Only
4/12/05	115089	TDS 192 53.4kA TF & +/-24kA OH
4/12/05	115090	No Shot
4/12/05	115091	TDS 191 53.4kA TF Only
4/12/05	115092	TDS 193 53.4kA TF & PF1AU/L Fault
4/12/05	115093	TDS 193 53.4kA TF & PF1AU/L Fault
4/12/05	115094	TDS 193 53.4kA TF & PF1AU/L Fault
4/12/05	115095	TDS 193 53.4kA TF & PF1AU/L Trip at End but OK
4/12/05	115096	TDS 194 53.4kA TF & PF1b Fault
4/12/05	115097	TDS 194 53.4kA TF & PF1b
4/12/05	115098	TDS 195 53.4kA TF & PF2U/L
4/12/05	115099	TDS 196 53.4kA TF & PF3U/L Fault
4/12/05	115100	TDS 196 53.4kA TF & PF3U/L Fault
4/12/05	115101	TDS 196 53.4kA TF & PF3U/L Fault
4/12/05	115102	TDS 196 53.4kA TF & PF3U/L Fault
4/12/05	115103	TDS 196 53.4kA TF & PF3U/L
4/12/05	115104	TDS 197 53.4kA TF & PF5
4/12/05	115105	TDS 192 53.4kA TF & +/-24kA OH
4/12/05	115106	TDS 193 53.4kA TF & PF1AU/L Fault
4/12/05	115107	TDS 193 53.4kA TF & PF1AU/L Trip at End but OK
4/12/05	115108	TDS 194 53.4kA TF & PF1b
4/12/05	115109	TDS 195 53.4kA TF & PF2U/L
4/12/05	115110	TDS 196 53.4kA TF & PF3U/L
4/12/05	115111	TDS 197 53.4kA TF & PF5
4/13/05	115112	TDS 184 TF 37.8kA & OH +/-12kA
4/13/05	115113	No Shot
4/13/05	115114	No Shot
4/13/05	115115	TDS 192 53.4kA TF & +/-24kA OH
4/13/05	115116	PF1AU only
4/13/05	115117	PF1AL only
4/13/05	115118	TDS 193 53.4kA TF & PF1AU/L Fault
4/13/05	115119	TDS 193 53.4kA TF & PF1AU/L
4/13/05	115120	TDS 194 53.4kA TF & PF1b
4/13/05	115121	TDS 195 53.4kA TF & PF2U/L
4/13/05	115122	TDS 196 53.4kA TF & PF3U/L
4/13/05	115123	TDS 197 53.4kA TF & PF5
4/13/05	115124	TDS 191 53.4kA TF Only
4/13/05	115125	TDS 192 53.4kA TF & +/-24kA OH
4/13/05	115126	TDS 193 53.4kA TF & PF1AU/L
4/13/05	115127	TDS 194 53.4kA TF & PF1b
4/13/05	115128	TDS 195 53.4kA TF & PF2U/L
4/13/05	115129	TDS 196 53.4kA TF & PF3U/L
4/13/05	115130	TDS 197 53.4kA TF & PF5
4/13/05	115131	TDS 185 TF 37.8kA & PF1AU/L
4/13/05	115132	TDS 198 26.7kA TF & 50% OH/PF
4/13/05	115133	TDS 198 53.4kA TF & 100% OH/PF Trip
4/13/05	115134	TDS 198 53.4kA TF & 100% OH/PF No PF1b

Hold Point

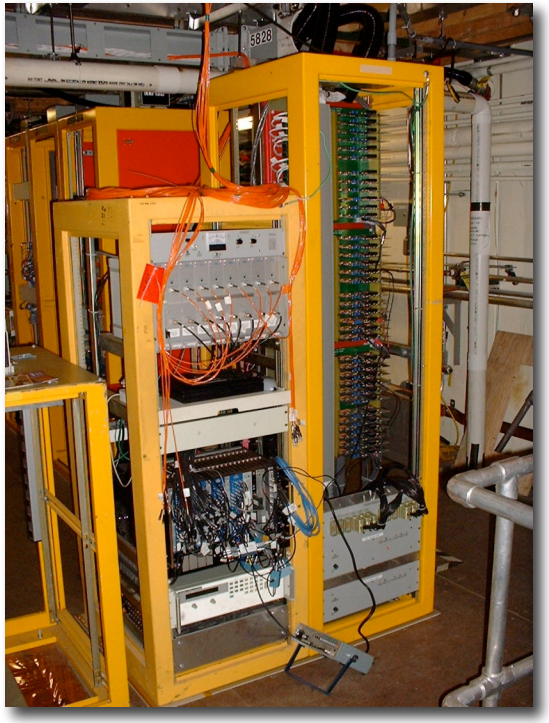
Final Shots were 50% and 100% daily test shots

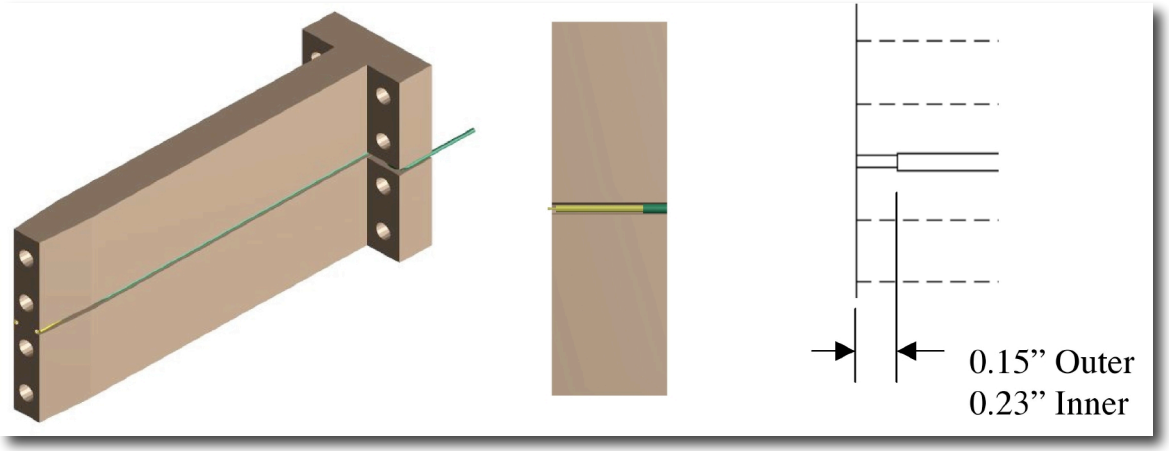
Voltage Probes

- Same as last run except 8 channels have A&B monitoring

- Allows monitoring of out-of-plane loading

- Web page developed to archive probe vs. channel assignments (instead of reliance on notebook records)



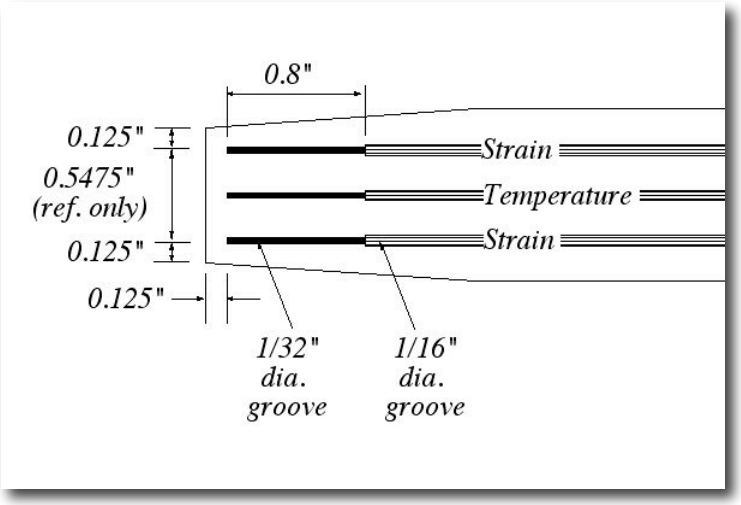


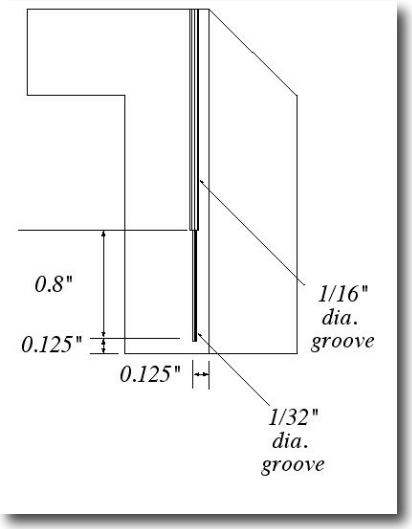
Fiber Optic Temperature, Strain, and Displacement

- Flags (inner, outer/top, bottom)
  - ✓4 flags x 3 strain/flag = 12 strain
  - ✓4 flags x 1 temp/flag = 4 temp
- Hub and Flag twist angle (top, bottom)
  - ✓2 displacement
- Flag end ΔZ & $\Delta\phi$ motion (top, bottom)
  - ✓4 displacement
- Hub (top only)
  - ✓1 displacement

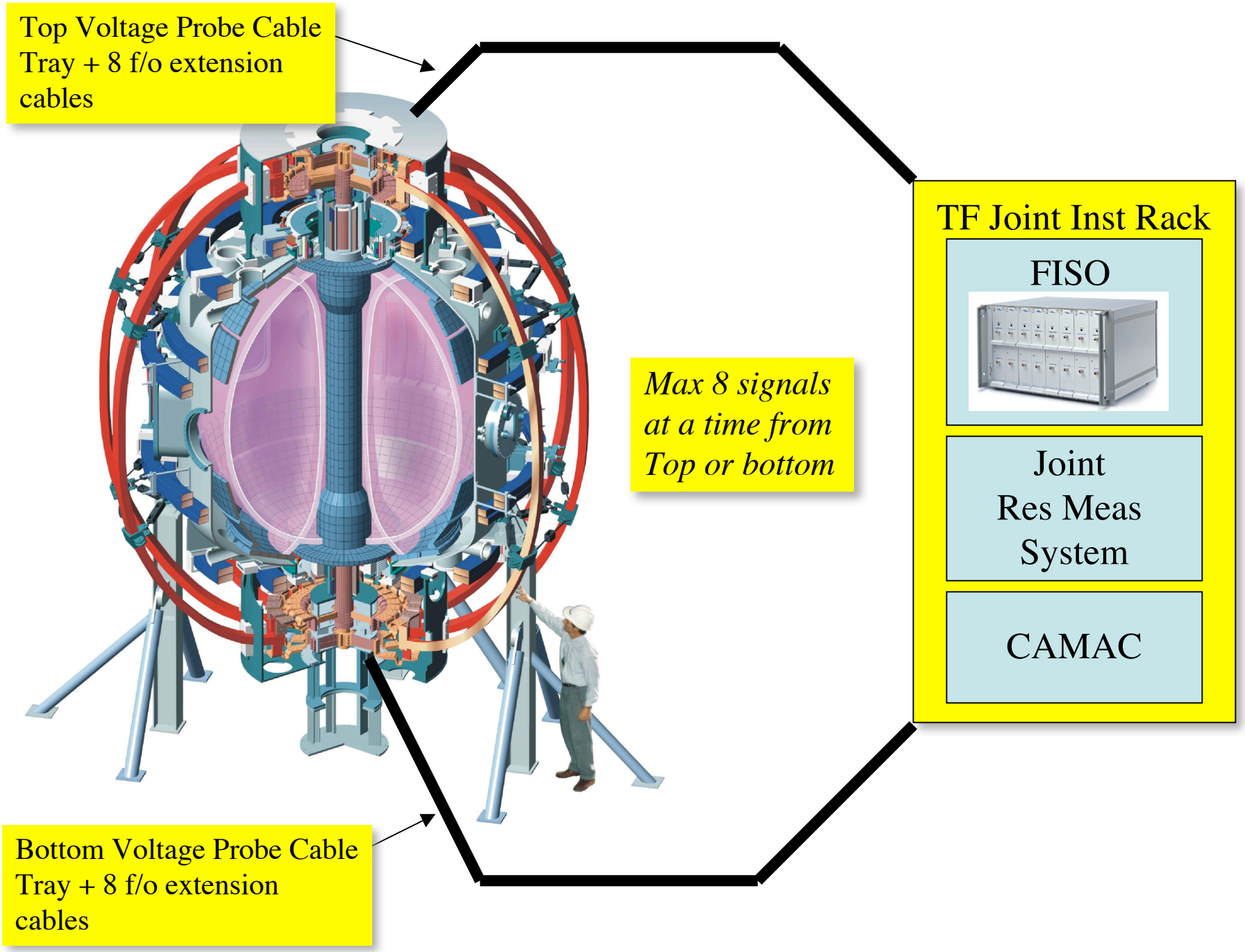
New

Total 23 transducers ⟺ *8 conditioner channels*

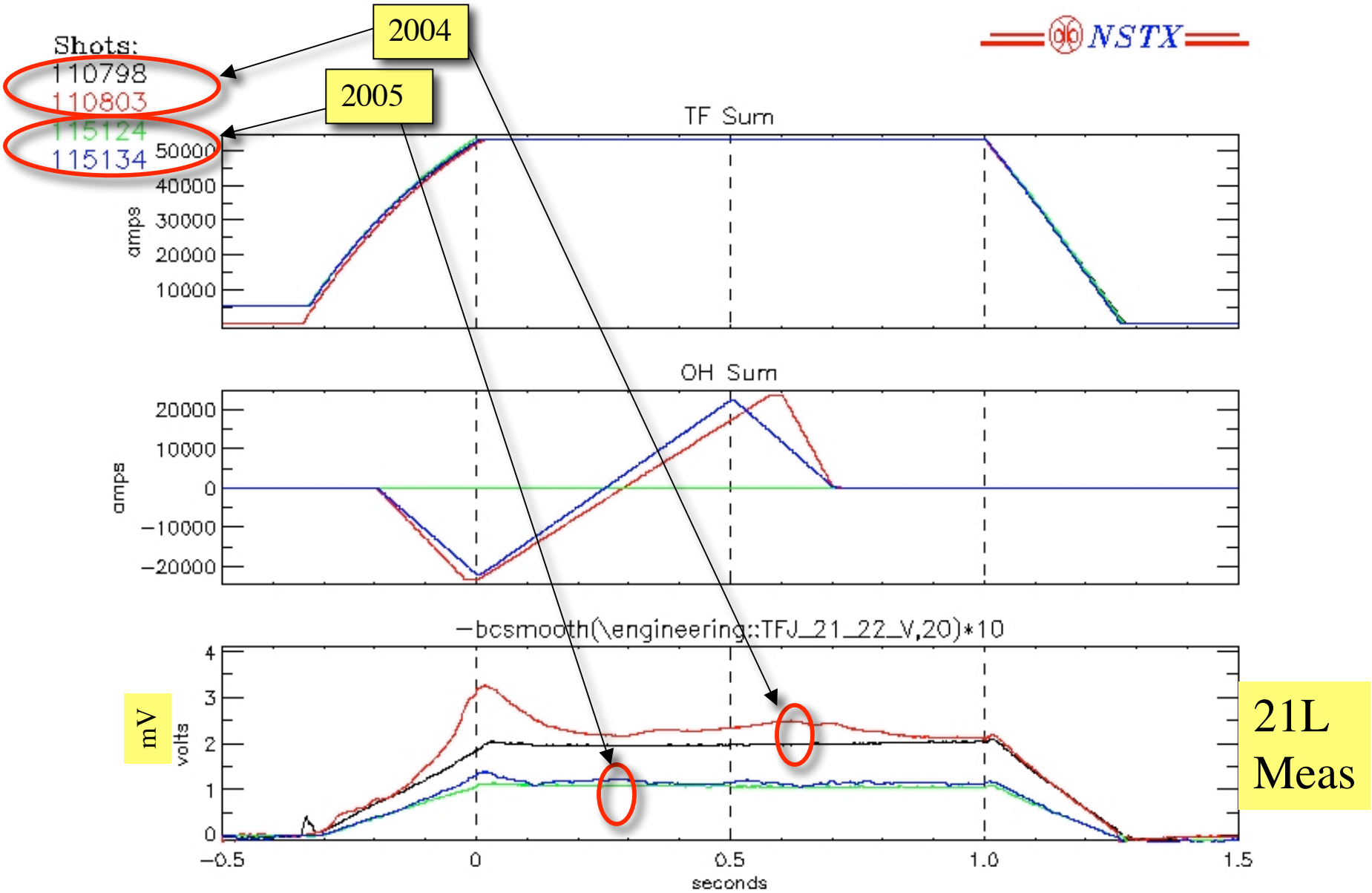




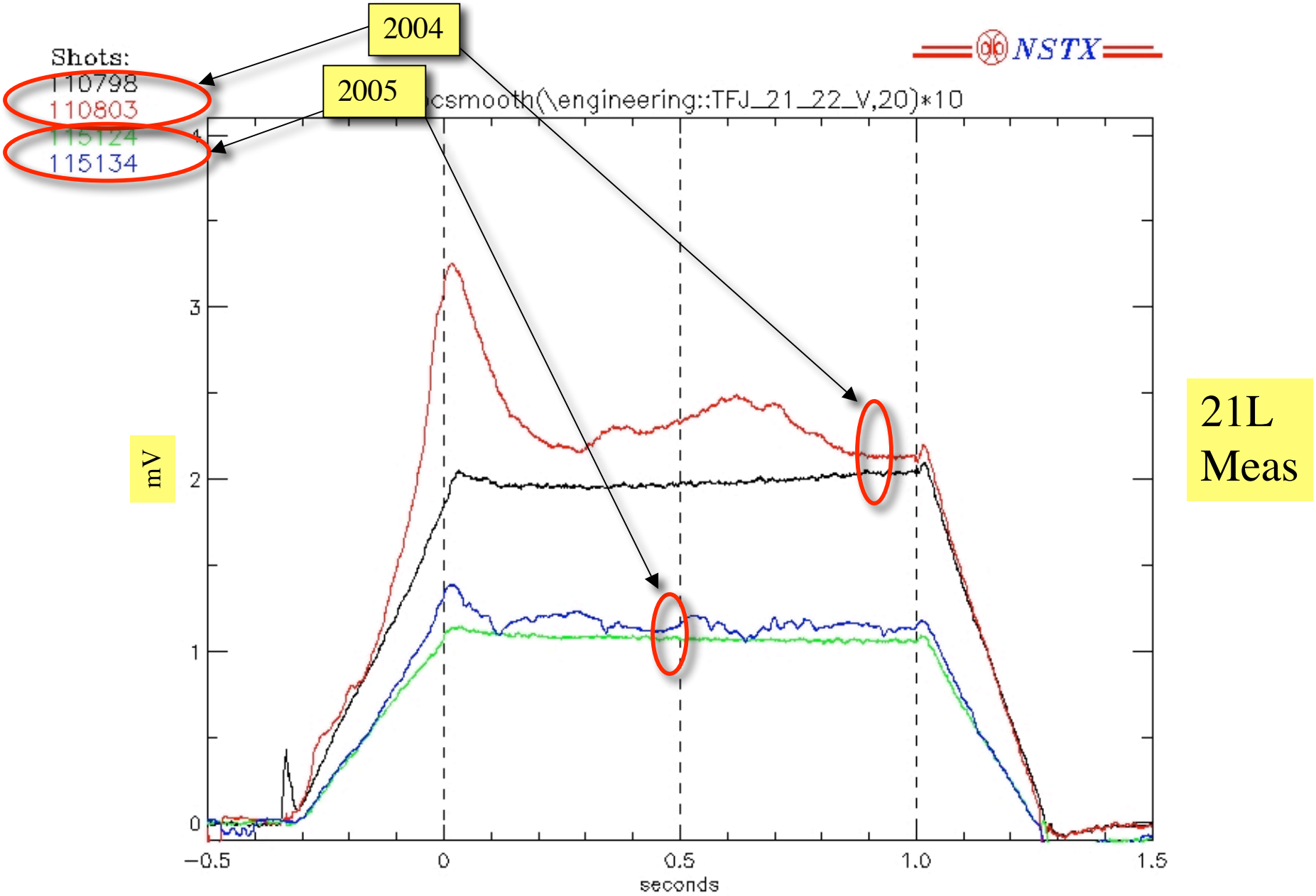
FISO Technologies, Inc.


Top Voltage Probe Cable Tray + 8 f/o extension cables
Max 8 signals at a time from Top or bottom
TF Joint Inst Rack
FISO
Joint Res Meas System
CAMAC
Bottom Voltage Probe Cable Tray + 8 f/o extension cables

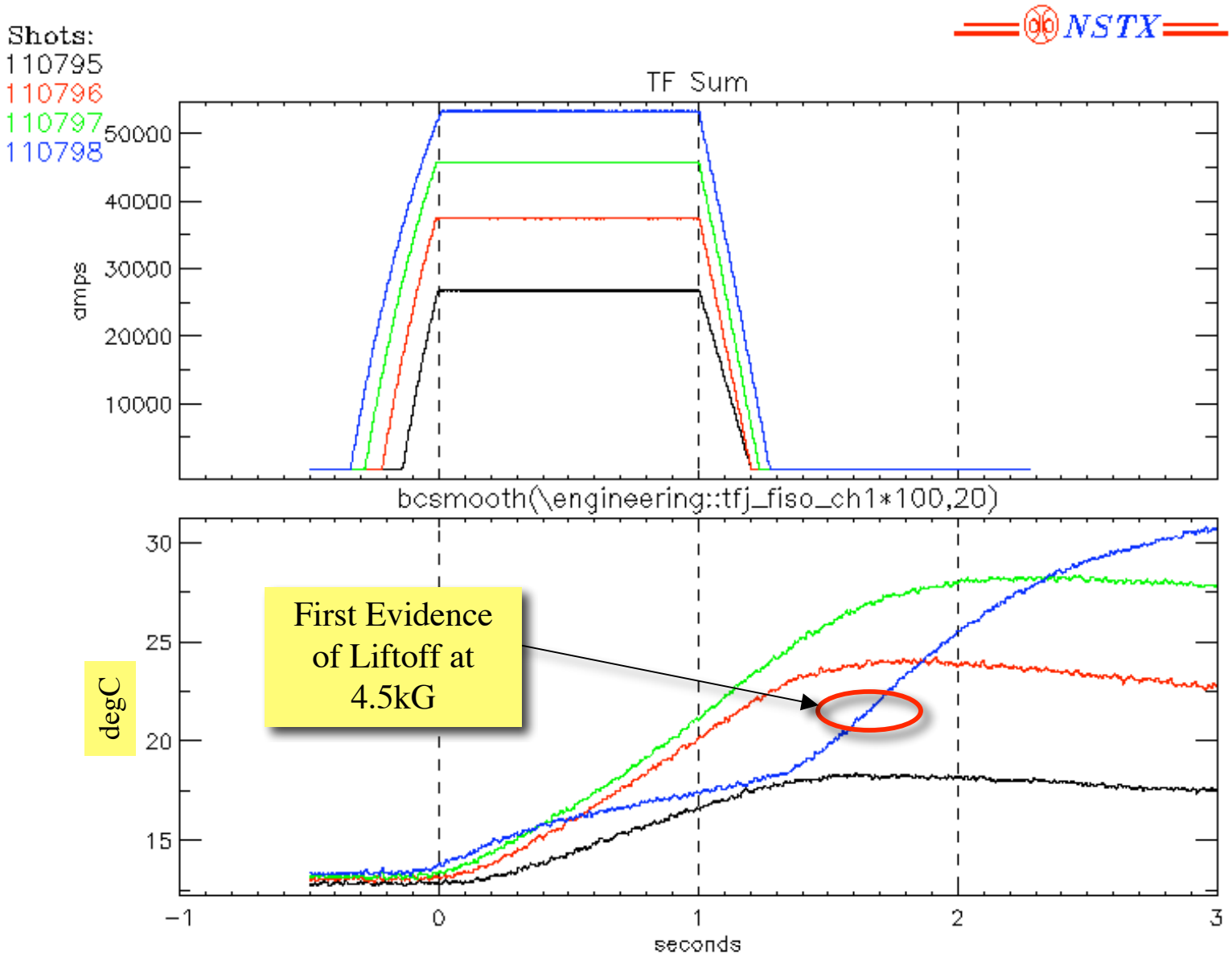
Joint Voltage for 4.5KG TF-Only and Combined 100% Field Shots



Joint Voltage for 4.5KG TF-Only and Combined 100% Field Shots

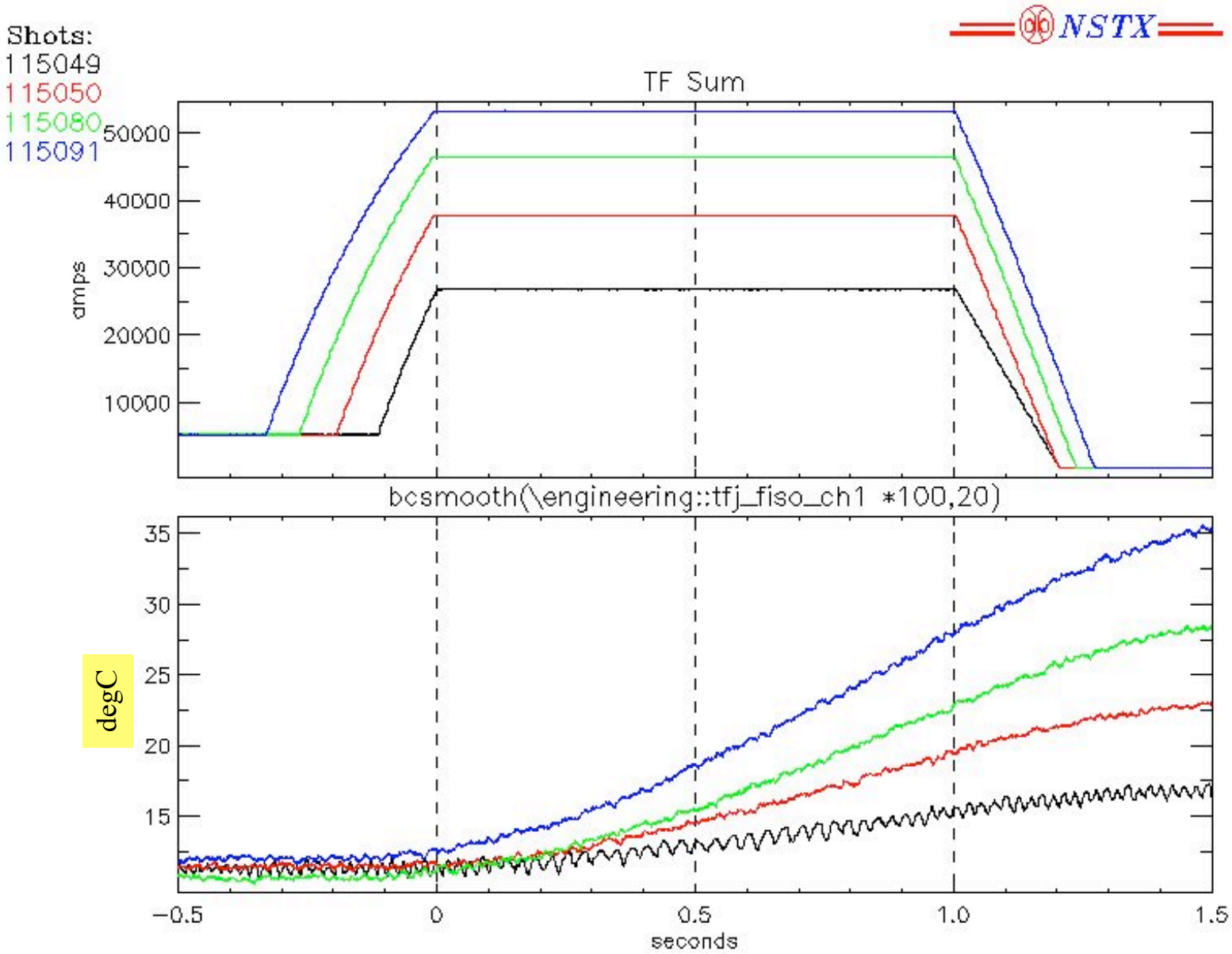


Flag Probe Temperature During TF-Only Shots - 2004



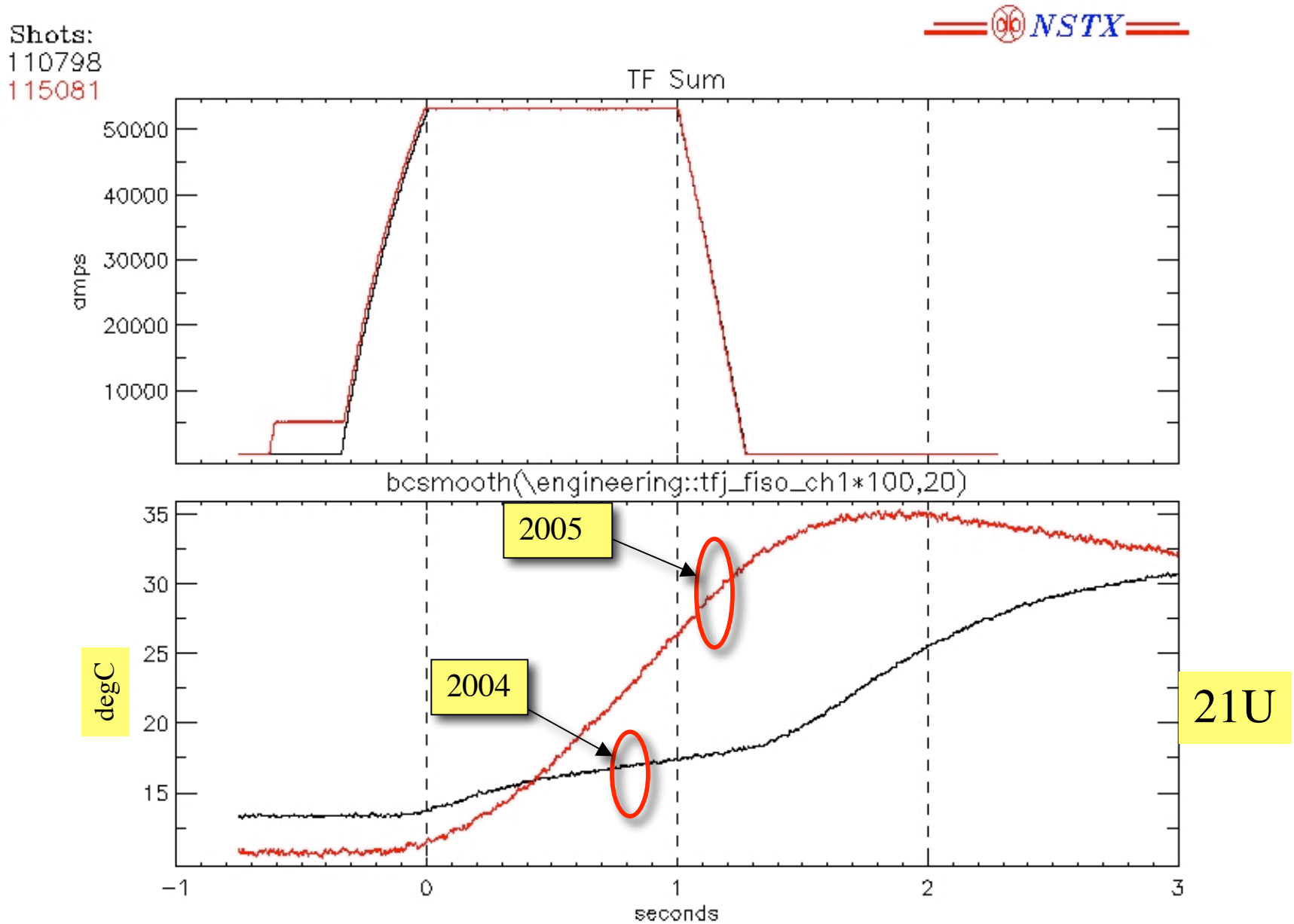
21U

Flag Probe Temperature During TF-Only Shots - 2005

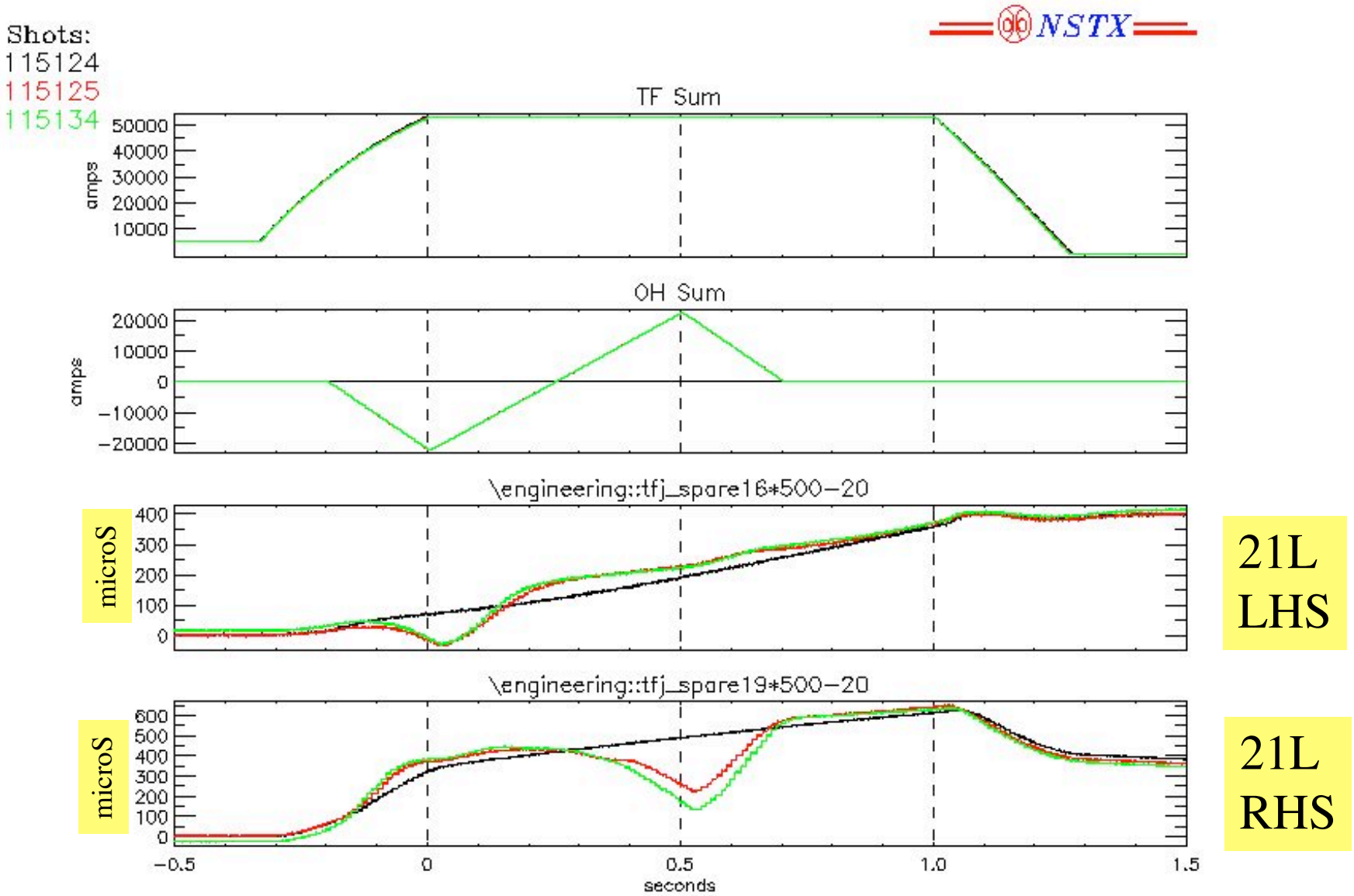


21U

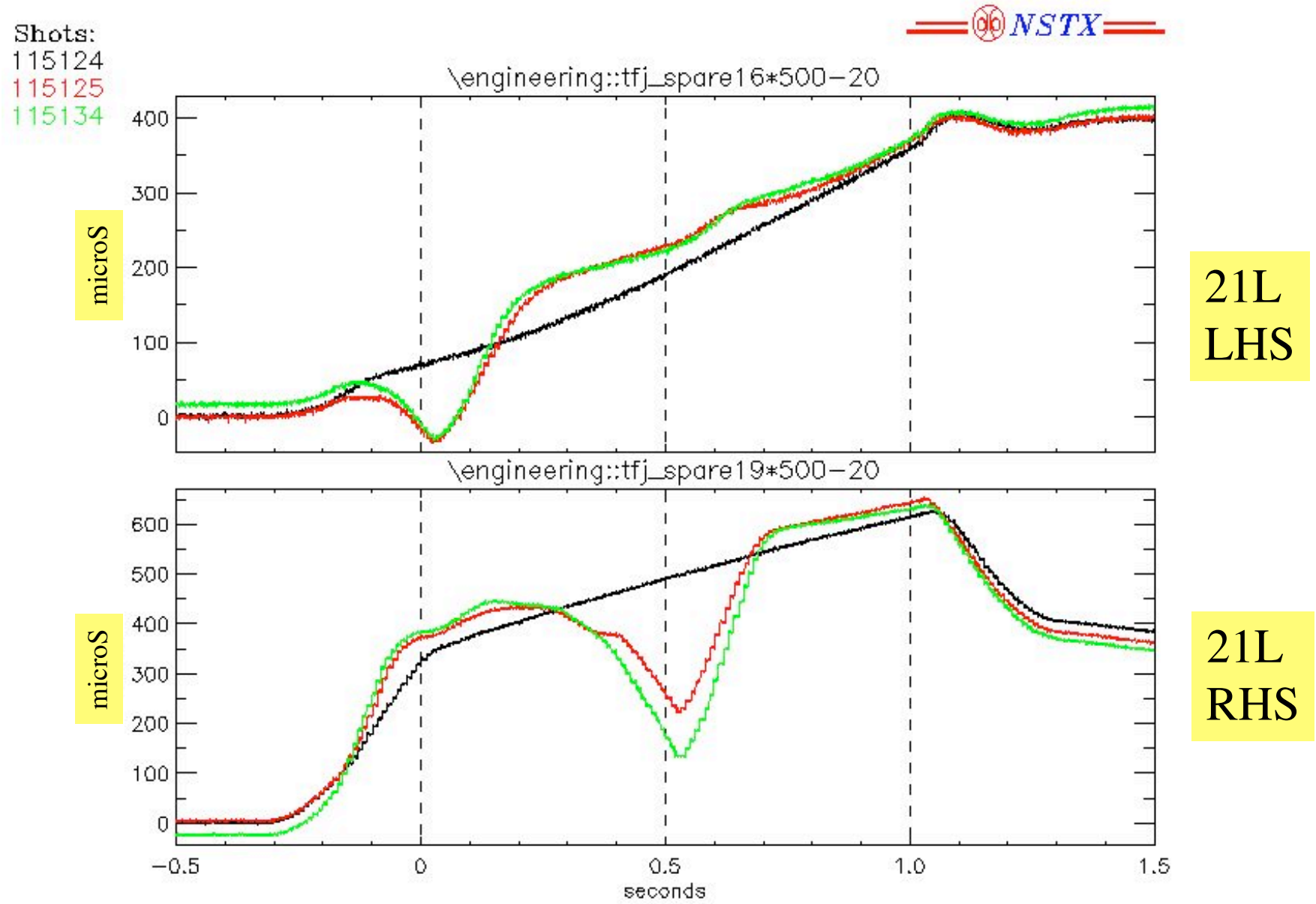
Flag Probe Temperature During TF-Only Shots - 2004 & 5



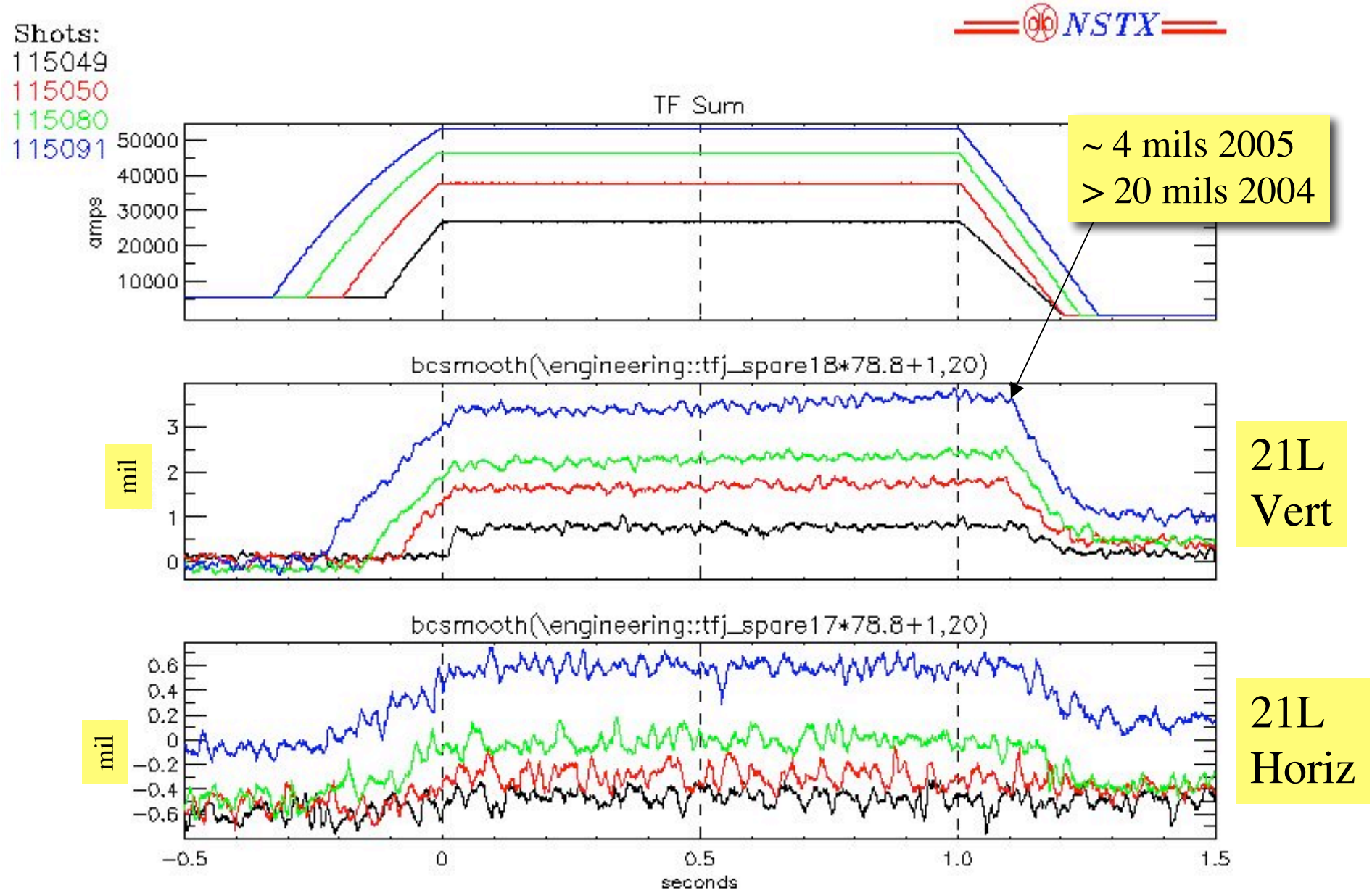
Strain During 4.5KG TF-Only, TF+OH, and Combined 100% Field Shots



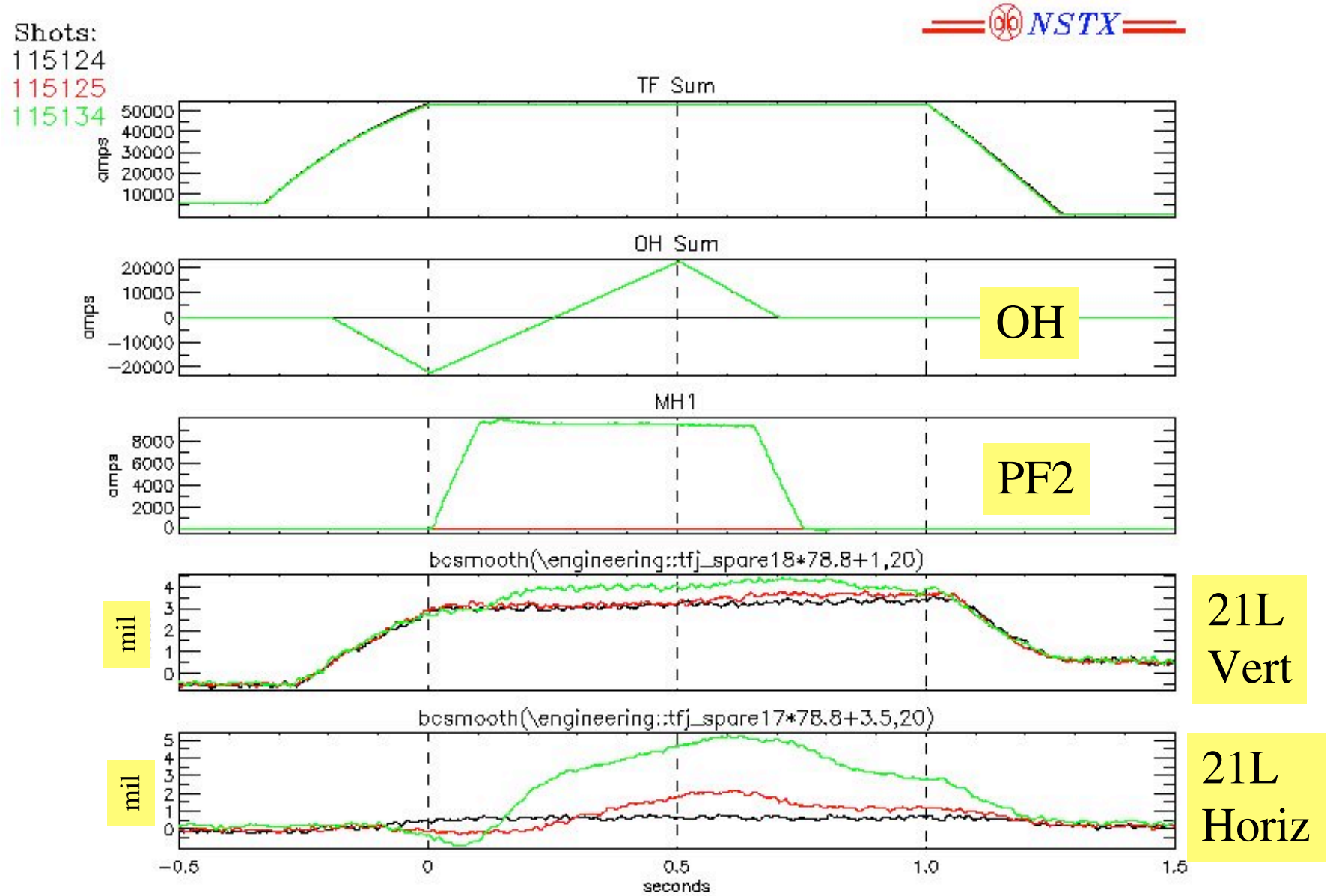
Strain During 4.5KG TF-Only, TF+OH, and Combined 100% Field Shots



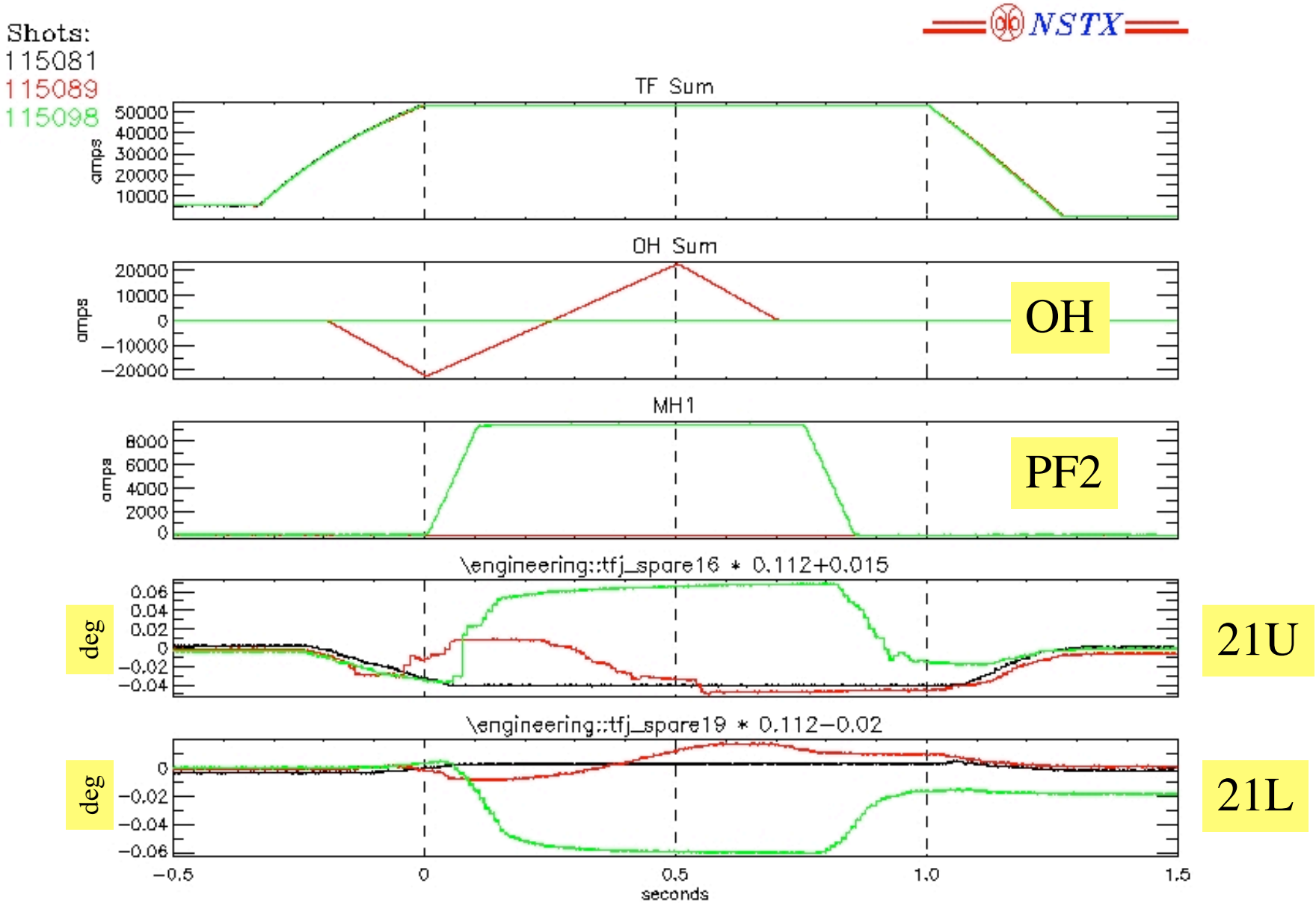
Flag End Displacement During TF-Only Shots



Flag End Displacement During 4.5KG TF-Only & Combined 100% Field Shots

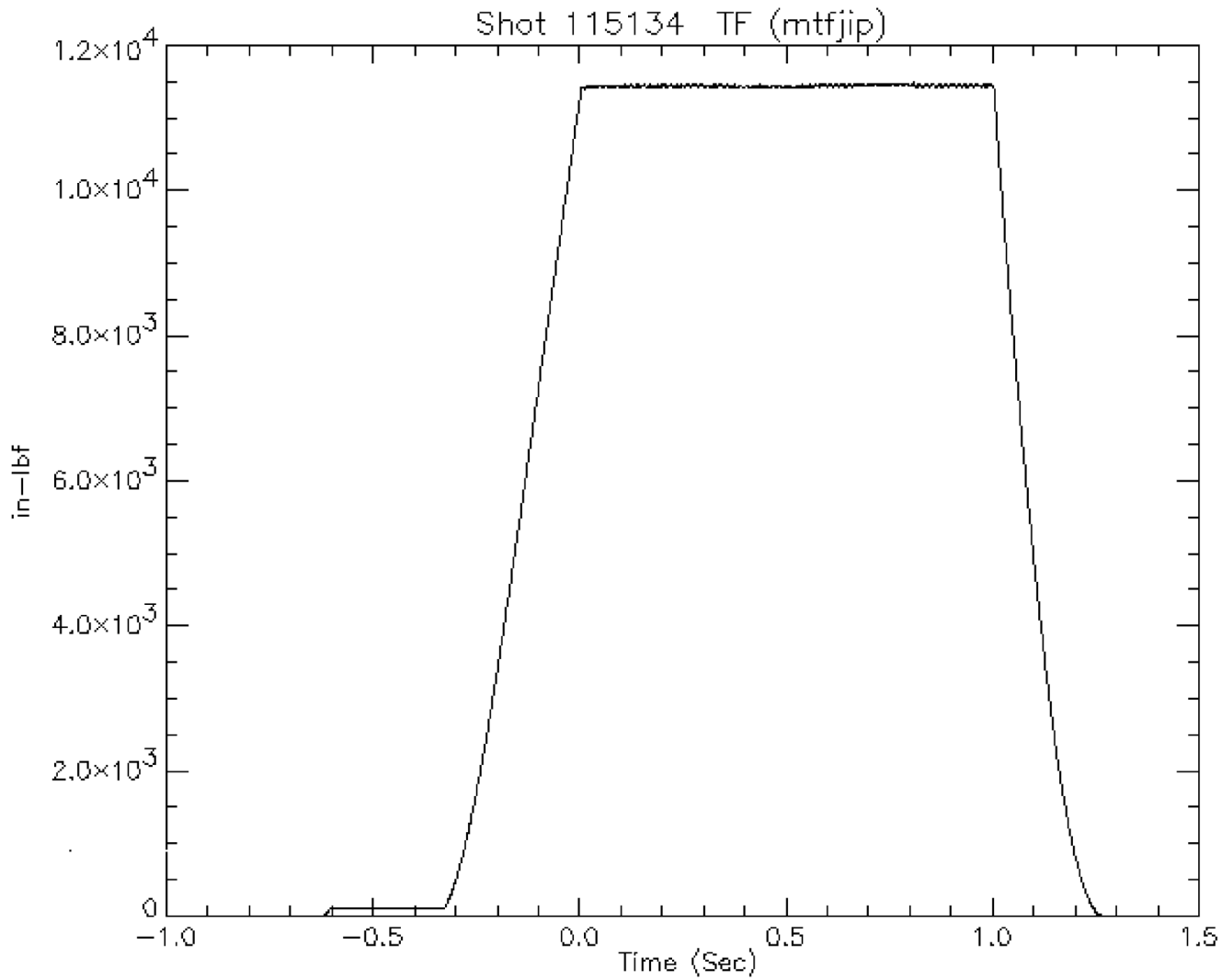


Toroidal Twist Measured by Flag End w.r.t. Umbrella TF-Only 4.5kG TF & OH, TF & PF2



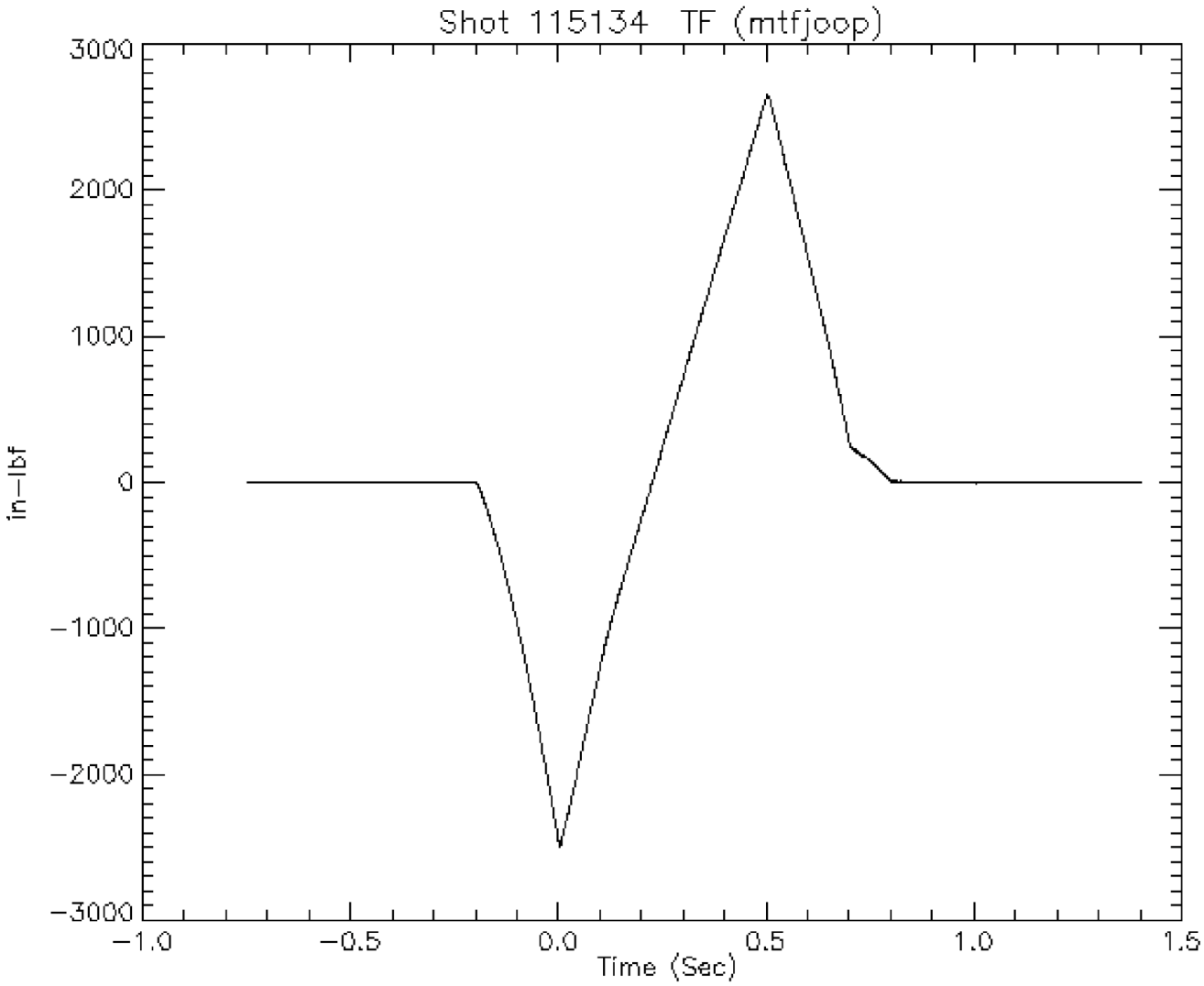
In-Plane Moment to Joint from PSRTC

115134



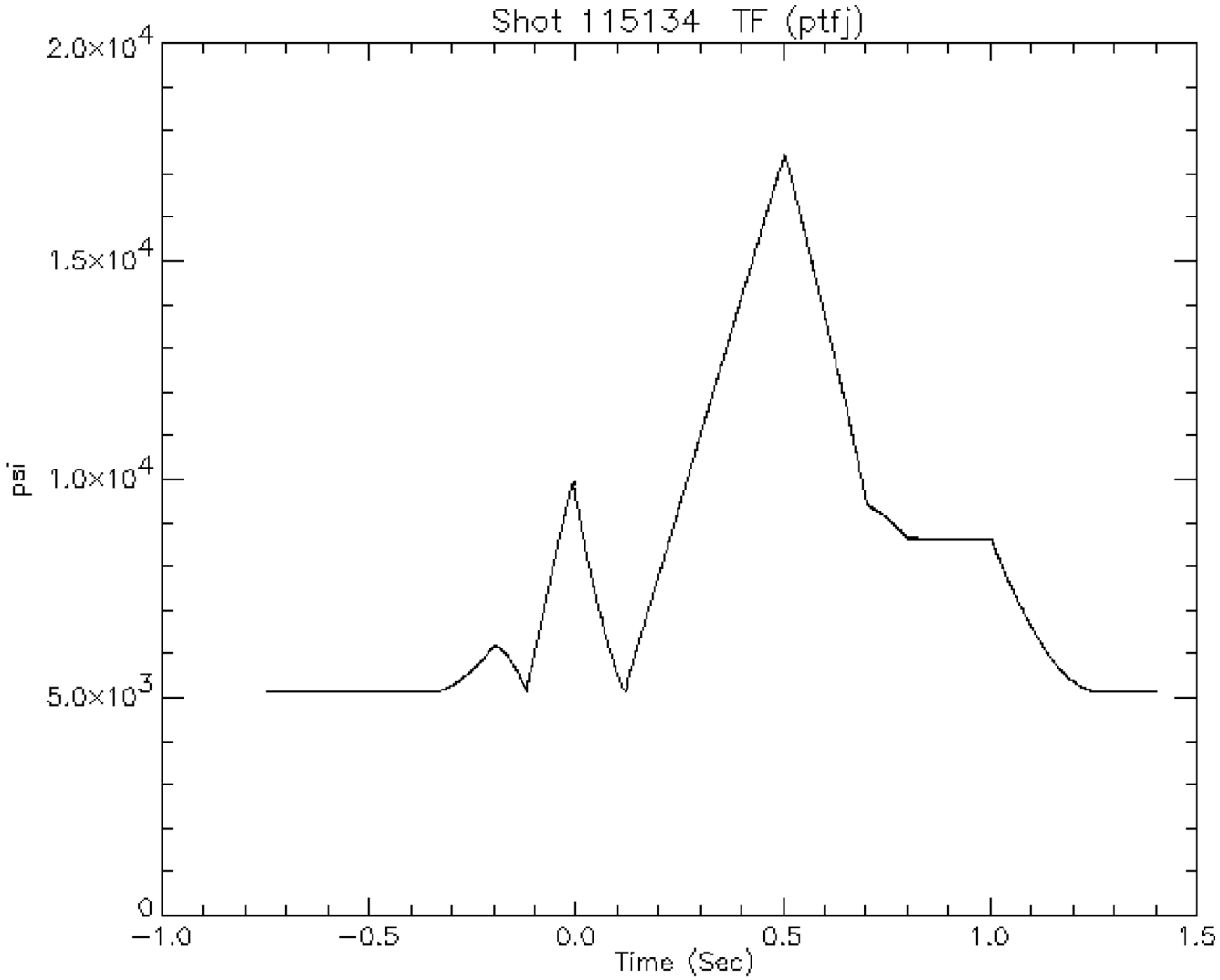
Out-Of-Plane Moment to Joint from PSRTC

115134



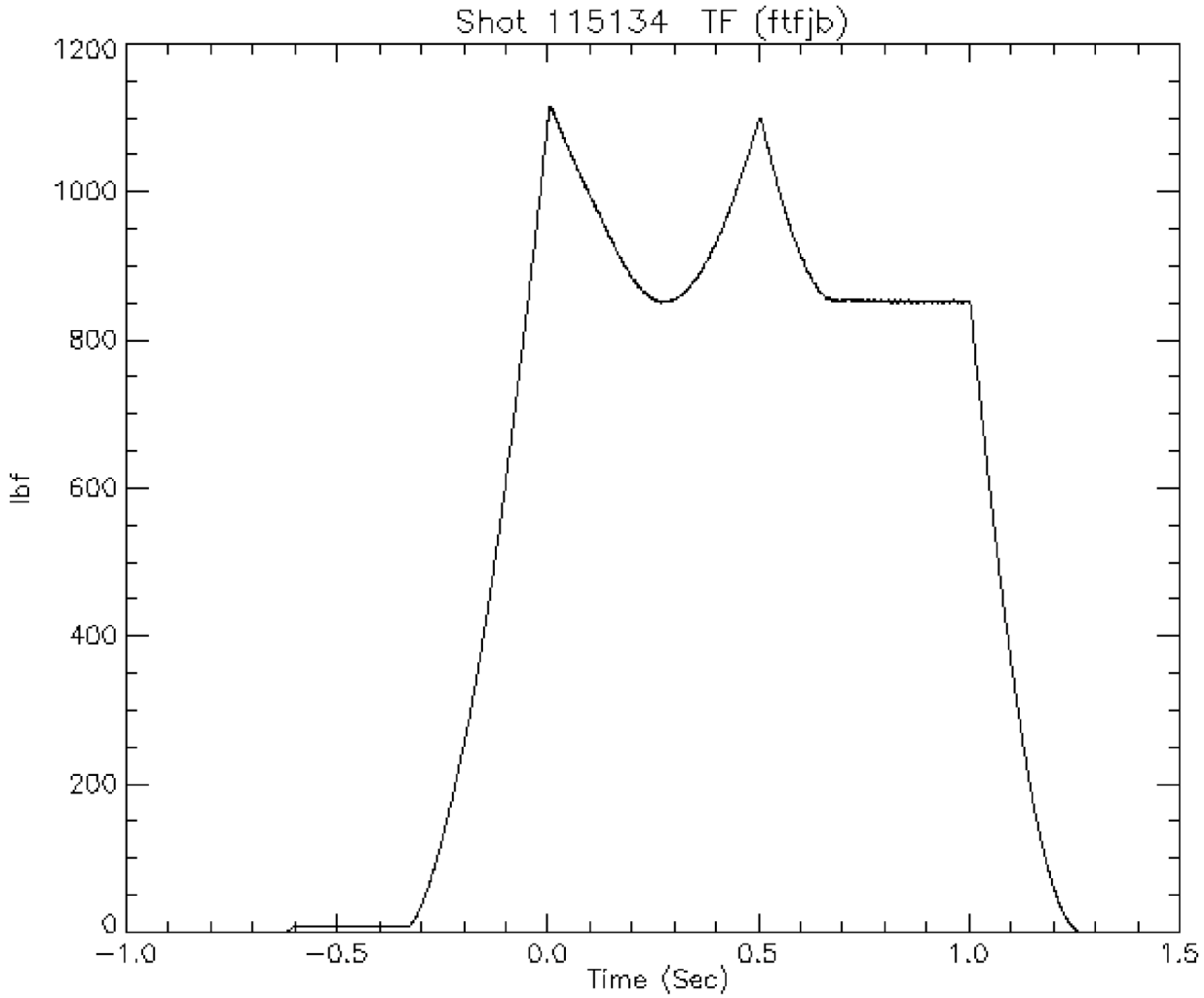
Peak Pressure at Joint from PSRTC

115134

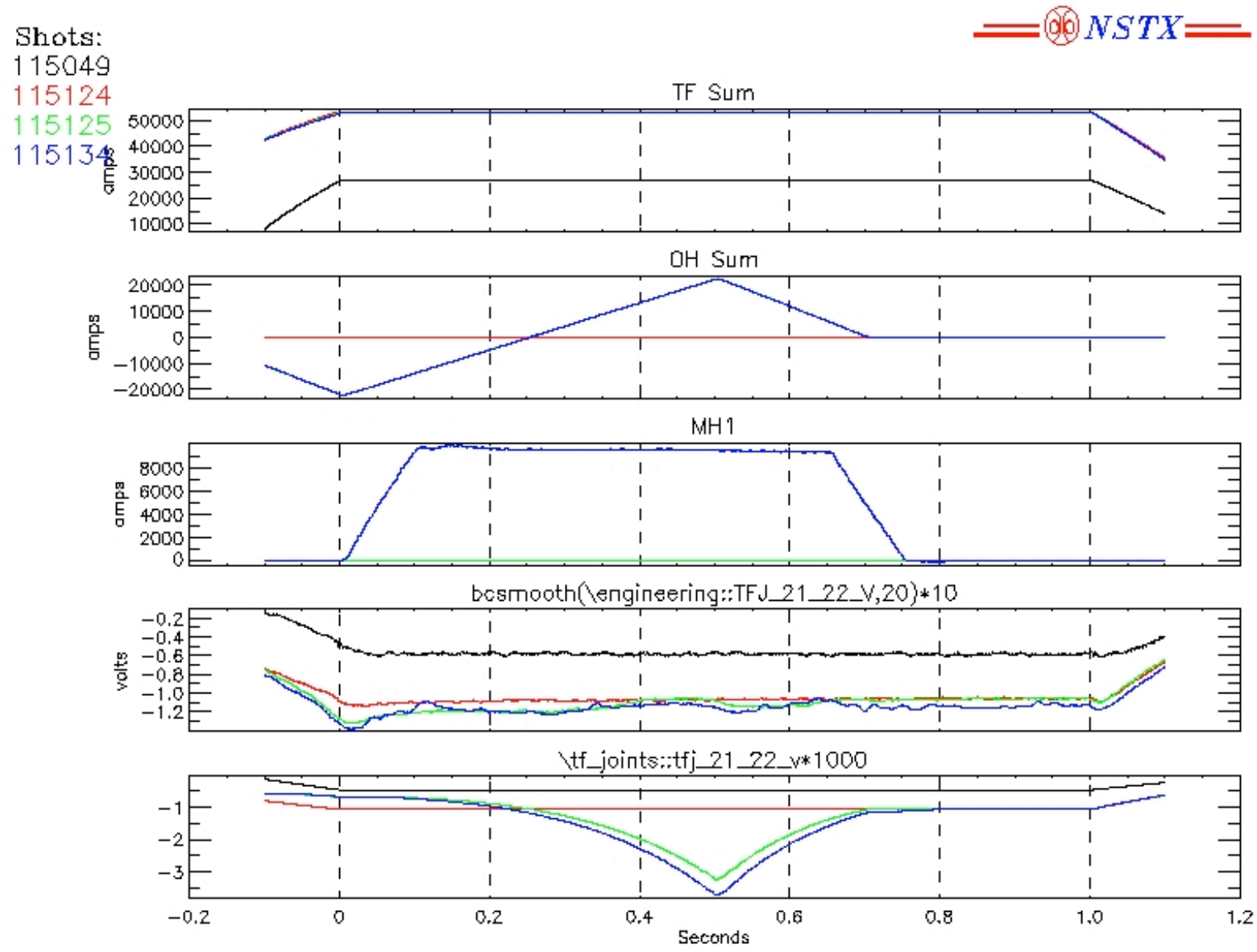


Hub/Box Shear Load from PSRTC

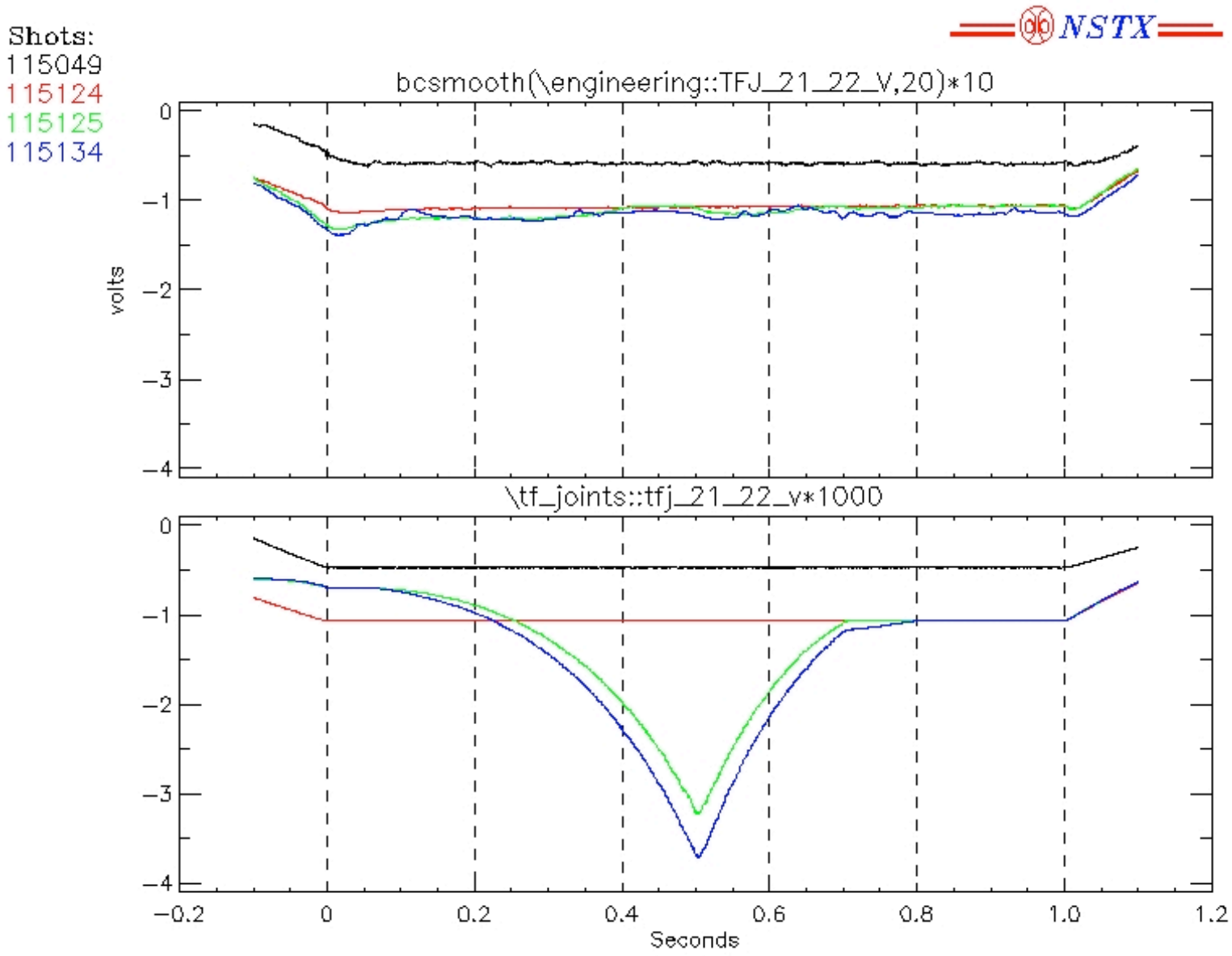
115134

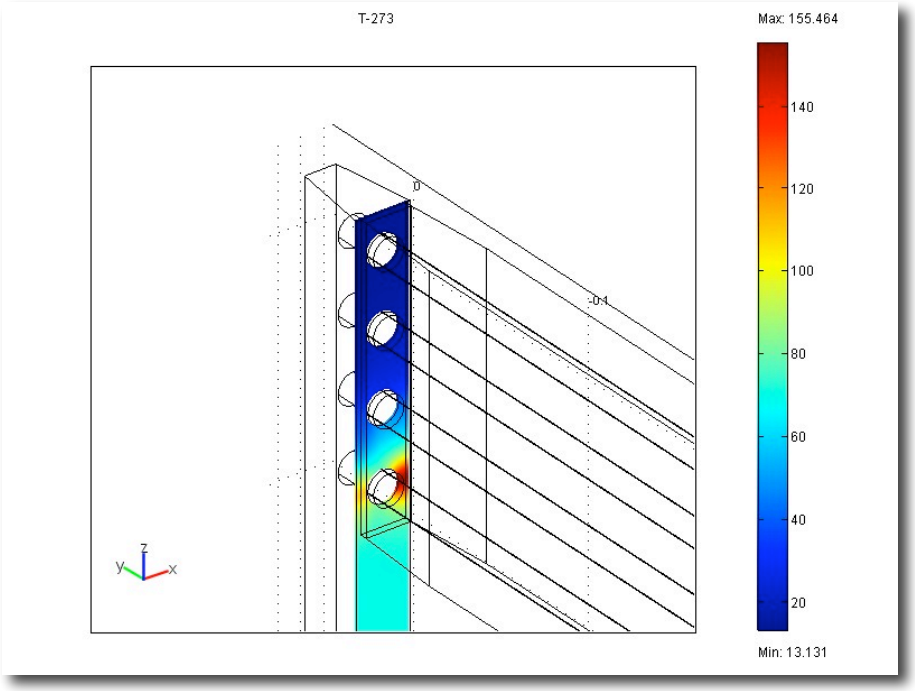
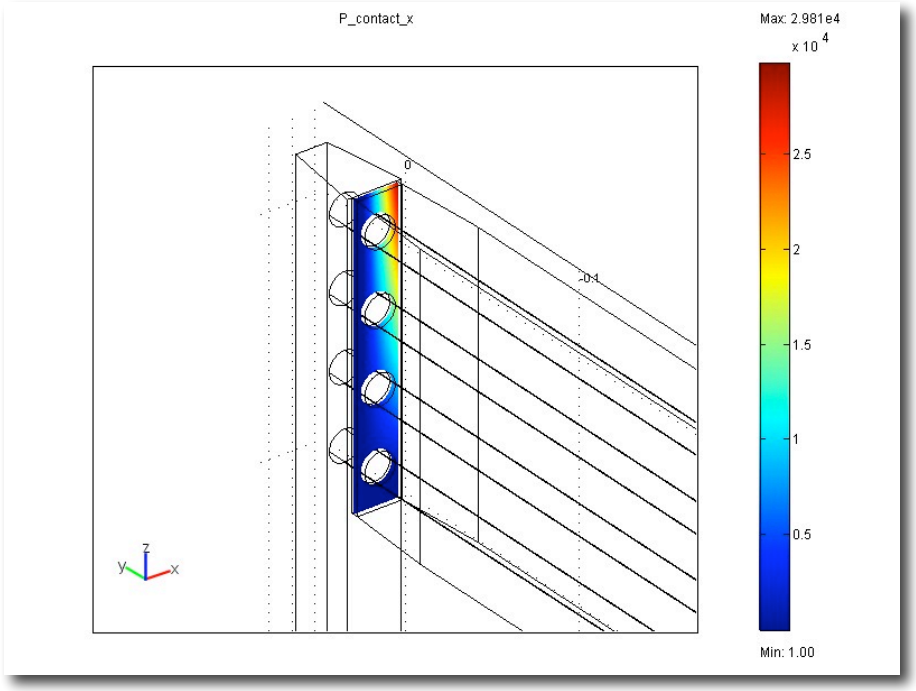


Voltage Drop Measurements vs. Model



Voltage Drop Measurements vs. Model



Benchmarking Procedure

- Fit Structural Coefficients to Measurements
- Identify Worst Case Joint
- Re-Run Engineering models
- Re-Assess 6kG Performance