

Status of MIST analysis for NSTX

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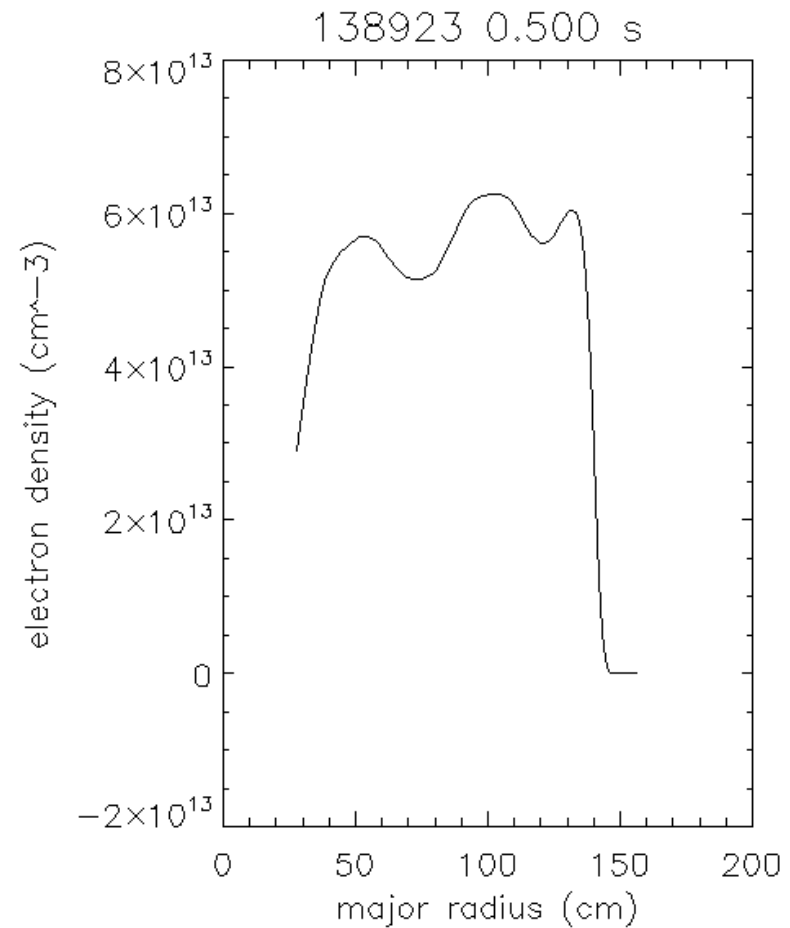
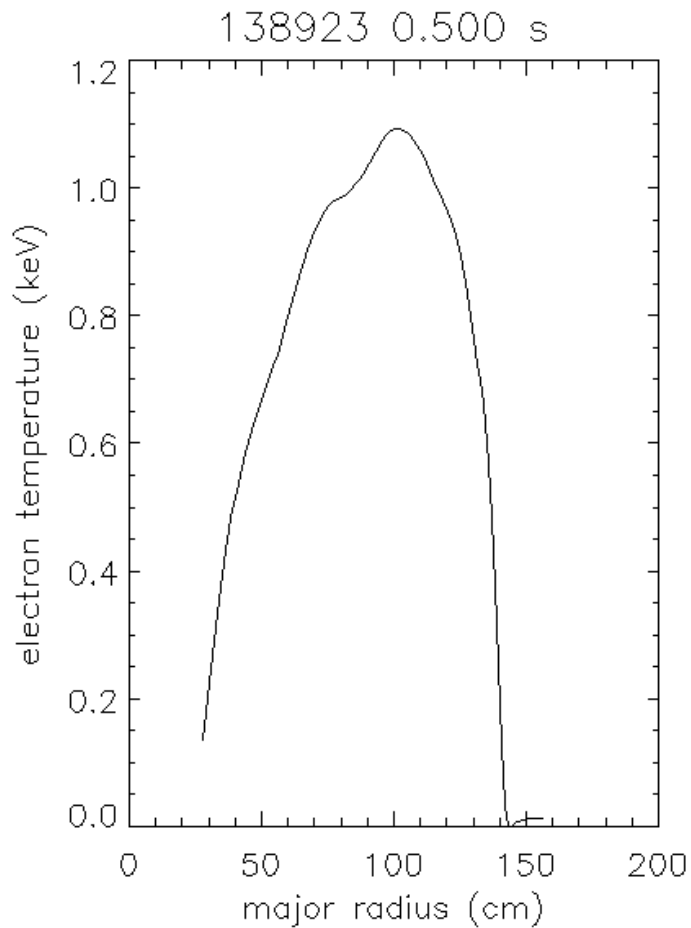
MIST Simulates Impurity Line Brightnesesses

- Need atomic data for specific lines
- Currently data for CIII 977 and OV629
- No data for NIV 765
- Use average of C and O for the present
- Need 1d Te and ne profiles
- Previously used SNAP or TRANSP profiles
- Rebuilding tools for symmetrizing MPTS

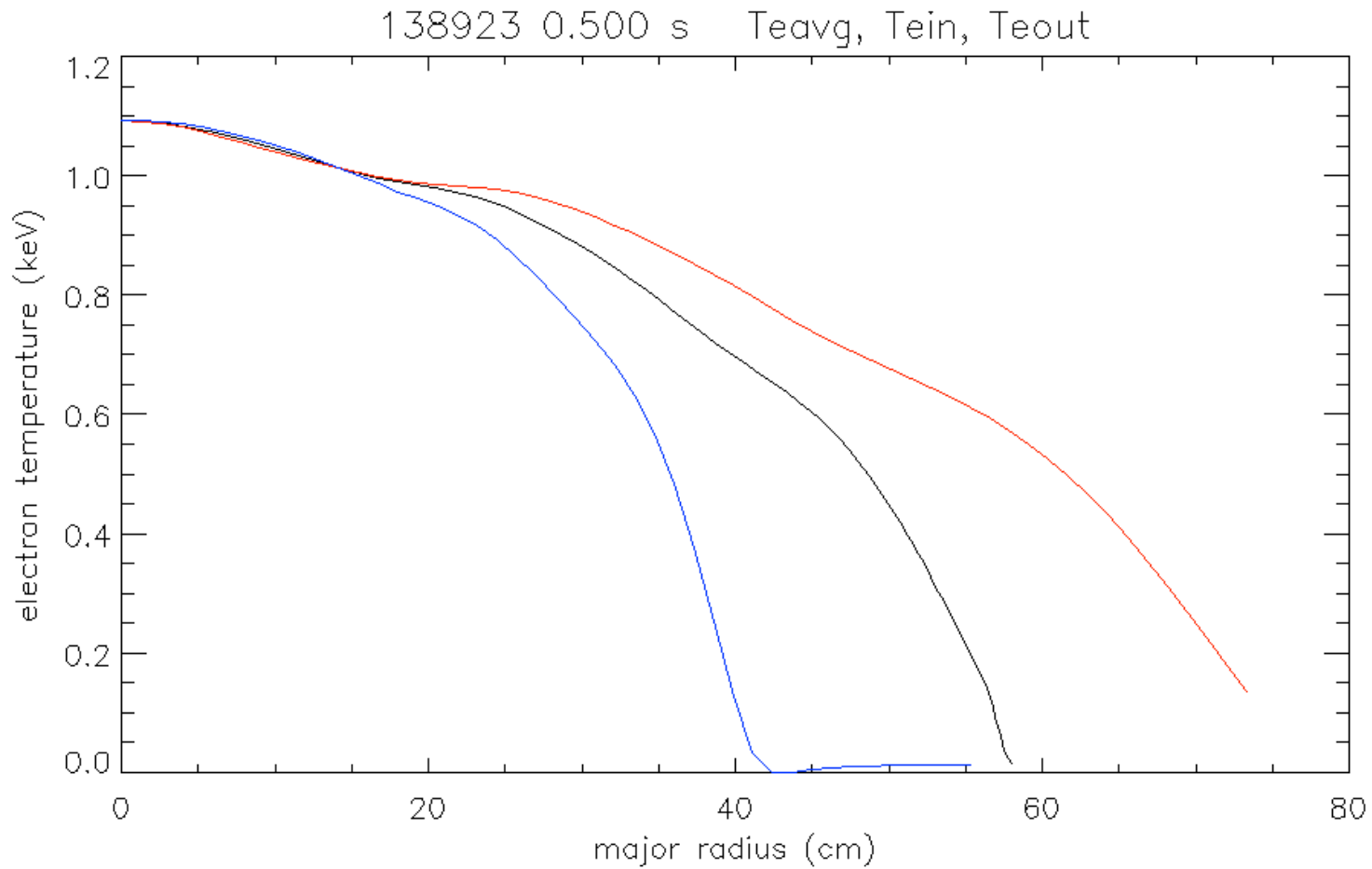
Compare MIST to SPRED to Estimate Concentrations

- SPRED not absolutely calibrated
- Get relative brightnesses of C, N, O lines
- Maybe use previously measured wavelength dependence of SPRED grating

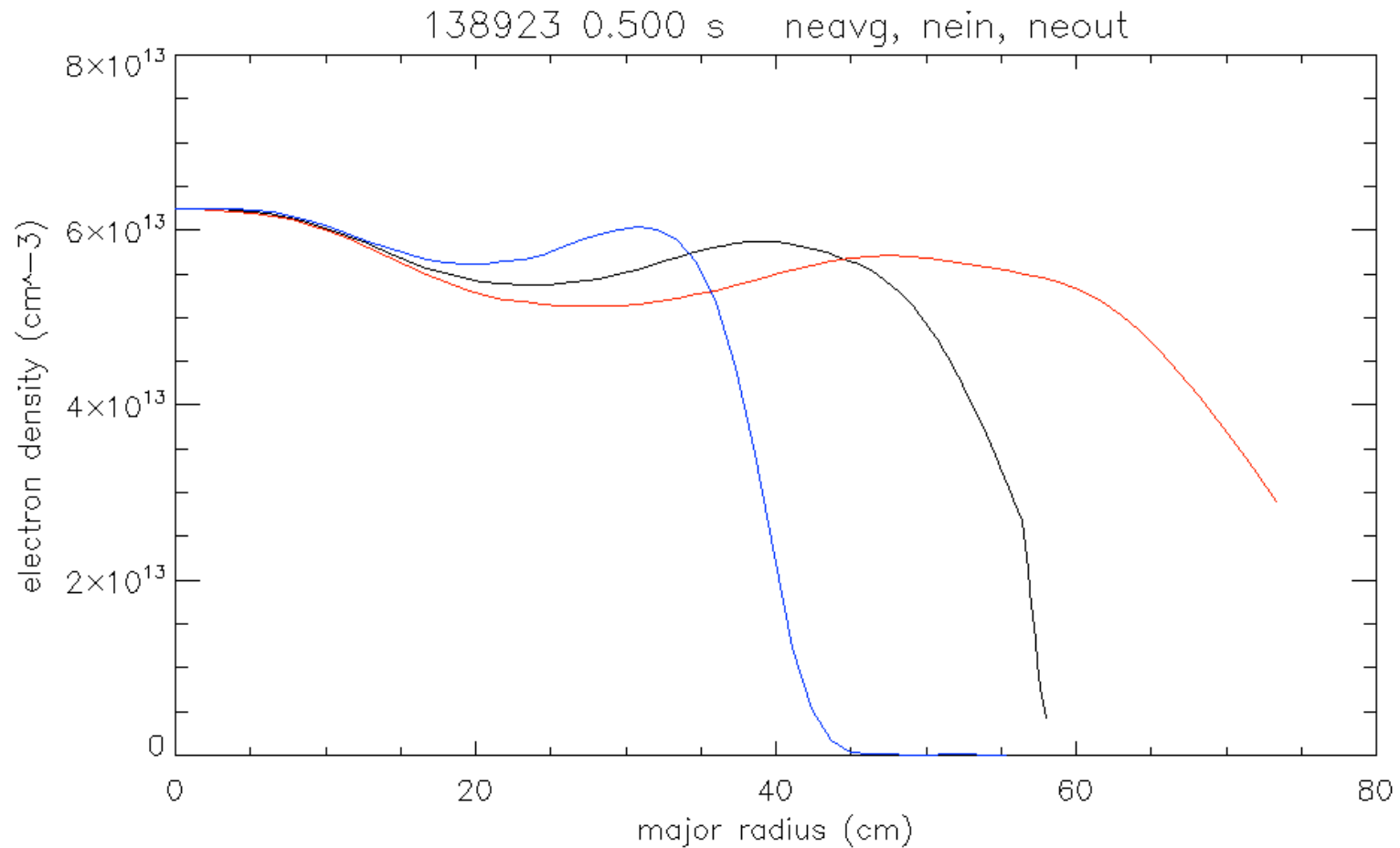
Using “slice and stack” on MPTS Te profile to symmetrize



In, Out, and Symmetrized Te Profiles



In, Out, Symmetrized ne Profiles



MIST Brightnesses Calculated for Some Shots

SHOT # 138560, TIME = 0.400 SECONDS

MIST transport equilibrium runs. Analytic Te and ne

Te(0) = 9.50E-01 ne(0) = 4.19E+13

CARBON

m_089 : profiles for adjusting Te0 and ne0 for scaling runs.

SPC CHG	WAVELENGTH	(SEQ#,TYPE)	BRIGHT	LINE PWR
3 +2	977.03_RC	(1,#EMDAT7	) 8.00E+11	2.05E+00
3 +2	977.03	(5,#EMDAT1	) 1.37E+12	3.52E+00
4 +3	384.10_RC	(2,#EMDAT7	) 3.03E+11	1.95E+00
4 +3	419.50_RC	(3,#EMDAT7	) 1.25E+10	7.36E-02
4 +3	312.43_RC	(4,#EMDAT7	) 3.00E+10	2.35E-01
4 +3	1548.20	(6,#EMDAT1	) 1.61E+12	2.58E+00
4 +3	312.43	(7,#EMDAT1	) 1.54E+10	1.21E-01
4 +3	384.10	(8,#EMDAT1	) 7.34E+10	4.72E-01
4 +3	419.50	(9,#EMDAT1	) 4.04E+10	2.39E-01
5 +4	40.268	(10,#EMDAT1	) 1.42E+11	7.88E+00
6 +5	33.736	(11,#EMDAT1	) 5.33E+12	2.29E+02
6 +5	182.1	(12,#EMDAT1	) 1.20E+11	9.51E-01
6 +5	28.5	(13,#EMDAT1	) 9.73E+11	4.92E+01
6 +5	182.17	(14,#EMDAT1	) 3.01E+11	2.41E+00
6 +5	134.95	(15,#EMDAT7	) 8.32E+10	8.96E-01

<Z>(r=0)	<ZSQ>-<Z>(r=0)	W/CM3(r=0)	WATTS
6.00E+00	3.00E+01	1.14E-04	7.58E+02

Brightnesses for O Calculated

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EUROPA$ ty NSTX_8_0400_138560.qmx
          [NSTX_8_0400_138560.QMX  VAX MIST 14-Jul-10 09:08:35]

SHOT # 138560.  TIME =  0.400  SECONDS

MIST transport equilibrium runs.  Analytic Te and ne

Te(0) = 9.50E-01    ne(0) = 4.19E+13

OXYGEN

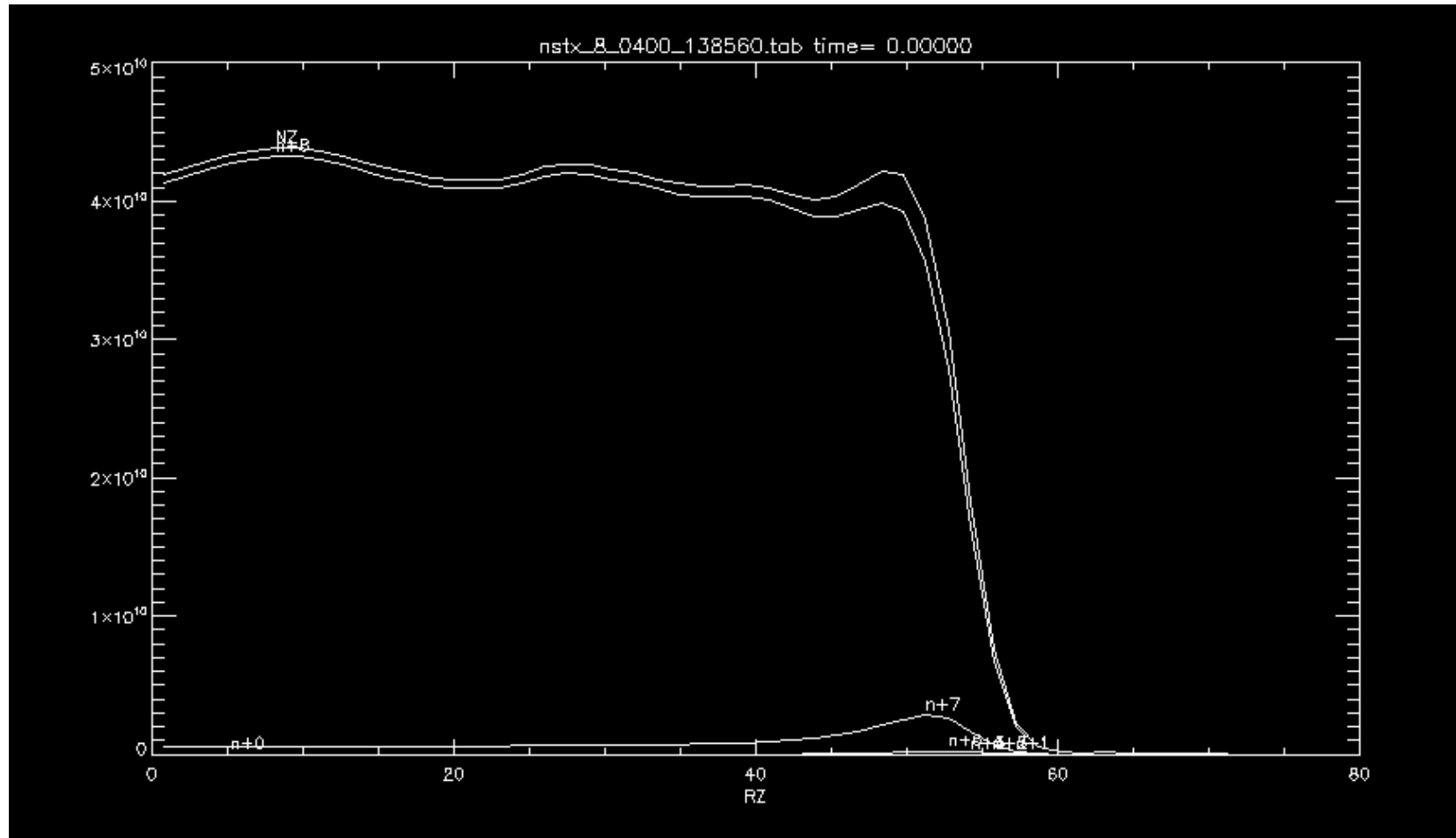
m_089  :  profiles for adjusting Te0 and ne0 for scaling runs.

SPC CHG  WAVELENGTH      (SEQ#.TYPE)          BRIGHT  LINE PWR
3 +2    703.36           ( 1.#EMDAT1         ) 1.36E+11 4.86E-01
4 +3    790.36           ( 2.#EMDAT1         ) 3.43E+11 1.08E+00
5 +4    629.73           ( 3.#EMDAT1         ) 1.85E+12 7.24E+00
6 +5    1031.95          ( 4.#EMDAT1         ) 1.97E+12 4.64E+00
6 +5    150.10           ( 5.#EMDAT1         ) 2.64E+10 4.20E-01
6 +5    173.0            ( 6.#EMDAT1         ) 8.94E+10 1.24E+00
6 +5    184.0            ( 7.#EMDAT1         ) 4.57E+10 5.99E-01
7 +6    21.602           ( 8.#EMDAT1         ) 7.41E+11 6.38E+01
8 +7    18.97            ( 9.#EMDAT1         ) 1.57E+13 1.15E+03
8 +7    102.5            (10.#EMDAT1         ) 3.48E+11 4.67E+00
8 +7    16.0             (11.#EMDAT1         ) 2.81E+12 2.42E+02

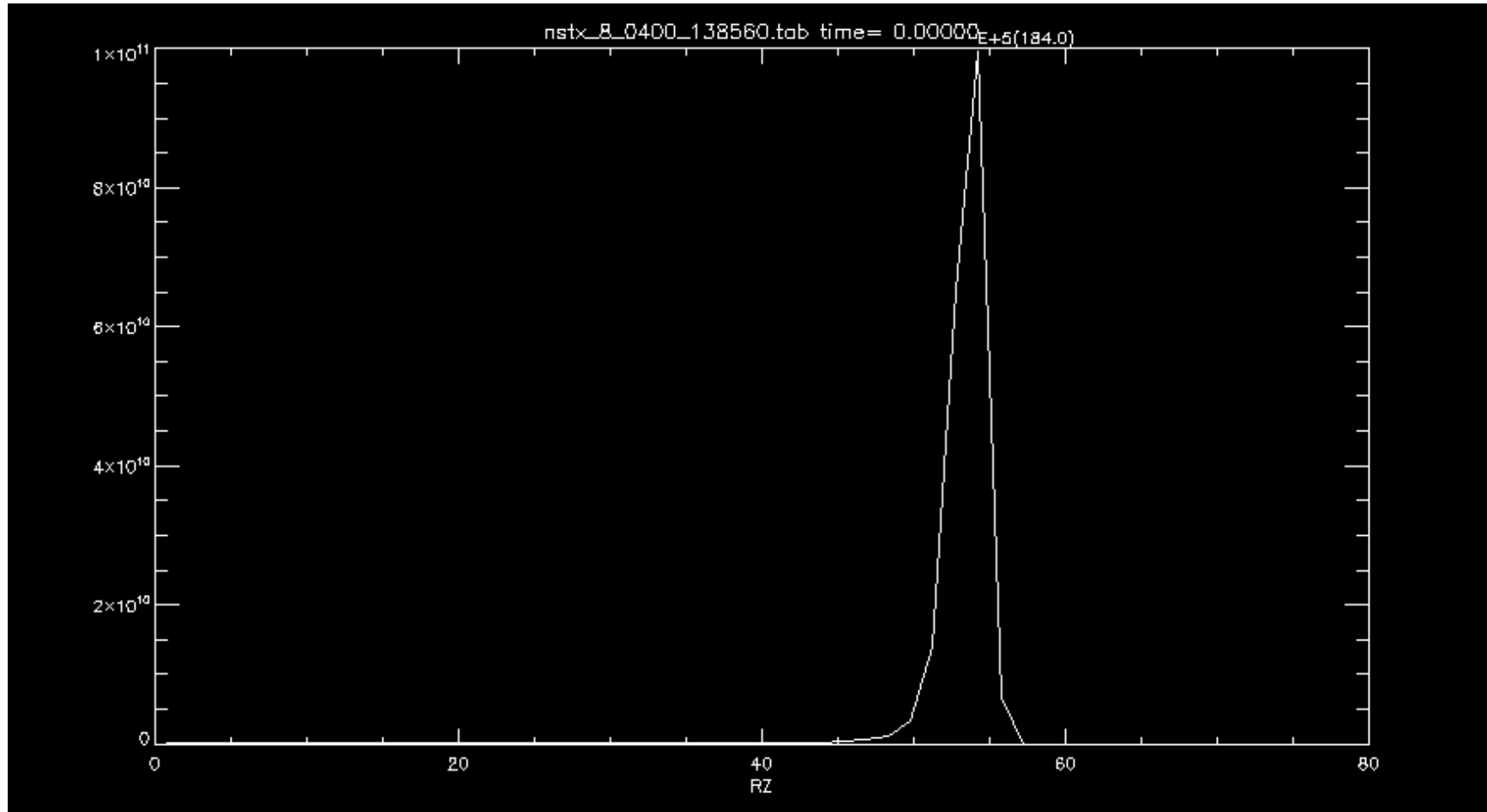
<Z>(r=0)  <ZSQ>-<Z>(r=0)  W/CM3(r=0)  WATTS
7.99E+00  5.58E+01  4.13E-04  2.89E+03

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Charge-state density profiles calculated for oxygen



MIST line brightness profiles simulated for oxygen lines



Work in Progress

- Tools to symmetrize MPTS profiles working
- Script to rename input and output files written
- Use Hulse qmext.com on vms to extract brightnesses
- Need more work on profile plotting