



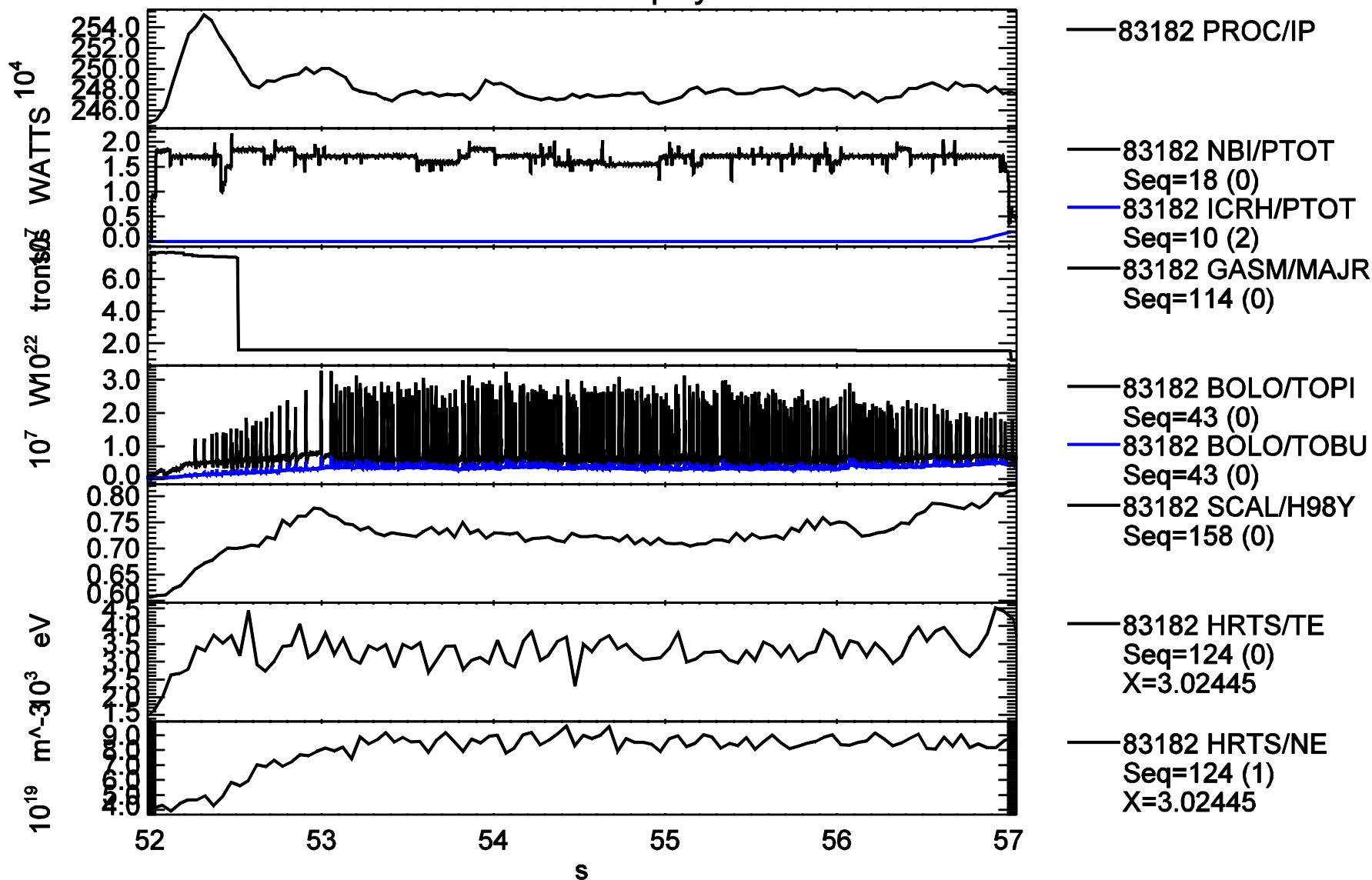
Sawtooth ufile preparation for TRANSP

Hyun-Tae Kim

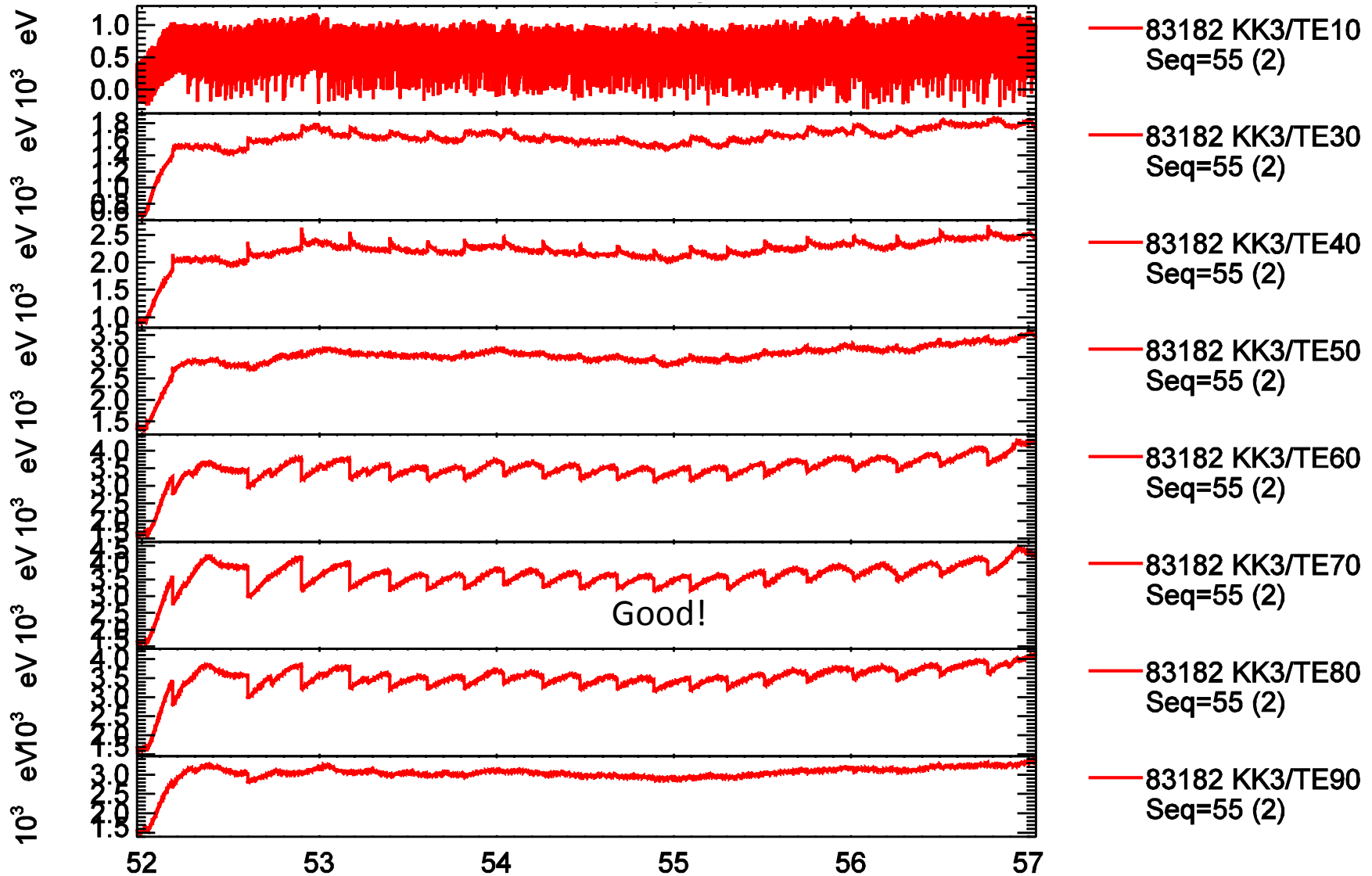


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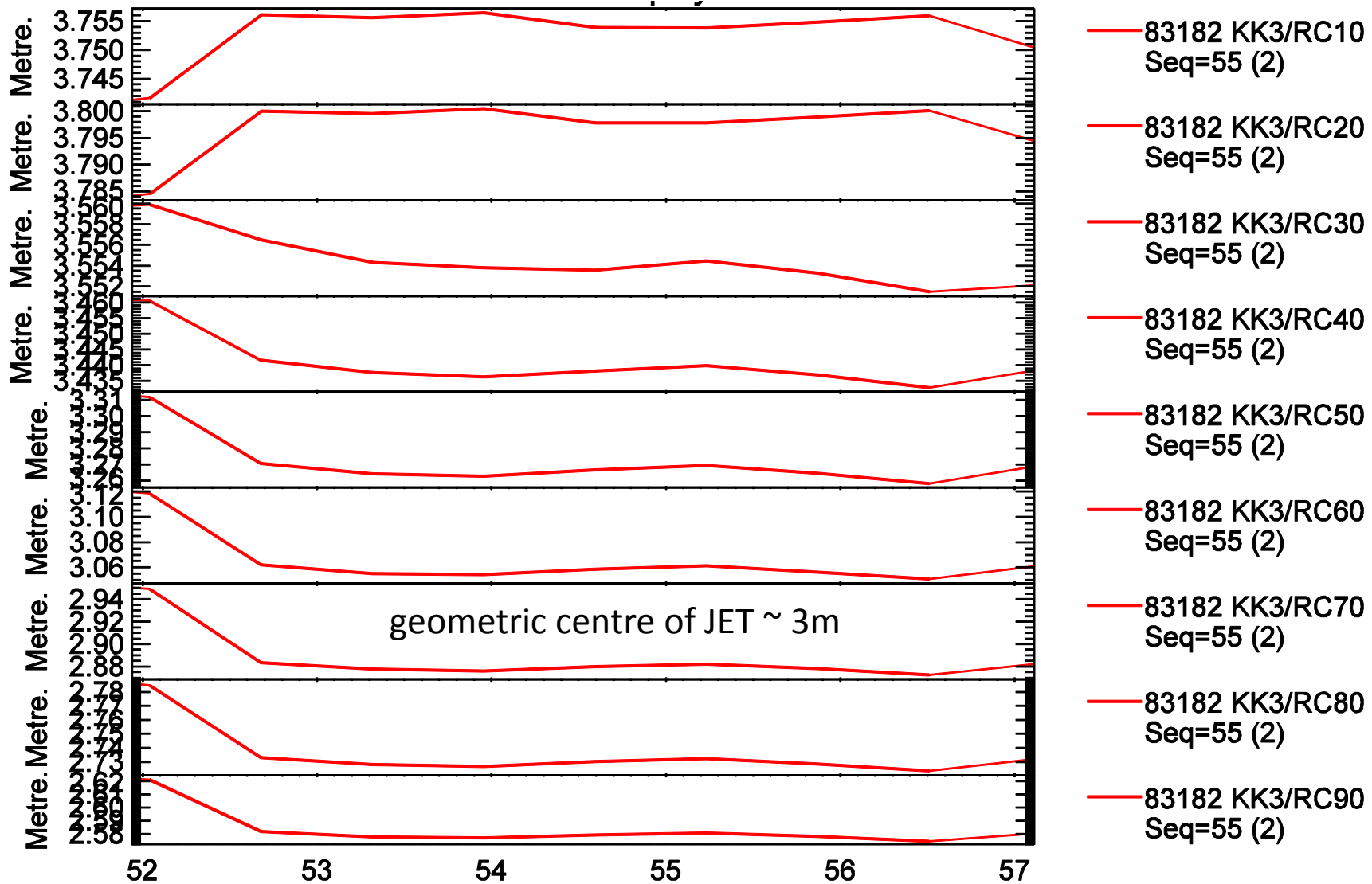
Find a time window of interest



Find a good ECE signal to see sawtooth crash



Check if the good signal shows the core T_e



Produce ECE ufile in \$SDD



- Open Transpwindow

~pshare/transp_window pro

- Start a new run

JETtransp 83182D04 new names 83182D03 config target pppl
mdstree new

- Modify namelist at step config

PRESAW='KK3'

EXTSAW='TE70'

- Step data will produce a ufile in \$SDD, KK383182.TE70_XXXX

Enter \$SDD, and run 'sawtoo'



```
%cd $SDD
```

```
%ls
```

```
83182          #err#          KS383182.ZEFH_0126  MAGN83182.XIP_0003  T83182.SAW
BOLO83182.TOBU_0043  GASM83182.MAJR_0114  KS383182.ZEFV_0109
MSCR83182.MRY_0430  TIN83182.RNT_0007
EDG783182.FLW_0027  HRTS83182.NE_0107   KS383182.ZEFV_0148  PNBI83182.NBI_0429
TIN83182.RNT_0152
EDG783182.FLW_0144  HRTS83182.NE_0124   LIDR83182.NE_0082   RFAG83182.A2_0000
TrFile.PtoU
EFIT83182.Q_0025   HRTS83182.TE_0107   LIDR83182.TE_0082   RFAG83182.ILL_0000
EFIT83182.Q_0452   HRTS83182.TE_0124   MAGN83182.FLX_0003   RFAG83182.ILU_0000
EFP83182.VPA_0049   KK383182.TE70_0055  MAGN83182.IPLA_0003   _scruncher_
EHTR83182.BTPD_0054  KS383182.ZEFH_0109  MAGN83182.ITOR_0003  scruncher_430.log
```

```
%sawtoo
```

```
SAWTOO: PLEASE TYPE IN YOUR NAME:
```

```
[fgetline: no command line editing available]
```

```
hkim
```

Enter filename of ECE ufile (input)



<<UFNTER>> SET UFILES FILENAME FORM FOR:

1D U.F(T) W/SAWTEETH: Z#####

WHERE ##### IS THE VARIABLE SHOT NUMBER;
IF DISK OR DIRECTORY NOT SPECIFIED, RMS DEFAULT IS USED

OPTIONS:

- C - case (unix only) set filename to upper or lower case
- D - CHANGE DISK (DEVICE) NAME
- E - CHANGE DIRECTORY NAME
- F - CHANGE FILENAME 1 CHAR PREFIX AND .EXT SUFFIX
- G - GENERATE LONGER UFILES FILENAME PREFIX AND SUFFIX
- H - GENERATE LONGER UFILES FILENAME (PREFIX AND SUFFIX) (Delimiters)
- I - INCLUDE SHOT NUMBER ENCODED IN UFILES FILE NAME (default)
- J - ACCESS UFILE WITHOUT SHOT NUMBER ENCODED IN FILE NAME
- N - SPECIFY COMPLETE UFILE NAME - SAVE SHOT NUMBER
- M - *** MDS+ Signal Data Access ***
- P - CHANGE SINGLE CHARACTER FILENAME PREFIX
- R - CHANGE Multiple CHARACTER FILENAME PREFIX
- S - CHANGE FILENAME SUFFIX (3 Characters)
- T - CHANGE FILENAME SUFFIX (Delimiter required)
- Q - QUIT

UFNTER: ENTER OPCODE (D/E/F/P/S/Q...):

H KK3 TE70_0055 Q

Enter filename of sawtooth ufile (output)



<<UFNTER>> SET UFILES FILENAME FORM FOR:

OUTPUT SAWTOOTH FILE: Z#####

WHERE ##### IS THE VARIABLE SHOT NUMBER;
IF DISK OR DIRECTORY NOT SPECIFIED, RMS DEFAULT IS USED

OPTIONS:

- C - case (unix only) set filename to upper or lower case
- D - CHANGE DISK (DEVICE) NAME
- E - CHANGE DIRECTORY NAME
- F - CHANGE FILENAME 1 CHAR PREFIX AND .EXT SUFFIX
- G - GENERATE LONGER UFILES FILENAME PREFIX AND SUFFIX
- H - GENERATE LONGER UFILES FILENAME (PREFIX AND SUFFIX) (Delimiters)
- I - INCLUDE SHOT NUMBER ENCODED IN UFILES FILE NAME (default)
- J - ACCESS UFILE WITHOUT SHOT NUMBER ENCODED IN FILE NAME
- N - SPECIFY COMPLETE UFILE NAME - SAVE SHOT NUMBER
- M - *** MDS+ Signal Data Access ***
- P - CHANGE SINGLE CHARACTER FILENAME PREFIX
- R - CHANGE Multiple CHARACTER FILENAME PREFIX
- S - CHANGE FILENAME SUFFIX (3 Characters)
- T - CHANGE FILENAME SUFFIX (Delimiter required)
- Q - QUIT

UFNTER: ENTER OPCODE (D/E/F/P/S/Q...):

F A SAW Q

Check the ECE ufile



INPUT: KK3#####.TE70_0055

OUTPUT: A#####.SAW

SAWTOO: ENTER 5 DIGIT SHOT #, "0" TO QUIT, "D" TO CHANGE NAMES

83182

NAMED FILE: KK383182.TE70_0055

SAWTOO OPTIONS (0 SAWTEETH FOUND):

G - GRAPH THE *INPUT* DATA WITH MARKED SAWTEETH IF AVAILABLE

H - GRAPH THE *OUTPUT* SAWTOOTH DATA

Q - QUIT (GET NEW SHOT WITHOUT WRITING OUTPUT FILE)

S - SMOOTH INPUT DATA AND EVALUATE SAWTOOTH TIMES

FROM "RESIDUE" $R(T) = F(T) - F:\text{SMOOTHED}(T)$

W - WRITE SAWTOOTH DATA TO OUTPUT FILE

P - COMPRESS- TOGGLE OUTPUT DATA FORMAT FLAG, NOW "binary "

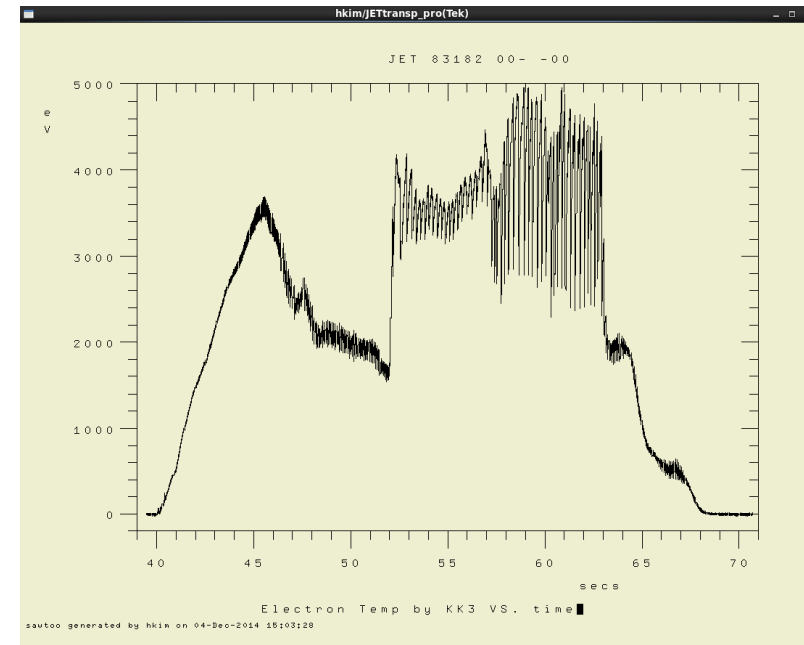
4 - FORMAT - *new* Ufile output format control menu

X - EXIT (STOP PROGRAM NOW)

SAWTOO: ENTER OPTION CODE:

G

[GFLIB/SGLIB -- output to plot screen or file]



Enlarge the time window of interest, and check if sawtooth crash is clearly seen.



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

C

GRAOPT - OPTIONS AFTER PLOT:

AXIS TYPE CONTROL OPTIONS

"A" CHANGE AXIS TYPES (LOG/LINEAR) AND PLOT AGAIN

"B" CHANGE AXIS DEFAULTS USED ON ENTRY TO PLOT ROUTINE

PLOT RESCALE OPTIONS

--> ALSO TRY HITTING "S" ON UPAUSE BEEP

"R" RESTORE SCALE FROM A PREVIOUSLY DRAWN PLOT

"S" CHANGE SCALE OF PLOT (X AND Y) AND PLOT AGAIN

"X" CHANGE X SCALE, AUTO-RESET Y SCALE, AND PLOT AGAIN

"Z" ZOOM IN/OUT IN X, AUTO-RESET Y, AND PLOT AGAIN

"T" CHANGE *DEFAULT SCALING* USED ON ENTRY TO PLOT ROUTINE

"G" MODIFY MISC. PLOT DEFAULTS: GRID/FRAME/TIC/LINE SYTLE

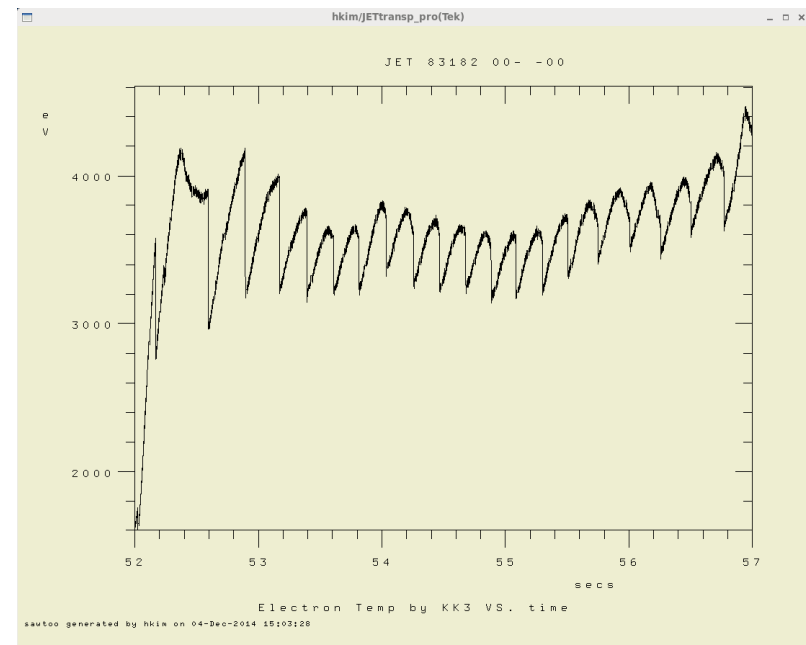
"O" (the letter O) to output 2 column ascii file

"P" JUST PLOT AGAIN (USING NEW DEFAULTS)

"Q" OR "N" TO QUIT PLOTTING (ALTERNATE RETURN CONTROL)

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

X 52 57



Smooth the ECE data



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

Q

SAWTOO OPTIONS (0 SAWTEETH FOUND):

G - GRAPH THE *INPUT* DATA WITH MARKED SAWTEETH IF AVAILABLE

H - GRAPH THE *OUTPUT* SAWTOOTH DATA

Q - QUIT (GET NEW SHOT WITHOUT WRITING OUTPUT FILE)

S - SMOOTH INPUT DATA AND EVALUATE SAWTOOTH TIMES

FROM "RESIDUE" $R(T) = F(T) - F:\text{SMOOTHED}(T)$

W - WRITE SAWTOOTH DATA TO OUTPUT FILE

P - COMPRESS- TOGGLE OUTPUT DATA FORMAT FLAG, NOW "binary "

4 - FORMAT - *new* Ufile output format control menu

X - EXIT (STOP PROGRAM NOW)

SAWTOO: ENTER OPTION CODE:

S

Smooth the ECE data



SMOOTHING: Y= Electron Temp by KK3 (eV)
VS. X= time (secs)

CURRENT SETTINGS ENCLOSED IN BRACKETS "[]"

OPTIONS:

- (1) GRAPH THE UNSMOOTHED DATA
 - (2) GRAPH THE SMOOTHED DATA
- "K" for both smoothed and unsmoothed data on same axes
- (3) DEFINE (REDEFINE) DELTA ARRAY (WGHTD AVG WIDTH)
 - (4) DEFINE (REDEFINE) EPSILON ARRAY (ERROR BAR)
DEFAULT - EPSILON=INFINITY
 - (5) SET BASELINE ["OFF"]
 - (6) SET SPIKE DROP CONDITION ["OFF"]
 - (7) SET END CONDITIONS [LH= 5.000E-01 RH= 5.000E-01]
 - (8) SET LOW-N RELAXATION OF ERROR BAR (EPSILON) [N= 0]
 - (9) TYPE HELP MESSAGE ***
 - (10) >>>>> SMOOTH THE DATA USING CURRENT PARAMETERS
 - (11) QUIT
 - (12) SET CONTROLS FOR PLOTTING "ERROR BARS" ["OFF"]
 - (13) RESTORE ORIGINAL (MIN & MAX OF F,X) SCALE TO 2D GRAPHS
- ... EVENT SMOOTHING FEATURES ...
- ** TYPE "I" FOR INTERIOR ENDPTS OPTION (0 NOW DEFINED)
- ** TYPE "X" FOR DELTA-WIDTH EXTRAPOLATION AT INT.ENDPTS, NOW "OFF"
- ** TYPE "S" FOR SAWTOOTH BREAK/SEARCH AT EACH ENDPT, NOW "OFF"
- SUB:USMOO1 >> ENTER OPTION #:

3

Decide smoothing time window (e.g. 0.2 second for entire data)



ENTER DEFINITION OF Y=AVERAGING (secs)
VS. X=time (secs) -- PIECEWISE LINEAR INTERPOLATION

currently 0 (x,y) points in definition

OPTIONS:

- (1) ADD A POINT TO THE DEFINITION
- (2) REMOVE A POINT
- (3) GRAPH THE CURRENT DEFINITION
- (4) DELETE DEFINITION, START OVER
- (5) EXIT ***
- (6) MULTIPLY ENTIRE DEFINITION BY A SCALAR QUANTITY

SUB:PCIDEF >> ENTER OPTION #:

1 40 0.2

Finish giving smoothing condition



ENTER DEFINITION OF Y=AVERAGING (secs)
VS. X=time (secs) -- PIECEWISE LINEAR INTERPOLATION

currently 1 (x,y) points in definition

OPTIONS:

- (1) ADD A POINT TO THE DEFINITION
- (2) REMOVE A POINT
- (3) GRAPH THE CURRENT DEFINITION
- (4) DELETE DEFINITION, START OVER
- (5) EXIT ***
- (6) MULTIPLY ENTIRE DEFINITION BY A SCALAR QUANTITY

SUB:PCIDEF >> ENTER OPTION #:

5

Smooth the data with the given condition



SMOOTHING: Y= Electron Temp by KK3 (eV)
VS. X= time (secs)

CURRENT SETTINGS ENCLOSED IN BRACKETS "[]"

OPTIONS:

(1) GRAPH THE UNSMOOTHED DATA

(2) GRAPH THE SMOOTHED DATA

"K" for both smoothed and unsmoothed data on same axes

(3) DEFINE (REDEFINE) DELTA ARRAY (WGHTD AVG WIDTH)

(4) DEFINE (REDEFINE) EPSILON ARRAY (ERROR BAR)

DEFAULT - EPSILON=INFINITY

(5) SET BASELINE ["OFF"]

(6) SET SPIKE DROP CONDITION ["OFF"]

(7) SET END CONDITIONS [LH= 5.000E-01 RH= 5.000E-01]

(8) SET LOW-N RELAXATION OF ERROR BAR (EPSILON) [N= 0]

(9) TYPE HELP MESSAGE ***

(10) >>>>> SMOOTH THE DATA USING CURRENT PARAMETERS

(11) QUIT

(12) SET CONTROLS FOR PLOTTING "ERROR BARS" ["OFF"]

(13) RESTORE ORIGINAL (MIN & MAX OF F,X) SCALE TO 2D GRAPHS

... EVENT SMOOTHING FEATURES ...

** TYPE "I" FOR INTERIOR ENDPTS OPTION (0 NOW DEFINED)

** TYPE "X" FOR DELTA-WIDTH EXTRAPOLATION AT INT.ENDPTS, NOW "OFF"

** TYPE "S" FOR SAWTOOTH BREAK/SEARCH AT EACH ENDPT, NOW "OFF"

SUB:USMOO1 >> ENTER OPTION #:

10

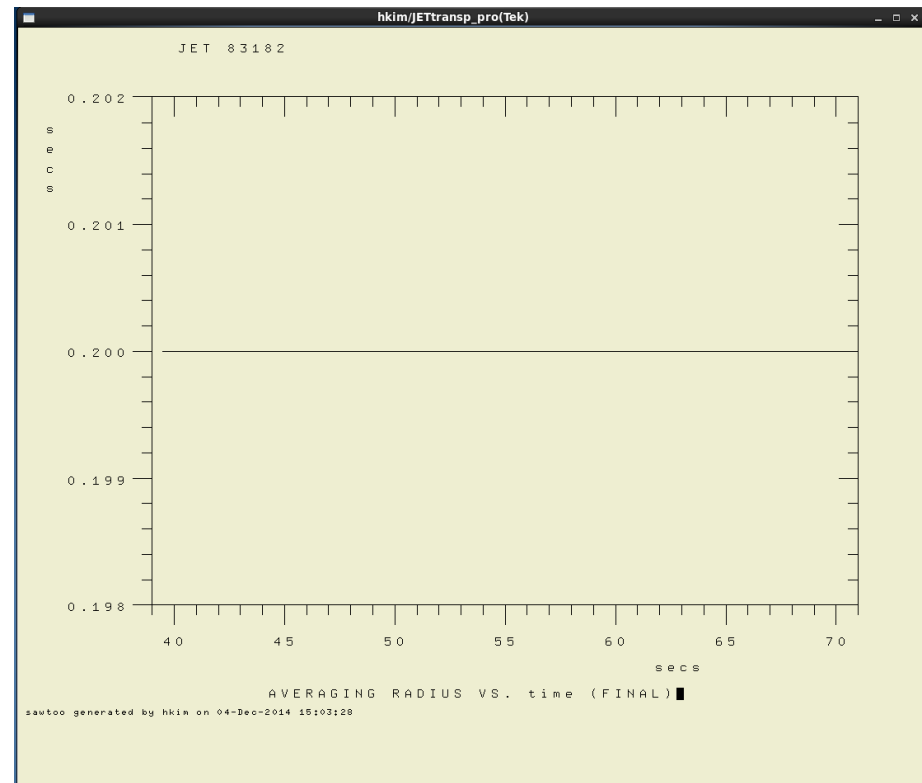
Check the smoothing time window is correct (e.g. 0.2 second for entire data)



SMOOTHING COMPLETED. ALGORITHM: "FILTR6.FOR"
CP TIME = 1.557E+00 SECONDS; 51200 DATA POINTS.
CURVATURE RATIO = 1.020E-04, SMOOTHED / UNSMOOTHED
0 POINTS RESET TO BASELINE
0 POINTS DROPPED AS DATA SPIKES

[USER ACKNOWLEDGE - HIT ANY KEY]
USMOO1: ENTER "Y" TO PLOT DELTA(FINAL):

Y



Finish smoothing process



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

Q

SMOOTHING: Y= Electron Temp by KK3 (eV)

VS. X= time (secs)

CURRENT SETTINGS ENCLOSED IN BRACKETS "[]"

OPTIONS:

(1) GRAPH THE UNSMOOTHED DATA

(2) GRAPH THE SMOOTHED DATA

"K" for both smoothed and unsmoothed data on same axes

(3) DEFINE (REDEFINE) DELTA ARRAY (WGHTD AVG WIDTH)

(4) DEFINE (REDEFINE) EPSILON ARRAY (ERROR BAR)

DEFAULT - EPSILON=INFINITY

(5) SET BASELINE ["OFF"]

(6) SET SPIKE DROP CONDITION ["OFF"]

(7) SET END CONDITIONS [LH= 5.000E-01 RH= 5.000E-01]

(8) SET LOW-N RELAXATION OF ERROR BAR (EPSILON) [N= 0]

(9) TYPE HELP MESSAGE ***

(10) >>>>> SMOOTH THE DATA USING CURRENT PARAMETERS

(11) QUIT

(12) SET CONTROLS FOR PLOTTING "ERROR BARS" ["OFF"]

(13) RESTORE ORIGINAL (MIN & MAX OF F,X) SCALE TO 2D GRAPHS

... EVENT SMOOTHING FEATURES ...

** TYPE "I" FOR INTERIOR ENDPTS OPTION (0 NOW DEFINED)

** TYPE "X" FOR DELTA-WIDTH EXTRAPOLATION AT INT.ENDPTS, NOW "OFF"

** TYPE "S" FOR SAWTOOTH BREAK/SEARCH AT EACH ENDPT, NOW "OFF"

SUB:USMOO1 >> ENTER OPTION #:

Select sawtooth crash time from correlation data



[OLD VALUE: 5.00000E-01]

SAWCOR: ENTER MULTIPLICATIVE FACTOR FOR DELTA:

0.5

[OLD VALUE: 2.00000E-02]

SAWCOR: ENTER MINIMUM CORRELATION DELTA (seconds):

0.002

USER OPTIONS:

- 1 - PLOT ORIGINAL TIMETRACE DATA
- 2 - PLOT UNSMOOTHED RESIDUE OF TIMETRACE DATA
- 4 - PLOT COMPUTED NORMALIZED SAWTOOTH CORRELATION DATA
- C - CALCULATE CORRELATION DATA WITH NEW RESCALED DELTA
FUNCTION [DELTA(CORR) = 5.0000E-01 * DELTA(SMOOTH)]
- S - SELECT SAWTOOTH TIMES FROM CORRELATION DATA
- H - ADD/DELETE SAWTOOTH TIMES BY HAND
- P - PLOT SELECTED SAWTEETH
- Q - QUIT (ABORT) RETURN NO DATA
- R - RETURN SAVED SAWTOOTH SEQUENCE

SAWCOR: SPECIFY DATA/PLOT OPTION:

S

Enter minimum sawtooth event separation factor



ENTER DEFINITION OF Y=MINIMUM CORRELATION ()
VS. X=time secs (secs) -- PIECEWISE LINEAR INTERPOLATION

currently 0 (x,y) points in definition

OPTIONS:

- (1) ADD A POINT TO THE DEFINITION
- (2) REMOVE A POINT
- (3) GRAPH THE CURRENT DEFINITION
- (4) DELETE DEFINITION, START OVER
- (5) EXIT ***
- (6) MULTIPLY ENTIRE DEFINITION BY A SCALAR QUANTITY

SUB:PCIDEF >> ENTER OPTION #:

5

[OLD VALUE: 2.00000E-01]

SAWCOR: ENTER MINIMUM EVENT SEPERATION FACTOR (* DELTA(SM)):

0.01

Plot sawtooth crash time

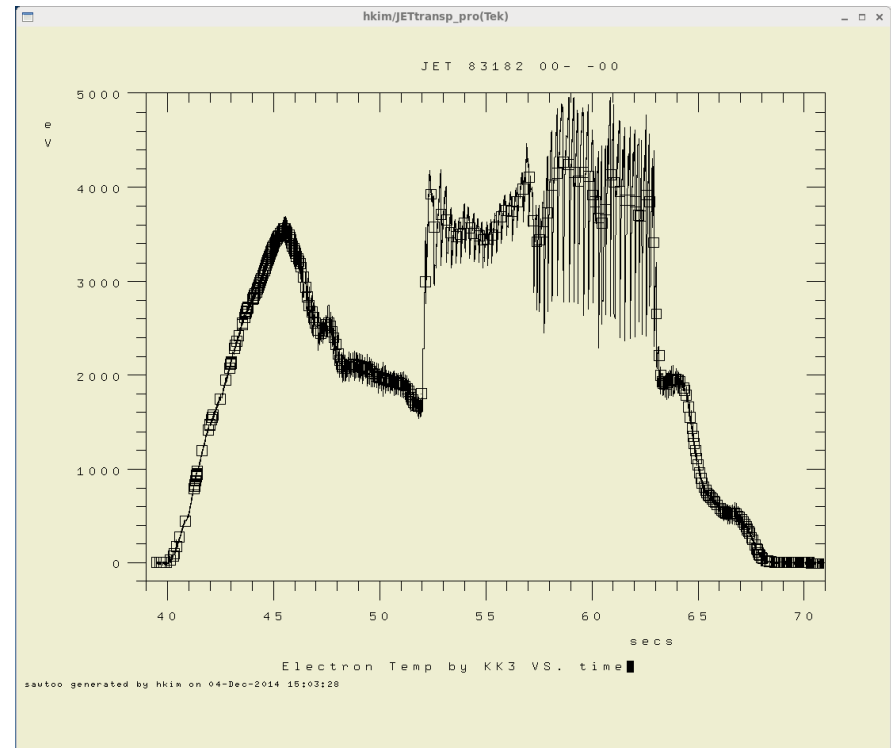


USER OPTIONS:

- 1 - PLOT ORIGINAL TIMETRACE DATA
- 2 - PLOT UNSMOOTHED RESIDUE OF TIMETRACE DATA
- 4 - PLOT COMPUTED NORMALIZED SAWTOOTH CORRELATION DATA
- C - CALCULATE CORRELATION DATA WITH NEW RESCALED DELTA FUNCTION [DELTA(CORR) = 5.0000E-01 * DELTA(SMOOTH)]
- S - SELECT SAWTOOTH TIMES FROM CORRELATION DATA
- H - ADD/DELETE SAWTOOTH TIMES BY HAND
- P - PLOT SELECTED SAWTEETH
- Q - QUIT (ABORT) RETURN NO DATA
- R - RETURN SAVED SAWTOOTH SEQUENCE

SAWCOR: SPECIFY DATA/PLOT OPTION:

P



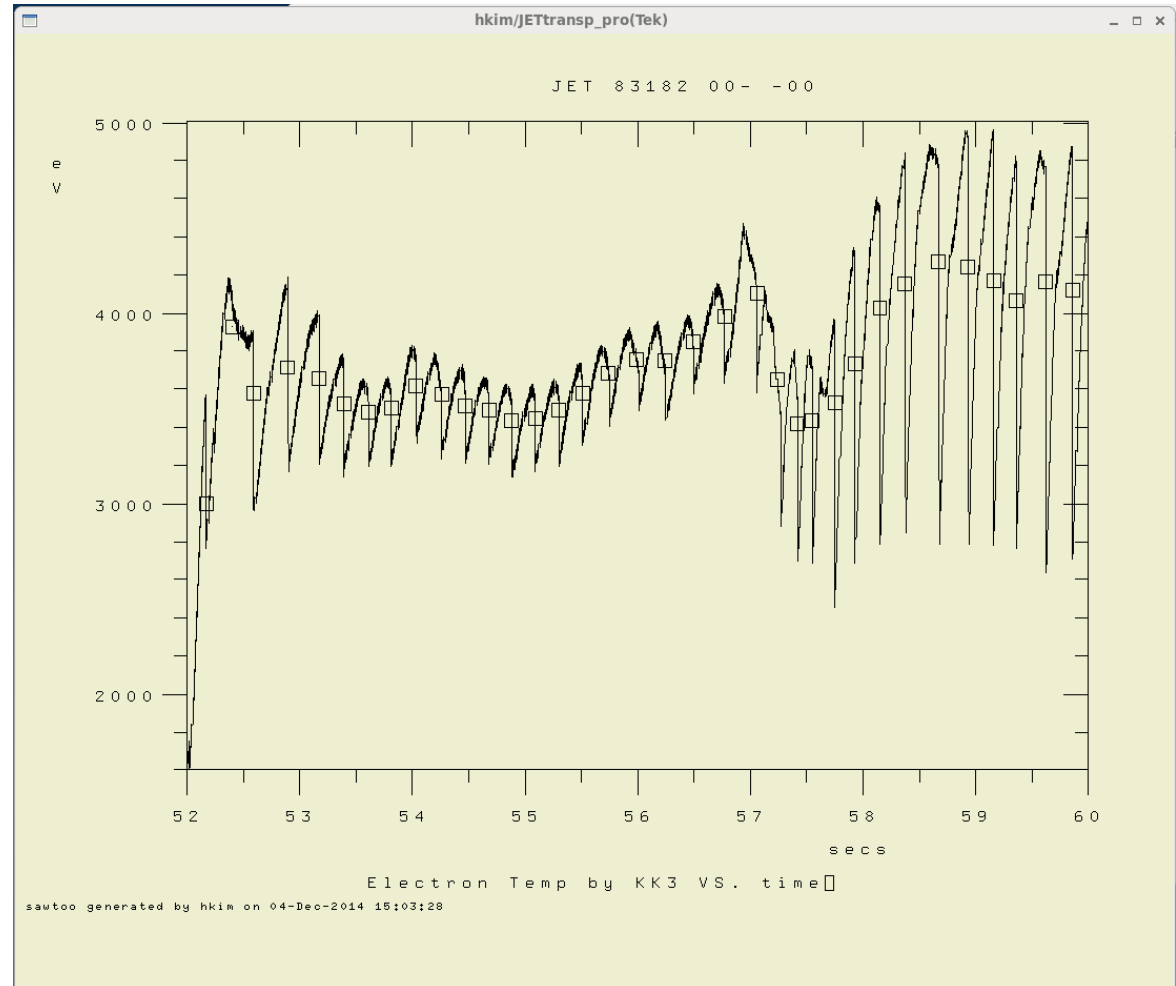
Enlarge the time window of interest, and check if sawtooth crash time is correctly found.



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

X 52 60



Remove redundant or incorrect sawtooth crash time



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

Q

USER OPTIONS:

- 1 - PLOT ORIGINAL TIMETRACE DATA
- 2 - PLOT UNSMOOTHED RESIDUE OF TIMETRACE DATA
- 4 - PLOT COMPUTED NORMALIZED SAWTOOTH CORRELATION DATA
- C - CALCULATE CORRELATION DATA WITH NEW RESCALED DELTA
FUNCTION [DELTA(CORR) = 5.0000E-01 * DELTA(SMOOTH)]
- S - SELECT SAWTOOTH TIMES FROM CORRELATION DATA
- H - ADD/DELETE SAWTOOTH TIMES BY HAND
- P - PLOT SELECTED SAWTEETH
- Q - QUIT (ABORT) RETURN NO DATA
- R - RETURN SAVED SAWTOOTH SEQUENCE

SAWCOR: SPECIFY DATA/PLOT OPTION:

H

Remove redundant or incorrect sawtooth crash time



INORDU (ORDERED LIST "SAWTOOTH TIMES" INPUT) OPTIONS:

TYPE NUMBER TO ADD A NEW VALUE, OR:

C TO CLEAR LIST

D <NUMBER> TO REMOVE <NUMBER> FROM LIST

R <NUMBER1> <NUMBER2> TO REMOVE RANGE OF NUMBERS FROM LIST

U TO READ NEW LIST IN FROM UFILE *NEW OPTION*

L TO TYPE OUT LIST CONTENTS

Q TO QUIT

% 358 ENTRIES IN LIST, RANGE: 3.950200E+01 TO 7.070000E+01

INORD: ENTER NEW ITEM OR OPTION FOR LIST "SAWTOOTH TIMES":

R 35 52

Remove redundant or incorrect sawtooth crash time



% 171 LIST ENTRIES DELETED

INORDU (ORDERED LIST "SAWTOOTH TIMES" INPUT) OPTIONS:

TYPE NUMBER TO ADD A NEW VALUE, OR:

C TO CLEAR LIST

D <NUMBER> TO REMOVE <NUMBER> FROM LIST

R <NUMBER1> <NUMBER2> TO REMOVE RANGE OF NUMBERS FROM LIST

U TO READ NEW LIST IN FROM UFILE *NEW OPTION*

L TO TYPE OUT LIST CONTENTS

Q TO QUIT

% 187 ENTRIES IN LIST, RANGE: 5.217240E+01 TO 7.070000E+01

INORD: ENTER NEW ITEM OR OPTION FOR LIST "SAWTOOTH TIMES":

R 60 80

Remove redundant or incorrect sawtooth crash time



% 152 LIST ENTRIES DELETED

INORDU (ORDERED LIST "SAWTOOTH TIMES" INPUT) OPTIONS:

TYPE NUMBER TO ADD A NEW VALUE, OR:

C TO CLEAR LIST

D <NUMBER> TO REMOVE <NUMBER> FROM LIST

R <NUMBER1> <NUMBER2> TO REMOVE RANGE OF NUMBERS FROM LIST

U TO READ NEW LIST IN FROM UFILE *NEW OPTION*

L TO TYPE OUT LIST CONTENTS

Q TO QUIT

% 35 ENTRIES IN LIST, RANGE: 5.217240E+01 TO 5.986700E+01

INORD: ENTER NEW ITEM OR OPTION FOR LIST "SAWTOOTH TIMES":

D 52.4

Remove redundant or incorrect sawtooth crash time



INORDU (ORDERED LIST "SAWTOOTH TIMES" INPUT) OPTIONS:

TYPE NUMBER TO ADD A NEW VALUE, OR:

C TO CLEAR LIST

D <NUMBER> TO REMOVE <NUMBER> FROM LIST

R <NUMBER1> <NUMBER2> TO REMOVE RANGE OF NUMBERS FROM LIST

U TO READ NEW LIST IN FROM UFILE *NEW OPTION*

L TO TYPE OUT LIST CONTENTS

Q TO QUIT

% 34 ENTRIES IN LIST, RANGE: 5.217240E+01 TO 5.986700E+01

INORD: ENTER NEW ITEM OR OPTION FOR LIST "SAWTOOTH TIMES":

Q

Plot sawtooth crash time again

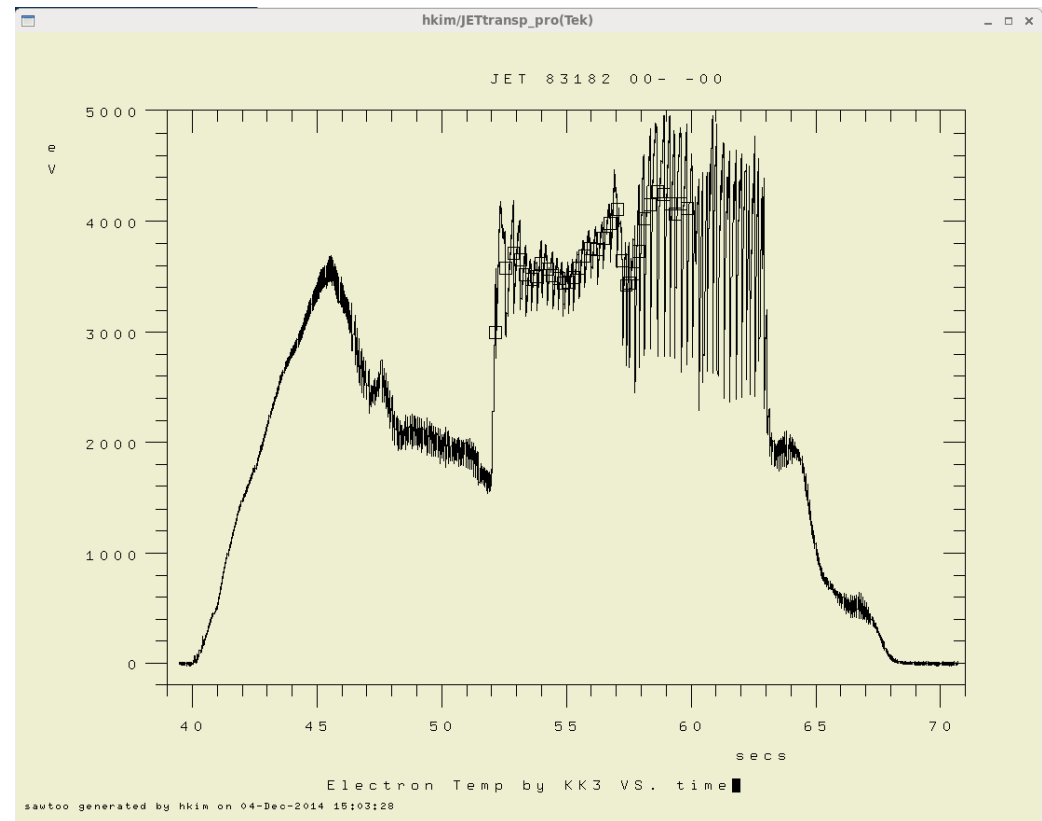


USER OPTIONS:

- 1 - PLOT ORIGINAL TIMETRACE DATA
- 2 - PLOT UNSMOOTHED RESIDUE OF TIMETRACE DATA
- 4 - PLOT COMPUTED NORMALIZED SAWTOOTH CORRELATION DATA
- C - CALCULATE CORRELATION DATA WITH NEW RESCALED DELTA
FUNCTION [DELTA(CORR) = 5.0000E-01 * DELTA(SMOOTH)]
- S - SELECT SAWTOOTH TIMES FROM CORRELATION DATA
- H - ADD/DELETE SAWTOOTH TIMES BY HAND
- P - PLOT SELECTED SAWTEETH
- Q - QUIT (ABORT) RETURN NO DATA
- R - RETURN SAVED SAWTOOTH SEQUENCE

SAWCOR: SPECIFY DATA/PLOT OPTION:

P



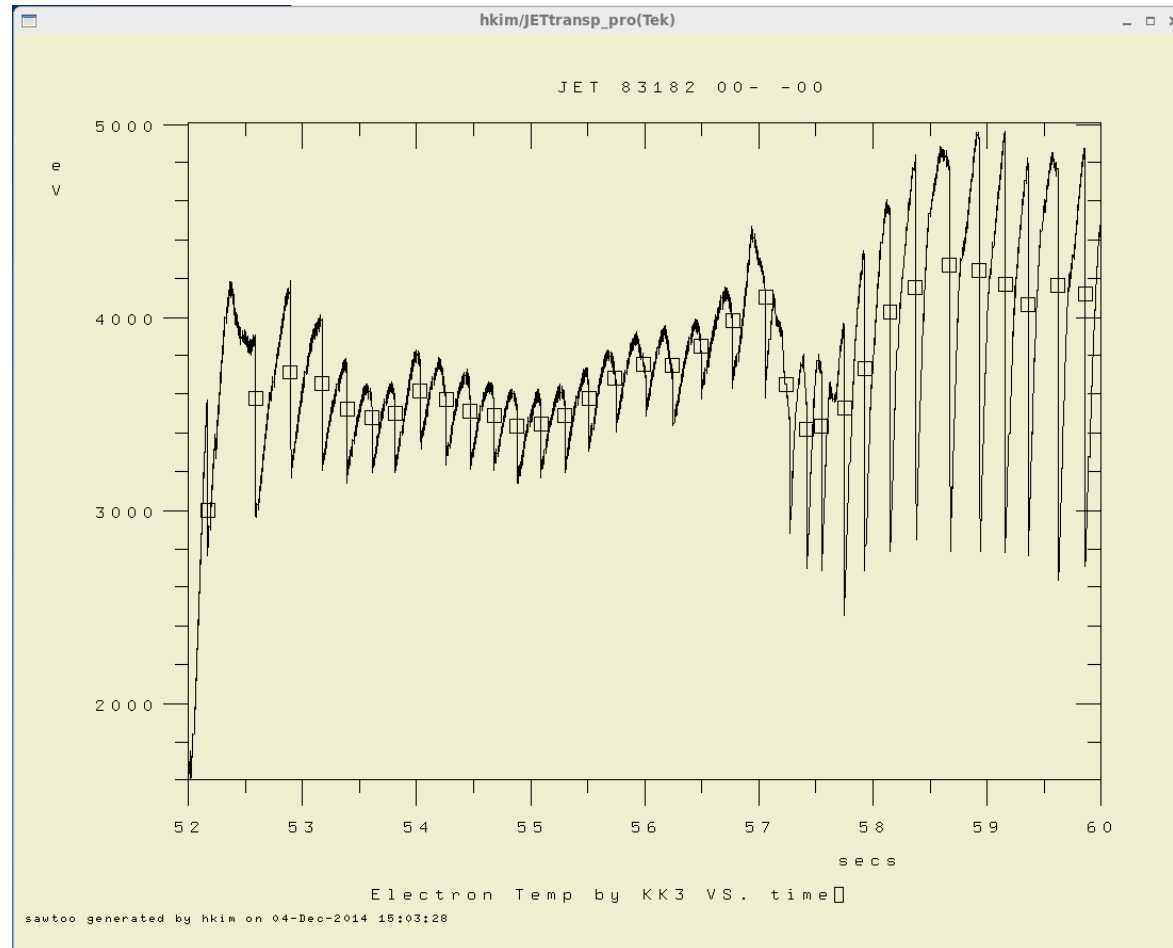
Enlarge the time window of interest, and check if the incorrect sawtooth crash time is removed.



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

X 52 60



Return the save sawtooth data



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

Q

USER OPTIONS:

1 - PLOT ORIGINAL TIMETRACE DATA

2 - PLOT UNSMOOTHED RESIDUE OF TIMETRACE DATA

4 - PLOT COMPUTED NORMALIZED SAWTOOTH CORRELATION DATA

C - CALCULATE CORRELATION DATA WITH NEW RESCALED DELTA

FUNCTION [DELTA(CORR) = 5.0000E-01 * DELTA(SMOOTH)]

S - SELECT SAWTOOTH TIMES FROM CORRELATION DATA

H - ADD/DELETE SAWTOOTH TIMES BY HAND

P - PLOT SELECTED SAWTEETH

Q - QUIT (ABORT) RETURN NO DATA

R - RETURN SAVED SAWTOOTH SEQUENCE

SAWCOR: SPECIFY DATA/PLOT OPTION:

R

Plot the output sawtooth data



SAWTOO OPTIONS (34 SAWTEETH FOUND):

G - GRAPH THE *INPUT* DATA WITH MARKED SAWTEETH IF AVAILABLE

H - GRAPH THE *OUTPUT* SAWTOOTH DATA

Q - QUIT (GET NEW SHOT WITHOUT WRITING OUTPUT FILE)

S - SMOOTH INPUT DATA AND EVALUATE SAWTOOTH TIMES

FROM "RESIDUE" $R(T) = F(T) - F:\text{SMOOTHED}(T)$

W - WRITE SAWTOOTH DATA TO OUTPUT FILE

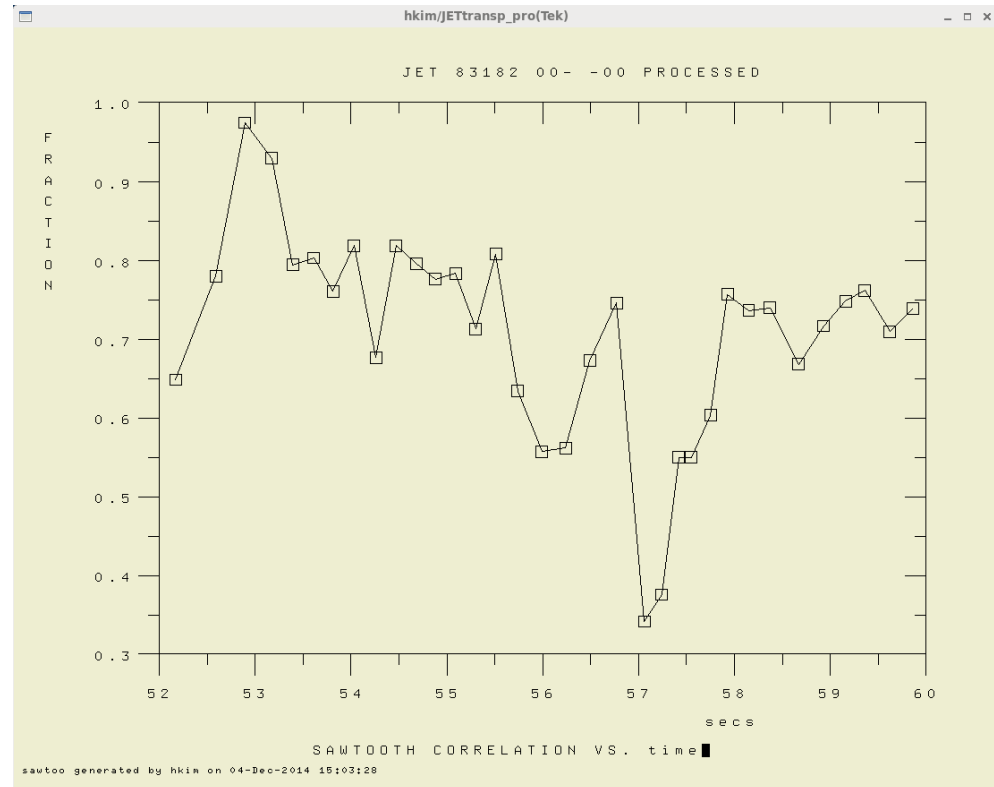
P - COMPRESS- TOGGLE OUTPUT DATA FORMAT FLAG, NOW "binary "

4 - FORMAT - *new* Ufile output format control menu

X - EXIT (STOP PROGRAM NOW)

SAWTOO: ENTER OPTION CODE:

H



Change the binary format to ufile format



GRAOPT - OPTIONS: ENTER "C" TO SEE THE ENTIRE MENU

GRAOPT: ENTER ONE LETTER OPCODE (.C/A/S/X/Z/G/P/Q):

Q

SAWTOO OPTIONS (34 SAWTEETH FOUND):

G - GRAPH THE *INPUT* DATA WITH MARKED SAWTEETH IF AVAILABLE

H - GRAPH THE *OUTPUT* SAWTOOTH DATA

Q - QUIT (GET NEW SHOT WITHOUT WRITING OUTPUT FILE)

S - SMOOTH INPUT DATA AND EVALUATE SAWTOOTH TIMES

FROM "RESIDUE" $R(T) = F(T) - F:\text{SMOOTHED}(T)$

W - WRITE SAWTOOTH DATA TO OUTPUT FILE

P - COMPRESS- TOGGLE OUTPUT DATA FORMAT FLAG, NOW "binary "

4 - FORMAT - *new* Ufile output format control menu

X - EXIT (STOP PROGRAM NOW)

SAWTOO: ENTER OPTION CODE:

P

Write the sawtooth ufile in \$SDD, make a comment, and finish.



```
SAWTOO OPTIONS ( 34 SAWTEETH FOUND):
G - GRAPH THE *INPUT* DATA WITH MARKED SAWTEETH IF AVAILABLE
H - GRAPH THE *OUTPUT* SAWTOOTH DATA
Q - QUIT (GET NEW SHOT WITHOUT WRITING OUTPUT FILE)
S - SMOOTH INPUT DATA AND EVALUATE SAWTOOTH TIMES
  FROM "RESIDUE" R(T)= F(T) - F:SMOOTHED(T)
W - WRITE SAWTOOTH DATA TO OUTPUT FILE
P - COMPRESS- TOGGLE OUTPUT DATA FORMAT FLAG, NOW "binary "
4 - FORMAT - *new* Ufile output format control menu
X - EXIT (STOP PROGRAM NOW)
SAWTOO: ENTER OPTION CODE:
W
NAMED FILE: A83182.SAW
%ubcpwr: loss free compression storage ratio for "x": 1.000E+00
%ubcpwr: loss free compression storage ratio for "f": 1.000E+00
% UREAD typeahead turned off. Lower case indented
  comments may be typed. To exit, type "x" or "X" in the
  FIRST character position followed by a carriage return
UFACOM: ENTER COMMENTS FOR OUTPUT FILE (max 80 CHARS/LINE):
used sawtoo to select sawteeth from KK383182.TE70_0055
R40 52
R 60 80
D 52.4
X
INPUT: KK3#####.TE70_0055
OUTPUT: A#####.SAW
SAWTOO: ENTER 5 DIGIT SHOT #, "0" TO QUIT, "D" TO CHANGE NAMES
0
```