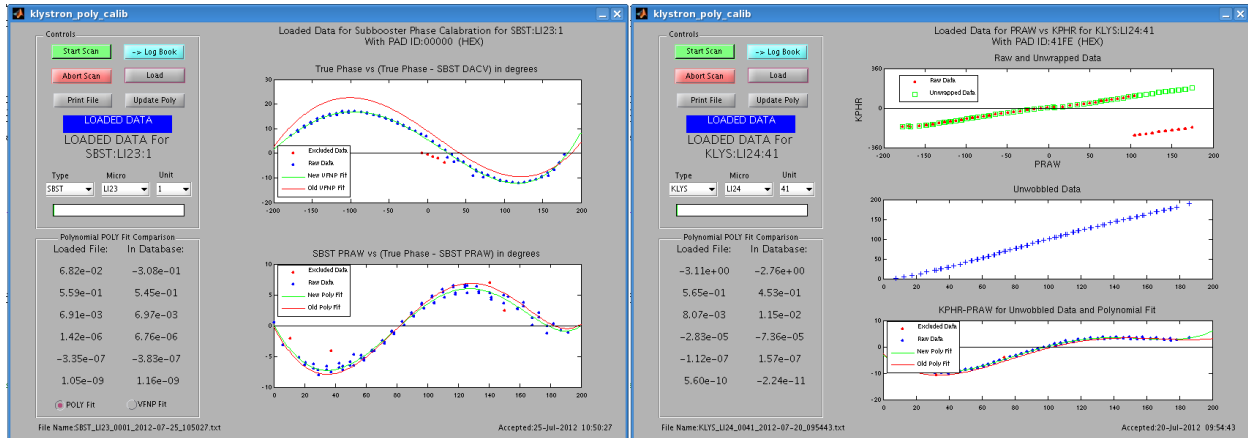


# User documentation for : “Klystron\_poly\_calib”

## Phase PAD Ploynomial Scan and Calabration.

The image below show the main screens for the program with a breif guide on how to run it.



Klystron phase calibration is preformed to find a relation between the requested klystron phase (KPHR) and the actual phase (PRAW). The relation is expressed as a polynomial function, stored in the database for each unit, such that  $KPHR = f(PRAW)$ . The data for the klystron calibration is obtained by stepping through 360 degrees in the klystron phase (KPHR) and then reading back the detected phase from the PAD (PRAW). Since the klystrons are independent from each other, they can all be phased for the data collection at the same time.

This program will generate a text file in which the data KPHR, PRAW, WOBBLED and STAT are placed. The first line of the file will be the record for the scan, it will contain the date and time of the scan, the PAD ID in HEX form and the list of what bin is what, the data is listed underneath this first line. All files are located in, “/u1/lcls/physics/amrf/klydata/PADcalibration”.

To do scan:

1. Use pull down to choose the if you like a subbooster or klystron, the sector of interest and the klystron unit of interest.
2. Press ‘Start Scan’, wait till done (about 8 min).
3. Compare the old and new polynomials by number and by graph.

To update polynomials

1. Press ‘Update Poly’
2. Ensure beam is not active, press ‘ok’

# Button list with their functions

## Abort Scan –

This will abort a scan and set the KPHR and the PTRM back to their original status, can be used at any time. May have to wait up to 5 seconds to ensure all is set right.

## →Log Book –

This logs the current screen into the logbook if needed.

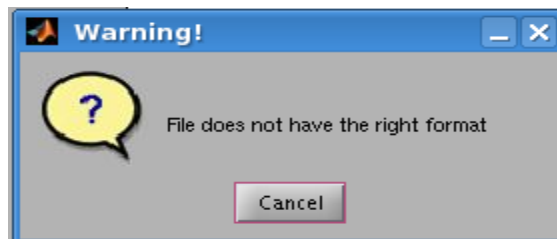
## Load –

This will load a file for the subbooster or klystron of choice. This will give a message if the name of the file is incorrect or tampered with. An example of the file names for scan information is 'SBST\_LI27\_0001\_2012-07-17\_121336.txt' or 'KLYS\_LI29\_0061\_2012-07-20\_101528.txt'.

<b>SBST_LI25_0001_2012-07-20_091045.txt</b>
Type
Micro
Unit
Date
time
<b>KLYS_LI29_0061_2012-07-20_100452.txt</b>

## POLY fit and VFNP fit –

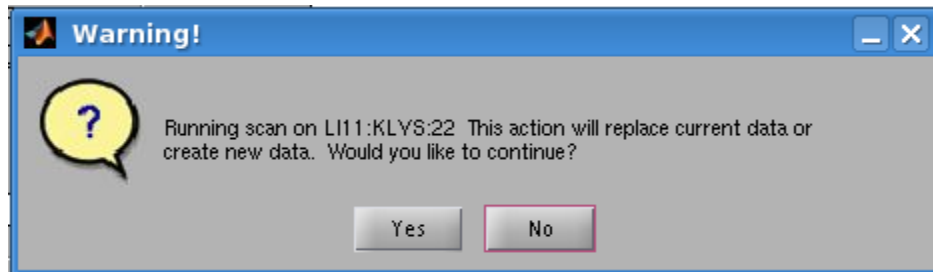
This is only for the subbooster system. This will allow the user to compare the two sets of polynomials, one for the VFNP and the other for POLY.



This will only come up if file of choice is improperly named.

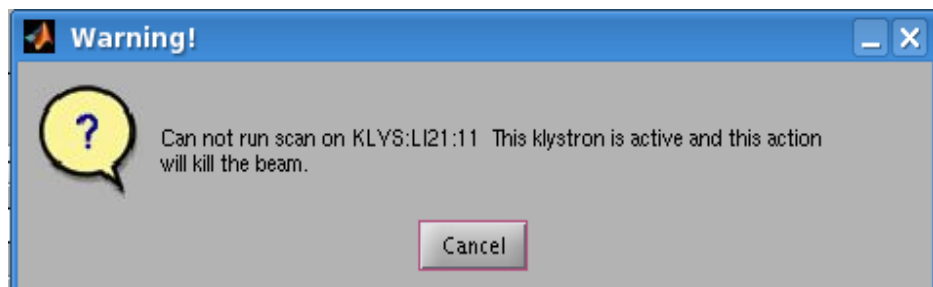
## Start Scan –

This will start the scan for either subbooster system or individual klystron. This has the following possible user input screens that come up:



This warns the user that this will interrupt the beam if the beam is on and ask if user would like to continue.

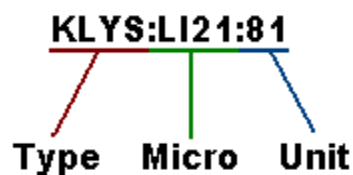
Or:



This will stop the user from running scan on active klystron. This is only when the klystron is actively accelerating the beam.

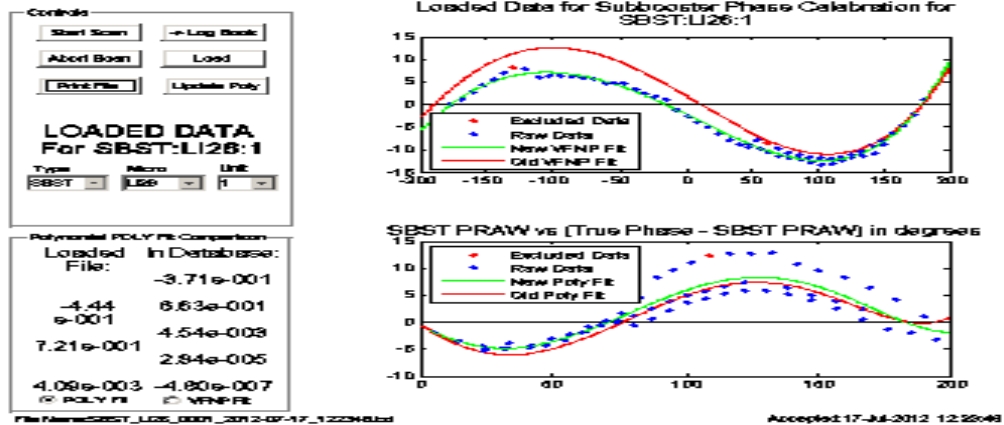
## Type, Micro and Unit –

This addresses the location and type of system you want. The type is one of two types, SBST or KLYS. The micro is the location and unit is the unit number for the klystron chosen. Essentially the process variable is formed from these boxes. For example:



## Print –

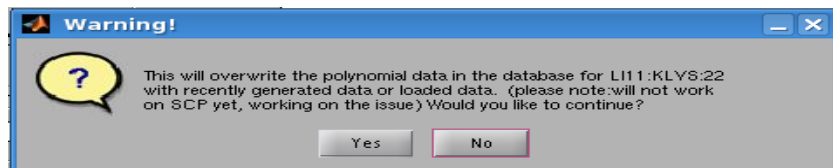
This will print a screen shot of the GUI, with the plots and the information for that subbooster or klystron.



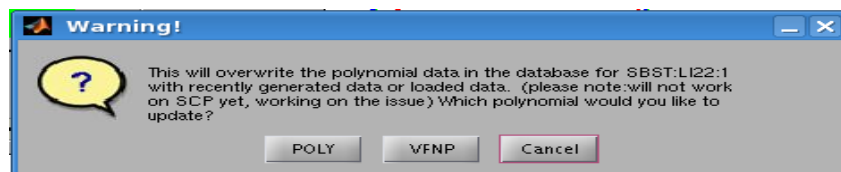
Sample screen shot, a printed page will be similar to this.

## Update Poly –

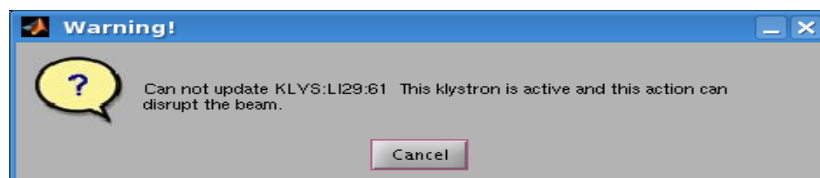
This will update the polynomial for the subbooster or the klystron. This will ask the user to continue.



For updating polynomials for the klystron only.

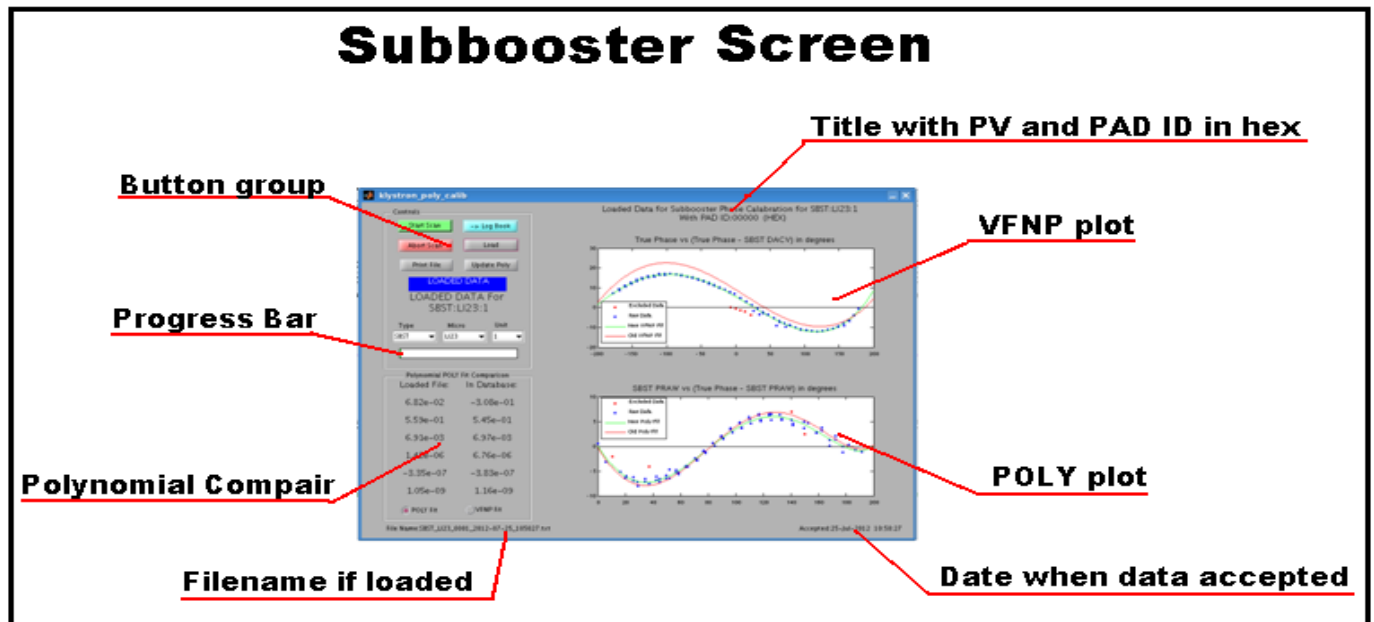


For updating the polynomials for the subbooster only, this has two polynomials that can be updated.

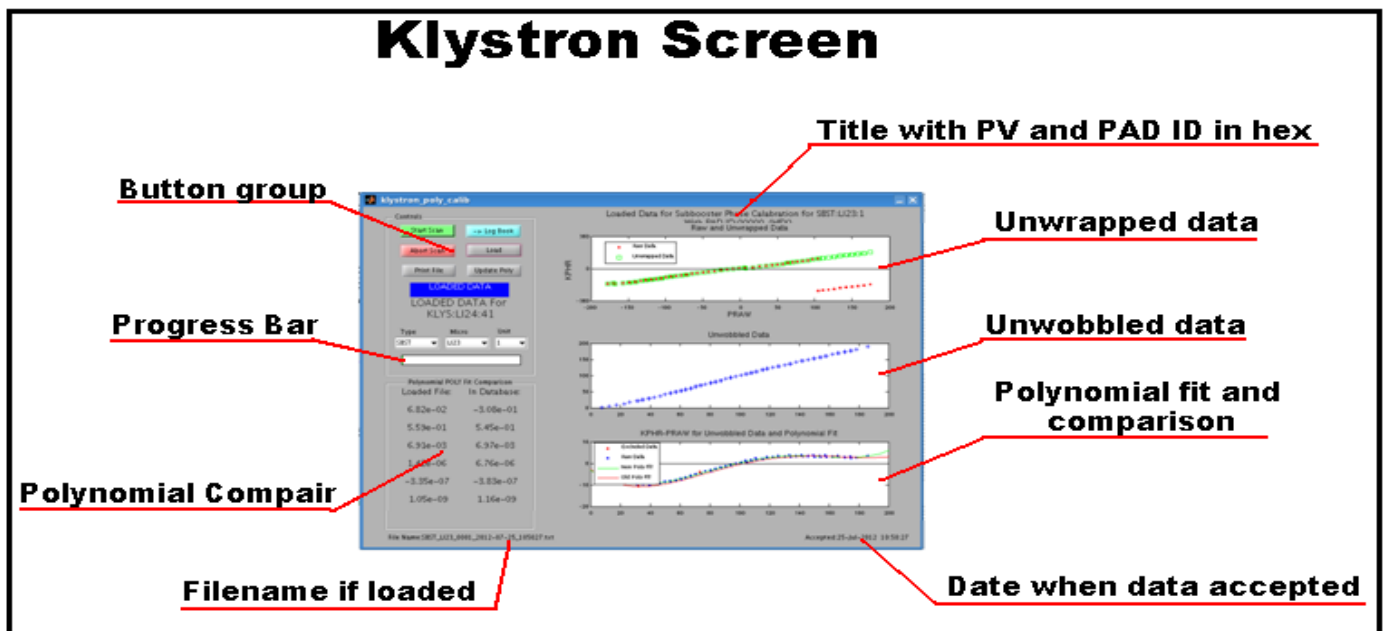


This warning only occurs if the beam is active for a klystron.

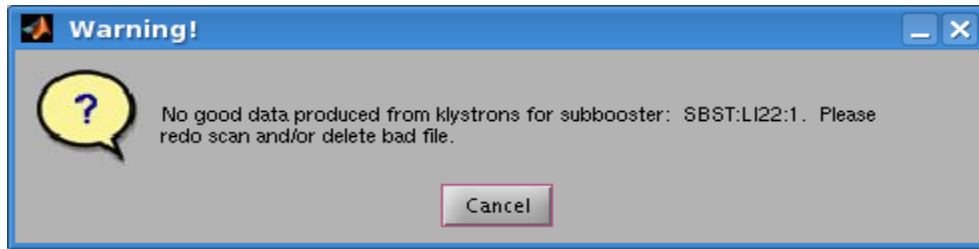
## The main subbooster screen



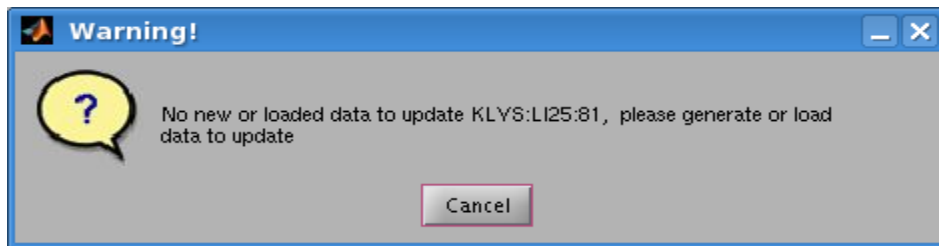
## The main klystron screen



## Other warning messages



This warning will appear for subbooster or klystron system if the data produced is not good or too much of the data is deemed bad by its status. In terms of programming, the two things that cause this is too many "NaN's" (Not a Number) or the status is bad (the PV, STAT).



This warning will appear if there is nothing loaded into the polynomials. Note, this will appear if you try to put in the polynomials twice.

Note: if there are any other anomalous errors, please contact the MATLAB specialist...

## Adding or Subtracting klystrons from the list for subboosters and for klystrons

There is an excluded list of klystrons that are taken out of the list in the GUI. These are, for example, stations that do not have a klystron or obsolete stations that have not been deleted. This list can be accessed by authorized personal that are considered the experts. They may remove or add any klystron to the list as they choose fit. This is a text file found in the same folder as the scan file, which is located in, "/u1/lcls/physics/amrf/klydata/PADcalibration". However if the user finds the file named, "KLYS\_unuseable\_list.txt" or "SBST\_unuseable\_list.txt" in the GUI 'Load' button, open it there and then SAVE the file after changes are made. Just add the klystron as the instructions above the list indicate, DO NOT CHANGE the first 6 lines of instructions, this will produce issues with the code if any are removed.