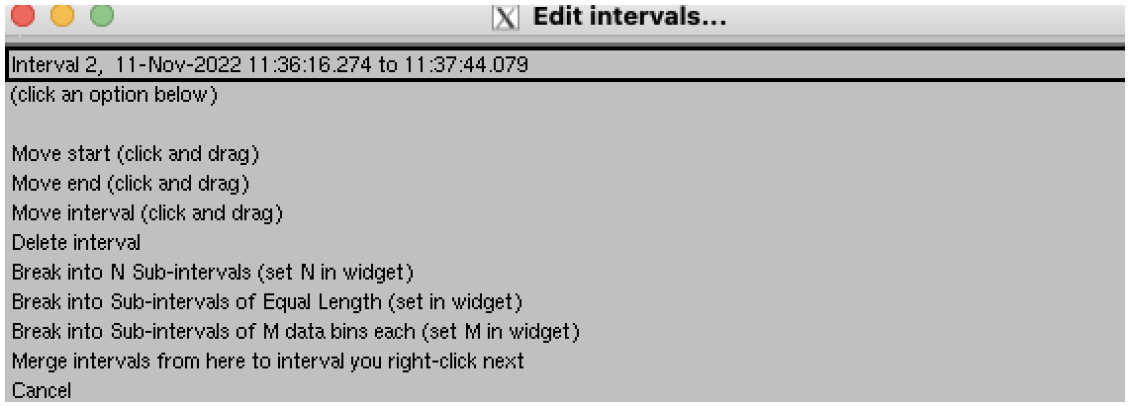
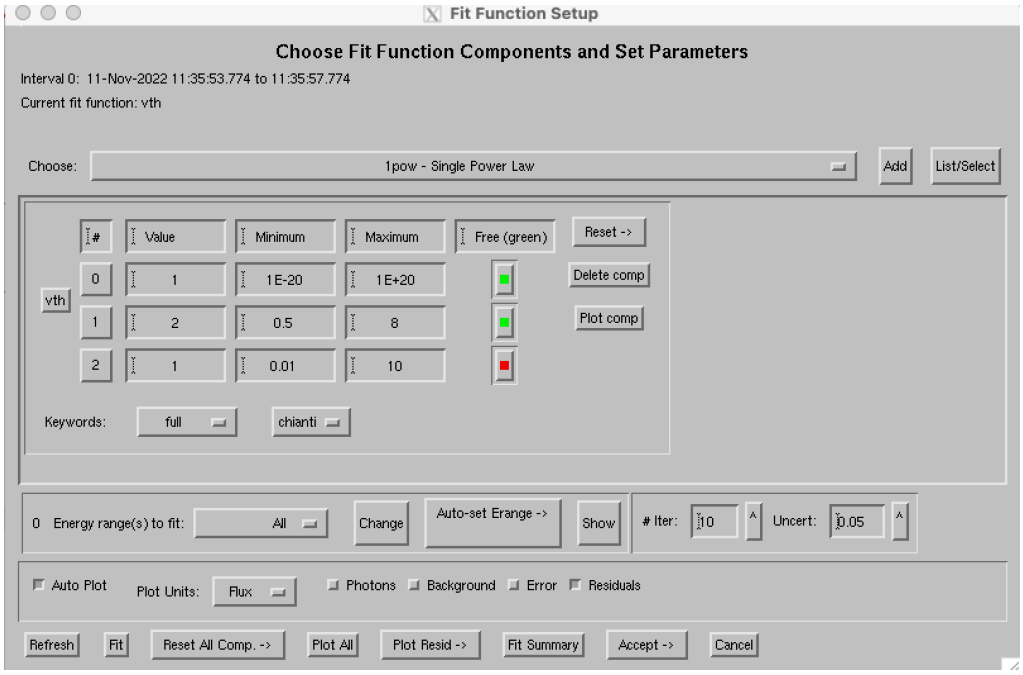
- Run test_ospex.pro which will compile try_ospex. Then type try_ospex. The gui will open.
- You can click on ‘XY plot display options’ in plot control from the window just to play around with the plot.
- Now to do **spectral analysis** go to file and click select fit options and do fit.
    1. First you need to select time intervals:
        - For single interval just left/right mouse click on start point. Then left two finger (together) click to end point.
        - You can also create sub intervals inside that single interval. For that you have to do left double (single finger) click



        - You can then click on ‘break in to sub intervals of equal length’ and change the length of sub intervals in seconds. Then click on ‘do fit’.

- In **fitting**



First you try to fit the thermal component. At first it will tell the parameter values.

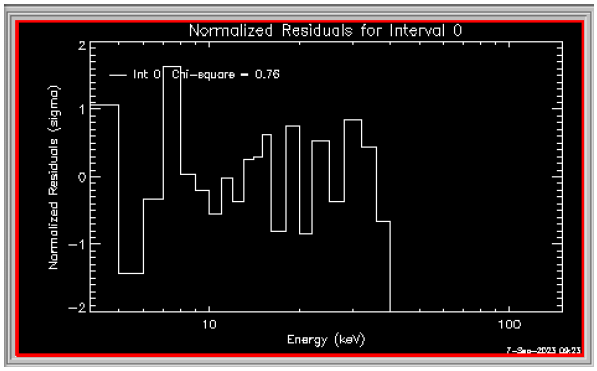
```
vth - Optically thin thermal bremsstrahlung radiation function
as differential spectrum seen at Earth in units of photon/(cm2 s keV)
Valid for temperatures between .086 and 8.6 keV.
  a[0] - Emission measure, 10^49 cm^(-3)
  a[1] - KT, plasma temperature (keV)
  a[2] - Relative abundance for Iron/Nickel, Calcium, Sulfur, Silicon
         Relative to coronal abundance for Chianti
         Relative to solar abundance for Mewe
         (unless user selects a different abundance table manually)
  Keyword options: full/continuum/lines    Chianti/Mewe
```

The red box means that parameter value will not change. So you are left with emission measure and plasma temperature. You can change these parameter values and do fit. Or you can also leave it as the software will automatically try to fit.

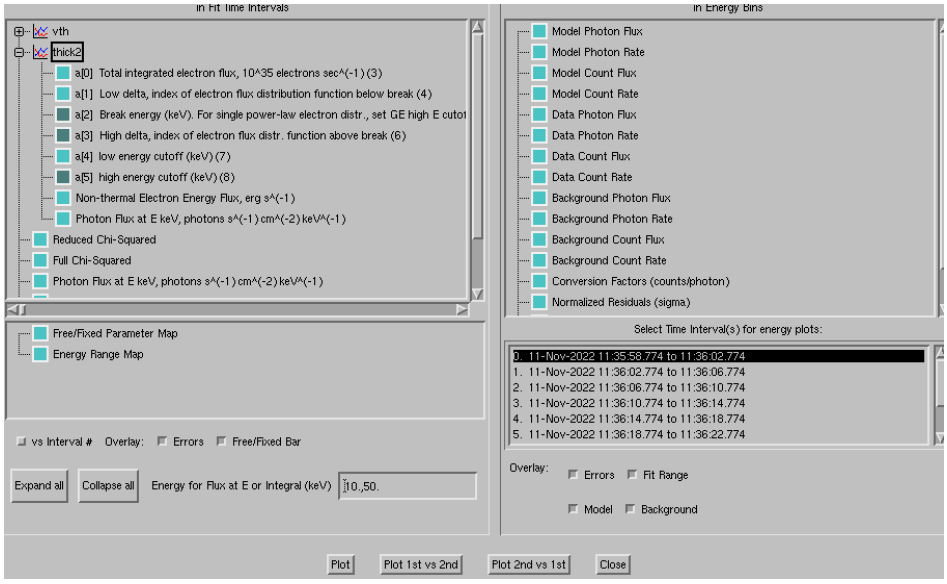
Then you can click **thick target Bremsstrahlung** to fit non thermal emission. Here the parameter values are:

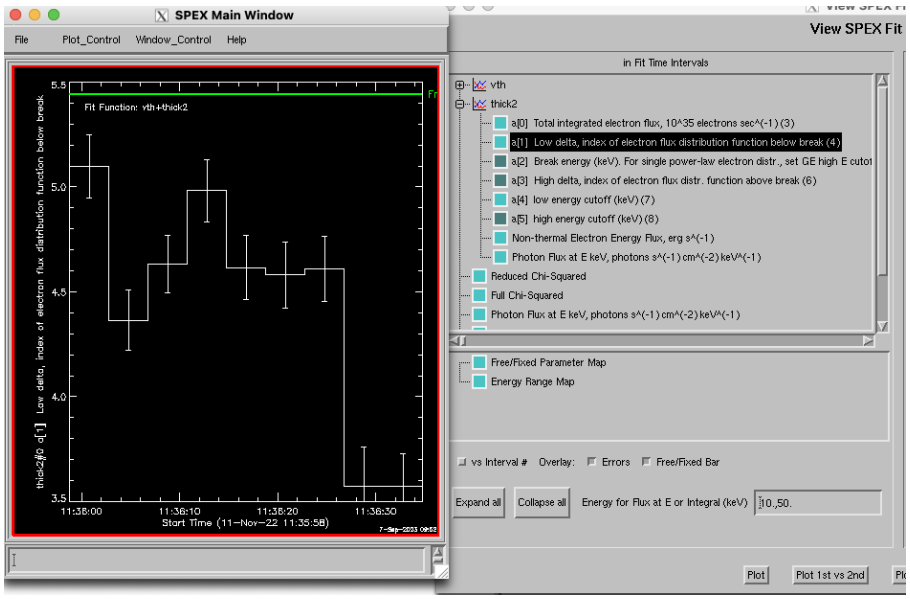
```
thick2 - Thick-Target Bremsstrahlung x-ray/gamma-ray spectrum from an isotropic electron distribution
         Version 2 (~10-100 times faster than Version 1, with a relative error of ~1.e-4)
         (see http://hesperia.gsfc.nasa.gov/ssw/packages/xray/doc/brm_thick_doc.pdf)
  a[0] - Total integrated electron flux, 10^35 electrons sec^(-1)
  a[1] - Low delta, index of electron flux distribution function below break
  a[2] - Break energy (keV). For single power-law electron distr., set GE high E cutoff or LE low E cutoff
  a[3] - High delta, index of electron flux distr. function above break
  a[4] - low energy cutoff (keV)
  a[5] - high energy cutoff (keV)
```

Here we will not care about 2, 3 and 5 as we dont really get the high energy cutoff (https://iopscience-iop-org.elib.tcd.ie/article/10.3847/1538-4357/aabae9/pdf read this paper for HE cutoff). So we fix these parameters.
One important thing is to check **energy ranges** for this you need to look at the timeseries and see if we have enough counts for the emax. Also another way to check if the fitting is good is to take a look at the chi square value (should be very close to 1) and the plot of normalized residuals vs. energy.



For **fitting for multiple time intervals,** once you are happy with the fit for first time interval, you can click accept which will store fit and loop through the intervals. For the next time interval the initial parameter values will be the fitted values from interval 0, so it's very important that you have done a good fitting for the interval 0.
After all the fitting are done. You can look at the fit results by clicking the '**plot fit results**' in the file menu on spex menu window.You will see the window below and click on the plus sign beside vth and thick2.





Then to save these results in fit, click on the **'save fit (no script)**' which will you to give a fits file name and save it.