

Weekly analysis meeting



A short introduction to iLat

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iLat is a python wrapper developed by Gino Tosti based on most of the script developed for ASP (mainly Jim Chiang), on the Science Tools and FTOOLS.

It provides Plotting capabilities (matplotlib/pylab).

It includes standalone scripts used by the catalog pipeline to perform likelihood analysis.

You can use it to:

- Get ft1 and ft2 data
- Produce Count Maps and aperture photometry light curves
- Perform source detection by PGWAVE
- Perform likelihood analysis and much more

It is currently used by FA as a common analysis tool that speeds up the analysis tasks and allows to use homogeneous criteria.

FA scripts can be found in (</afs/slac.stanford.edu/u/gl/tramacer/Script-iLat>).

Chuck Patterson is working on an excellent tutorial that will be soon available on the web.

Getting the data (3C454.3)

To get the ft1/2 data you can follow two ways:

- using the **getdcf** command :

```
ILAT>setdcdir /Data/Flight/Level1/LPA
```

To set the data repository.

```
ILAT>setwd ./
```

To set your working directory.

```
ILAT>getdcft 243756000.0 243772109.0 ft1.fits ft2.fits
```

OR

```
ILAT>getdcft 2008-09-28 00:11:06 2008-09-28 04:24:37 ft1.fits ft2.fits
```

All sky data (slower and waste disk space), you have to perform the event class selection later!

```
ILAT>setevtcl 2
```

```
ILAT>setft1 ft1_diffuse.fits
```

- using the command **getastroft1/getastroft2** :

```
ILAT>getastroft2 237859200.0 240451200.0 ft2.fits
```

```
ILAT>getastroft1 237859200.0 240451200.0 200 300000 343.4906163 16.1482111  
25 2 ft1_diffuse.fits
```

```
ILAT>setft1 ft1_diffuse.fits
```

Faster , you get only the ROI of sky you need, it returns FT1 file with event class selection already performed.

Parameters setting, and model definition

```
ILAT>setirfs P6_V1_DIFFUSE
```

You **must set the IRF** accordingly to the evtclass selection.

```
ILAT>setene 100 300000
```

Set energy boundaries in MeV.

```
ILAT>setroi 343.6566 16.1494 15 25
```

(RA,DEC, R1=roi rad, R2=src rad.)

```
ILAT>xmlmodel 0.5
```

To run a source detection for the ROI. It Looks for the sources therein and generates accordingly the xml model (likelihood analysis). The parameter sets pixel resolution;

```
gtselect infile=ft1_diffuse.fits outfile=region_0000_evt.fits .....
```

```
emin=100.0 emax=300000.0 evclsmin=0 evclsmax=10 convtype=-1
```

```
zmax=105.0.....
```

zenith angle cut

```
gtmktime scfile=ft2.fits sctable="SC_DATA"
```

```
filter="angsep(RA_ZENITH,DEC_ZENITH,343.657, 16.149)+
```

```
15.000<105.000" ..... generates GTIs to account for zenith angle cut
```

region_0000_pgw_map.list

#[ID]	[X]	[Y]	[RA]	[DEC]	[POS_ERR]	[SNR]	[K-signf]	[Counts]	[SigC]	[BKG]	[SigBkg]
1	24.0	25.0	343.9172	16.3992	0.833	4.404	5.419	33	7	5	8

Running the likelihood

ILAT>ltcube To generate the livetime cube.

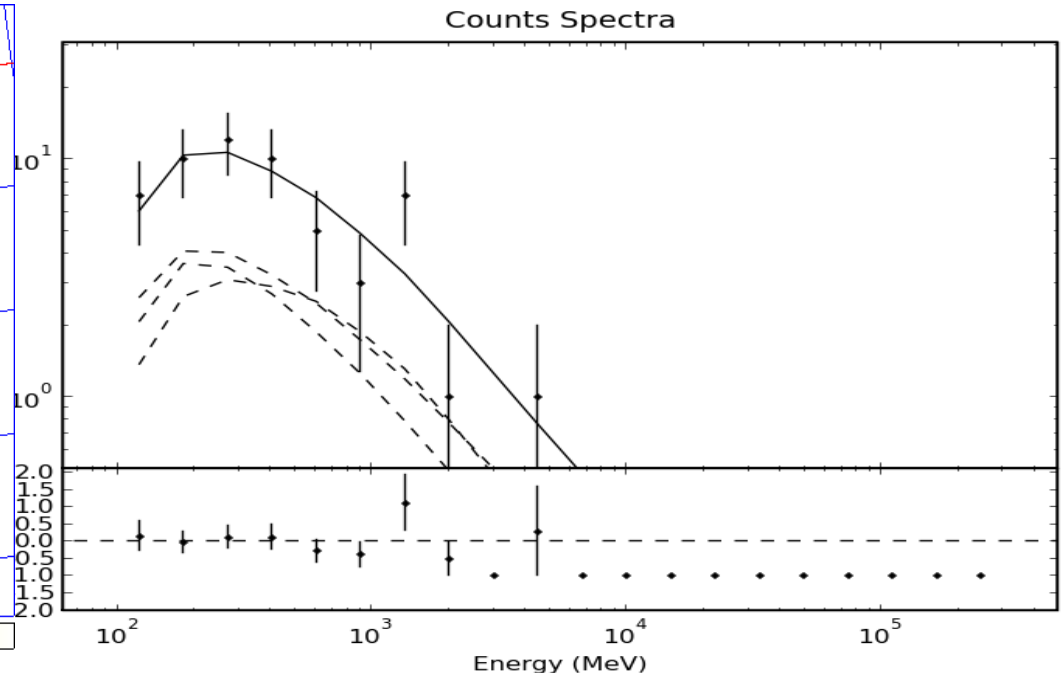
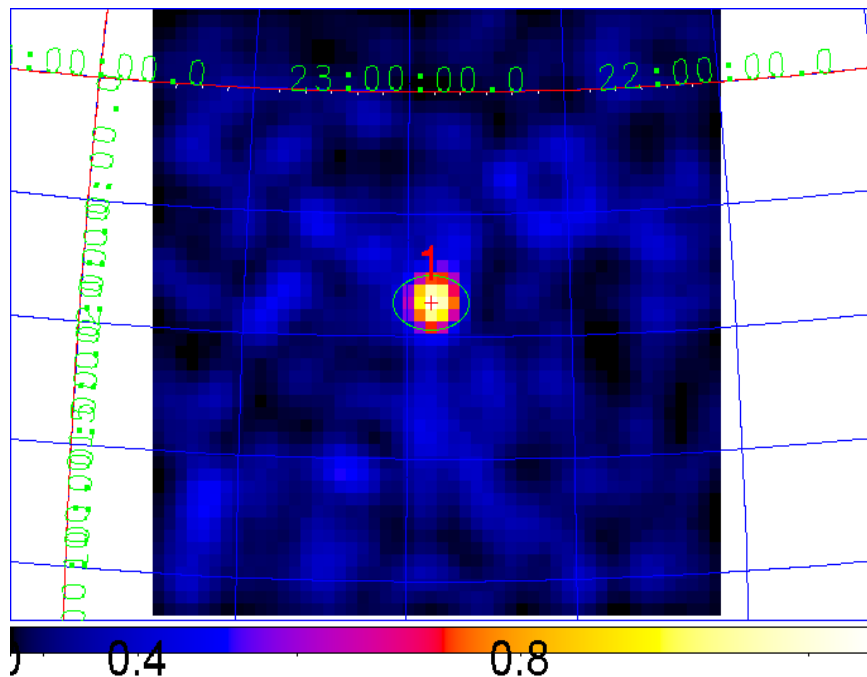
ILAT>diffuse To add the diffuse component

ILAT>expmap To generate the exposure map

ILAT>setulike region_0000_evt.fits expCube_0000.fits expMap_0000.fits
region_0000.xml

ILAT>ulike 3C454-like-results.dat

[PGW-src-ID	Tstart	Tstop	Emin	Emax	TS	Npred	Flux	error	index	error	U.L.]
PGW_0001	243760616.6	243772015.6	100.0	300000.0	64.28	16.999	2.62e-06	8.24e-07	-2.26	0.28	False



Conclusions

- iLat has many more options that allow to perform almost all the analyses you can do with the Science Tools.
- As general caveat, please never use this tool (or any tool) as a black box. Inspect step by step products, and look at the log messages. Check always the cmap, to be sure that your xlm model is taking into account all the sources in your ROI. Useful prescriptions for the likelihood analysis are given in the Jim's presentation at Sept. 2008 Collaboration Meeting:
<https://confluence.slac.stanford.edu/download/attachments/22743143/Likelihood>
- A smart way to use iLat is to generate scripts and then submit them to the farm. I developed several scripts at this regard (some used by FA). Currently I added also script to perform Xspec analysis of iLat data.
- If you need detailed informations about iLat and Science Tools, ask Gino and Jim (thanks to both for developing such a useful tool!!)