LoFASM Tools : Crawler usage examples

This quick start tutorial explains how to get started reading *.lofasm* data files.

Note: **The functions on this tutorial will be executed on the example file that is included in this repository as *testdata/20150323_033624.lofasm*.**

LoFASM imports

```
from lofasm import parse_data as pdat
```

Opening the *.lofasm* file

```
#instantiate the crawler instance
crawler = pdat.LoFASMFileCrawler('20150323_033624.lofasm')

#parse file header and move pointer to first integration
crawler.open()
```

Print file header

```
print crawler.getFileHeader()
```

This will print the file header dictionary which is described by the following table.

Field name	Note/Unit
hdr_sig	
hdr_ver	file header version
hdr_len	length of file header in bytes
station	LoFASM station

Field name	Note/Unit
Nbins	number of frequency bins. this will read 2048 but only the first 1024 are usable at the moment
fstart	MHz, start frequency
fstep	fractional MHz, '097' should be interpreted as '0.097 MHz'
mjd_day	integer mjd date
mjd_msec	ms, time after beginning of mjd date in milliseconds
int_time	integration time in seconds
Dfmt_ver	version of data format
notes	notes on observation

Print data start time mjd

```
print crawler.time_start
```

Times are stored as astropy time objects.

Print time of current integration

It is possible to print out the timestamp for each integration as the crawler moves through a LoFASM file.

```
#print timestamp for current integration (mjd)
print crawler.time

#print timestamp in datetime format
print crawler.time.datetime.strftime("%Y/%m/%d %H:%M:%S")

#print how much time (in seconds) has passed since the beginning
#of the file
print (crawler.time - crawler.time_start).sec
```

Print integration time (TimeDelta object)

```
print crawler.int_time
```

Set polarization

If only one polarization is going to be used in a script then it is convenient to set it only once. Once the polarization is `set` then all subsequent calls to `crawler.get()` will return data corresponding to the selected polarization. It is possible to change the default polarization at any time.

```
crawler.setPol('AA')
```

Get spectrum

The current integration's spectrum can be accessed by using the `get` method. `crawler.get` will return a numpy array containing a single spectrum in the polarization requested by `crawler.set`.

```
fb = crawler.get()
```

Plot spectrum

A spectrum can be plotted on a log10 scale using matplotlib and numpy.

```
from lofasm import parse_data as pdat
import matplotlib.pyplot as plt
import numpy as np

freqs = pdat.freqRange()
plt.plot(freqs,10*np.log10(fb))
plt.show()
```

Navigate in time by integrations

It is possible to move to different integrations within a file by using the `forward` and `backward` methods.

```
#move forward 1 integration
crawler.forward() # or crawler.forward(1)

#move forward 10 integrations
crawler.forward(10)

#move backward 1 integration
crawler.backward() #or crawler.backward(1)

#move backward 10 integrations
crawler.backward(10)

#move backward 15 integrations using forward
crawler.forward(-15)
```