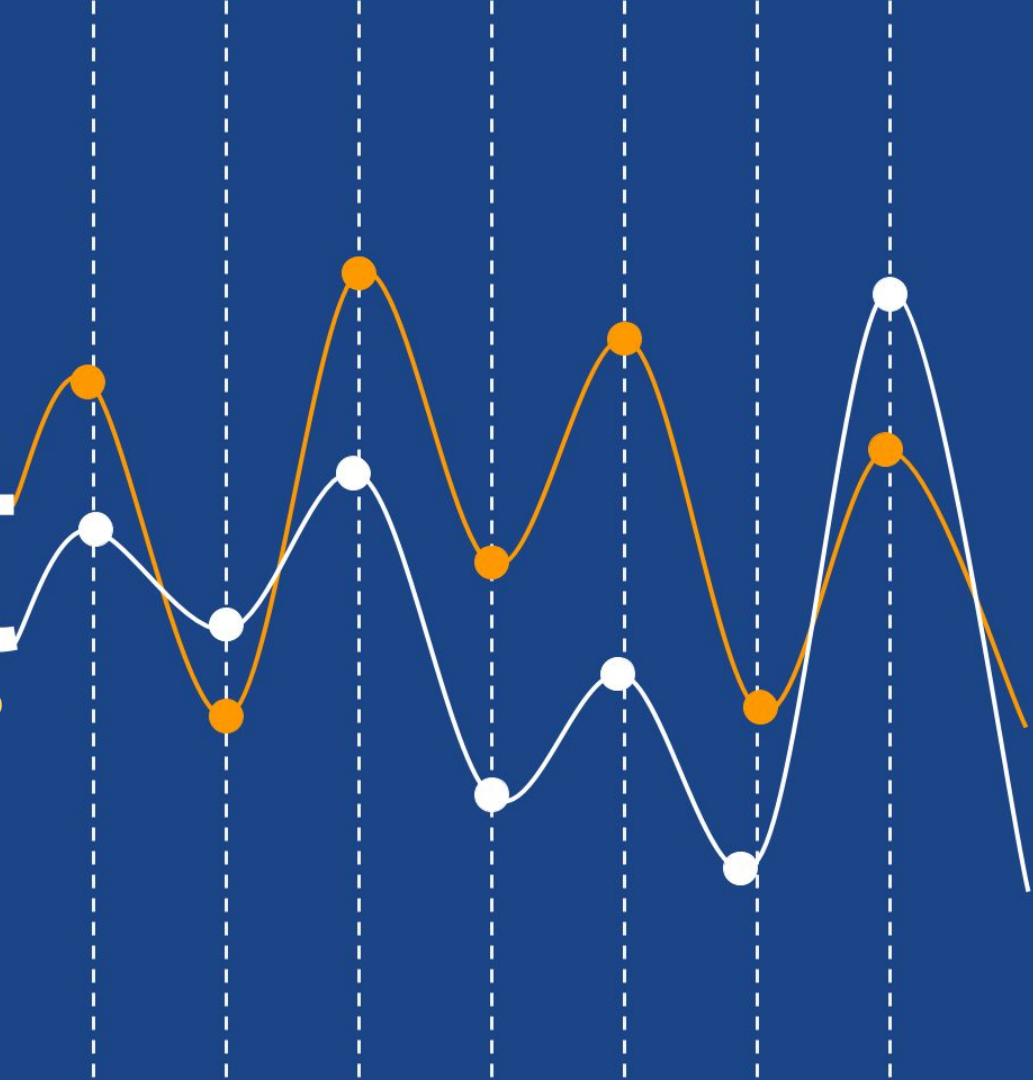


Curvfit

An open-source Python package to generate light curves from UVIT data



Visit

<https://github.com/prajwel/curvit>

Installation

```
pip install curvit
```

Requirements

- Python 3.6 or higher
 - Astropy
 - Matplotlib
 - Numpy
 - Photutils
 - Scipy
-

UV variability studies with UVIT

- Lots of data is in the public domain.
- Submit a new proposal!
- A time resolution of ~ 66 msec.
- Even higher time resolution is also possible.

**Curvit paper is published
on JAA (AstroSat
Special issue)**



Required input FITS file
UVIT L2 events list

Two main functions

makecurves

Automatically detects sources in the events list, creates light curves for all of them.

curve

If you have a single source of interest of known coordinates, use this function.

Both functions can do automatic background estimation, aperture correction, & saturation correction.

Curvit workflow

UVIT L2 events list

**Get the data from ISSDC
Astrobrowse**

UVIT L2 data is available from the Astrobrowse website.

makecurves

**Identify and study
sources of interest**

The automatic source detection and light curve generation will help to identify interesting sources.

curve

Study sources of interest

To extract the light curve for a single source.

makecurves example run

```
import curvit
curvit.makecurves(events_list = 'AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.fits.gz',
                  background = 'auto')
```

Detected source coordinates saved in file:

* sources_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.coo

Detected sources are plotted in the image:

* sources_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

The estimated background CPS = 0.00332 +/-0.00066

----- light curves -----

* makecurves_2636.71_907.91_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

* makecurves_3867.99_1656.64_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

* makecurves_3395.27_1886.3_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

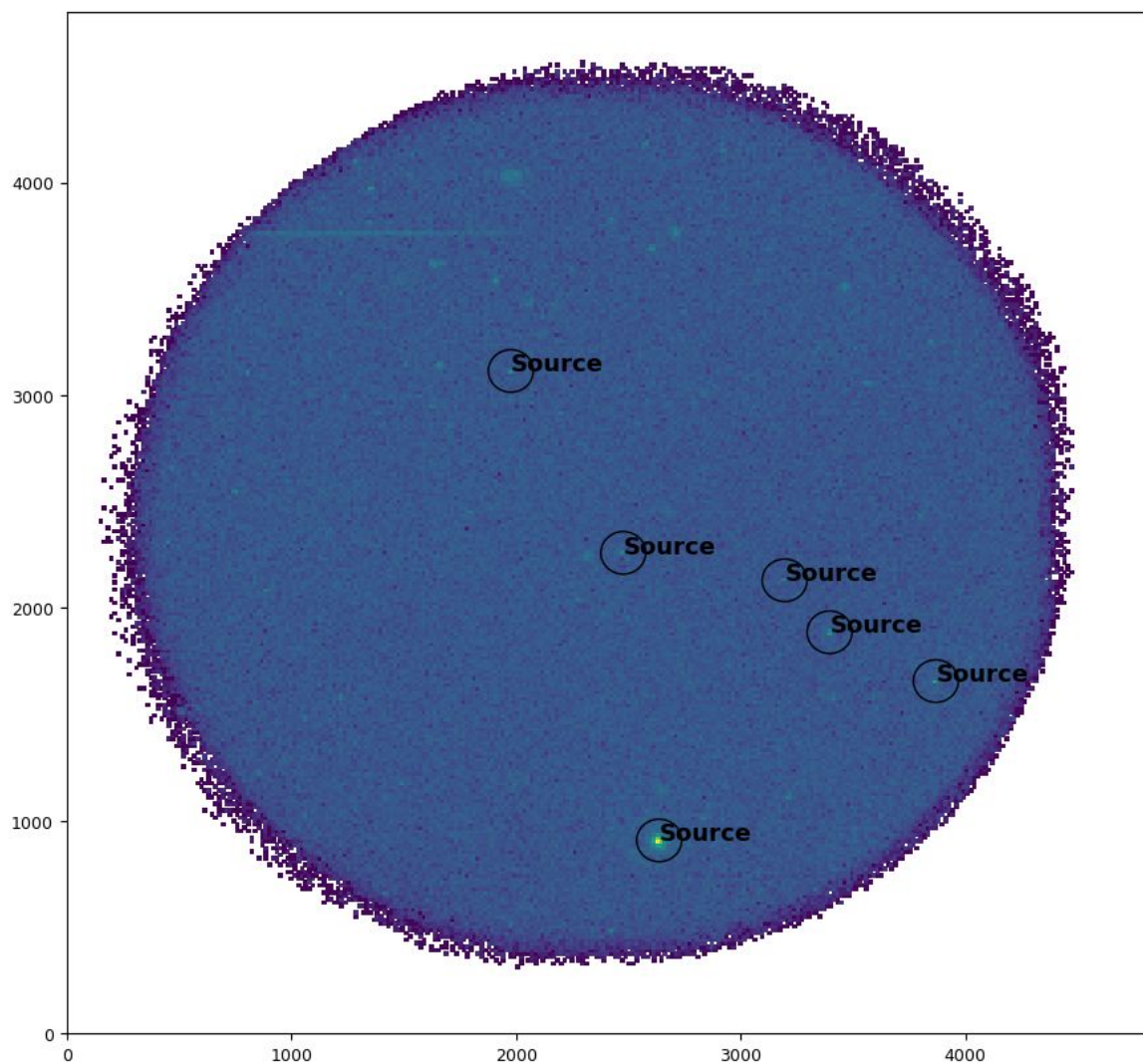
* makecurves_1977.13_3114.44_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

* makecurves_2477.12_2259.5_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

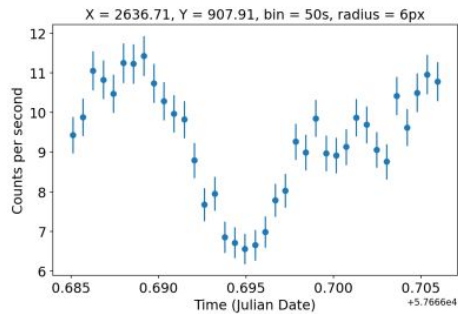
* makecurves_3195.29_2130.41_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png

Done!

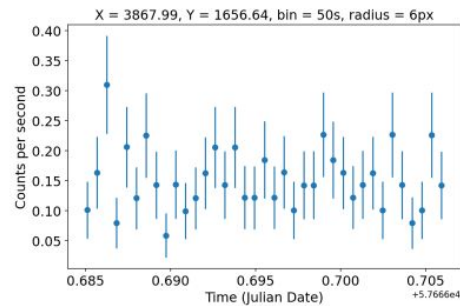
—
makecurves
example run



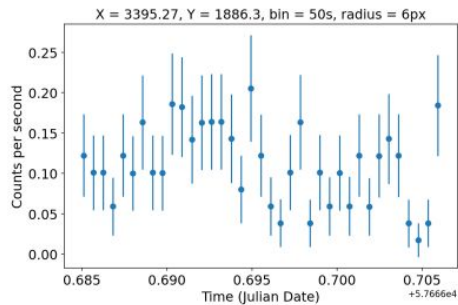
makecurves example run



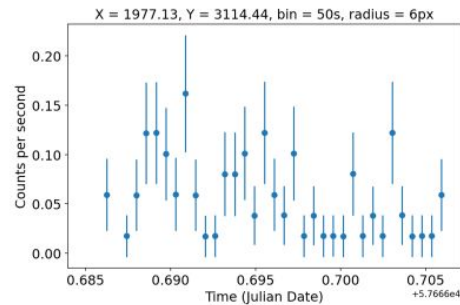
(a)



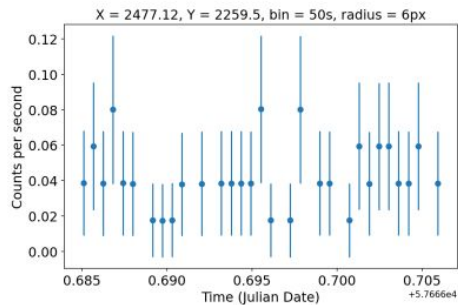
(b)



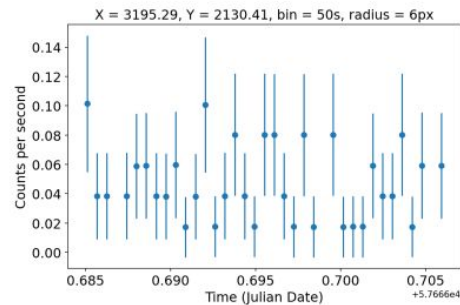
(c)



(d)



(e)



(f)

curve example run

```
curvit.curve(events_list = 'AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.fits.gz',  
             xp = 2636.71, yp = 907.91,  
             radius = 10,  
             bwidth = 25,  
             background = 'auto')
```

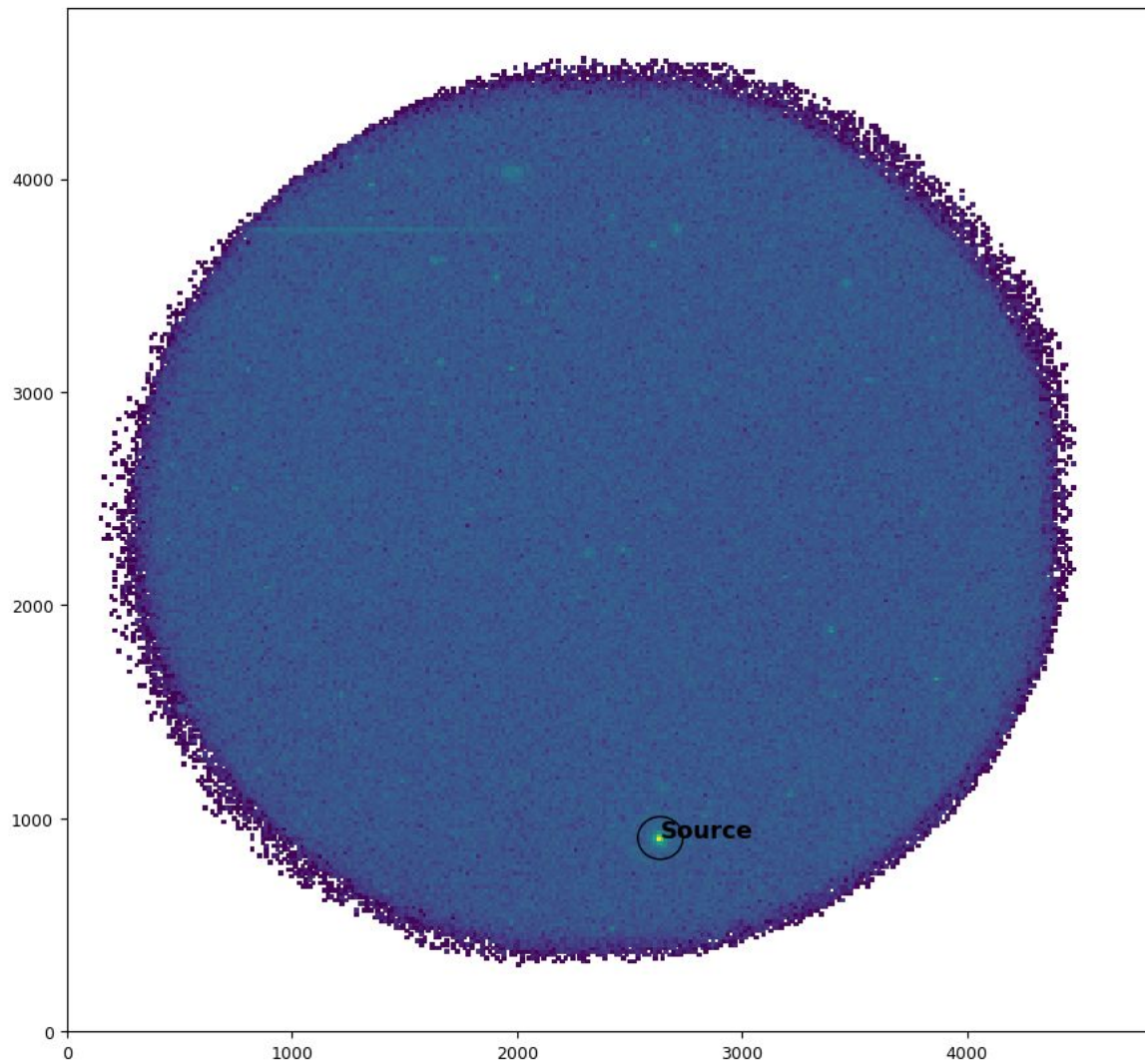
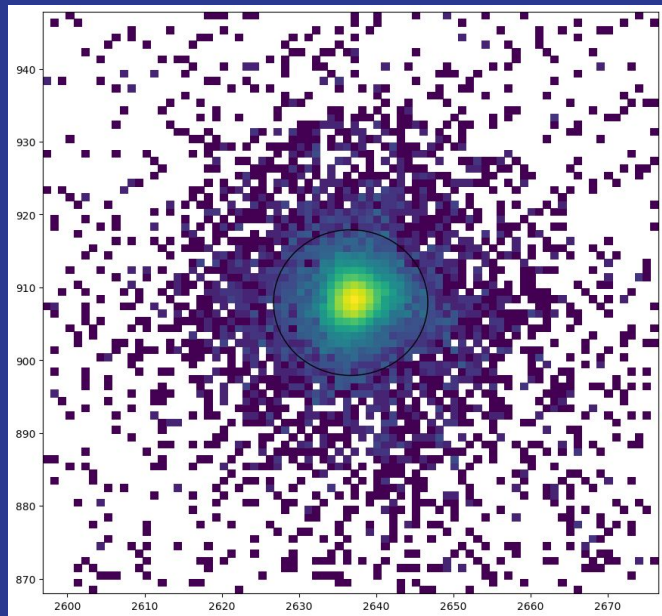
The estimated background CPS = 0.00329 +/-0.00066

```
----- curve -----  
source: source_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png  
        source_zoomed_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png  
data: curve_2636.71_907.91_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.dat  
plot: curve_2636.71_907.91_AS1G06_084T01_9000000710uvtFIIPC00F1_l2ce.png
```

Done!



curve
example run



curve example run

