UTGO pySIS Guide

If you would like to perform difference imaging for microlensing with an 'industry standard' code, then pySIS may be for you! Here is the guide for using pySIS with Harlingten 50cm data.

To start, we need to do some formatting and manipulation of our files to be compliant with the PySIS pipeline. Copy your reduced images to the **'/home/obs/Pysis_3.1'** folder into a new sub-folder (maybe named with your target ID). Then, type:

cd UTGO_Pipeline/Utils

python prep4pysis.py [path2images] [prefix] [verbose]

The prefix is a 9-character string for renaming files to be PySIS compliant. This will separate the files into 2 folders called 'Left' and 'Right' to indicate the side of meridian they are on (arbitrary). Then, the script will flip one set of images to match the other and copy the remaining files to a final folder 'All'. You can then proceed to run PySIS from this 'All' folder. To do this, type:

cd [path2Allfolder]

../../bin/reduce4 -e [Prefix+LeadingZeros] -s Squid -l ds9

This will commence the PySIS photometry process. The first step in the photometry is creating a reference image, which is usually a stack of the best seeing and low background images (of similar exposure time). However, the automated choice of the best frames seems to fail more often than not, due to light cloud making the image seem to have better seeing than it really does. I therefore recommend opening the seeing file and choosing manually. You will then enter the selection images as space separated list.

Then, the images will be registered (i.e shifted and transformed to have the same x,y coordinate between all frames). You will then choose the ‘lens’ position, which is the position of your target on the frame (this comes from microlensing terminology). You will need to open one of the ‘_interp.fits’ images via DS9 to get the coordinates.

Now you can sit back as the magic happens. The pipeline will now perform image subtraction, create a PSF model from your images and then perform aperture and PSF photometry on the difference images to get relative photometry of your target. The photometry is outputted to the files ‘[object_id].report’ and ‘[object_id].pysis’. The difference images are labelled ‘conv_[object_id].fits’. Ask JP for more information about the other outputs within the folder.

Summary:

1. Copy reduced images into a new subfolder in the **‘/home/obs/Pysis_3.1’** directory.

2. Run ‘prep4pysis.py’ on this subfolder.

3. Now change directory to the newly made ‘All’ subfolder inside the original.

4. Start PySIS pipeline.

5. Use DS9 to choose images for the reference.

6. Use DS9 to find the x,y coordinates of the lens on an ‘interp’ image.

7. Profit???