

PDS Data Review

LCO Data

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document_lco

LCO SIS

- Las Campanas Observatory SIS support documents for
 - Magellan Baade 6.5m
 - Inamori-Magellan Areal Camera & Spectrograph (IMACS)
 - Swope 1m telescopes
 - Facility 4K CCD camera
- SIS describes the three data products
 - Raw Image data (FITS files)
 - Reduced and calibrated image data (FITS files)
 - Only include Didymos data
 - Bias subtracted, Flat fielded and trimmed
 - Astrometric WCS included
 - Remain in units of DN (On-field stars used to calibrate photometry)
 - Photometry tables (ASCII Tables)
- SIS Generally looks good
 - No separate table for IMACS calibrated data FITS headers ?
 - **One residual comment field on page 10**

data_lcoimacsraw

data_lcoimacscal

IMACS Raw & Calibrated Images

- Overview files
 - Present a short summary of the IMACS info from the SIS
- Raw data: FITS images with detached XML labels
 - 1088 x 2112 pixels
 - 1527 images in 4 directories (by date)
 - 27 Twilight flats
 - 76 Dome flats
 - 1424 Didymos images
- Calibrated data: FITS images with detached XML labels
 - 1023 x 2050 pixels
 - 1424 images in 4 directories (by date)
 - 1424 Didymos images
 - WCS added to each frame

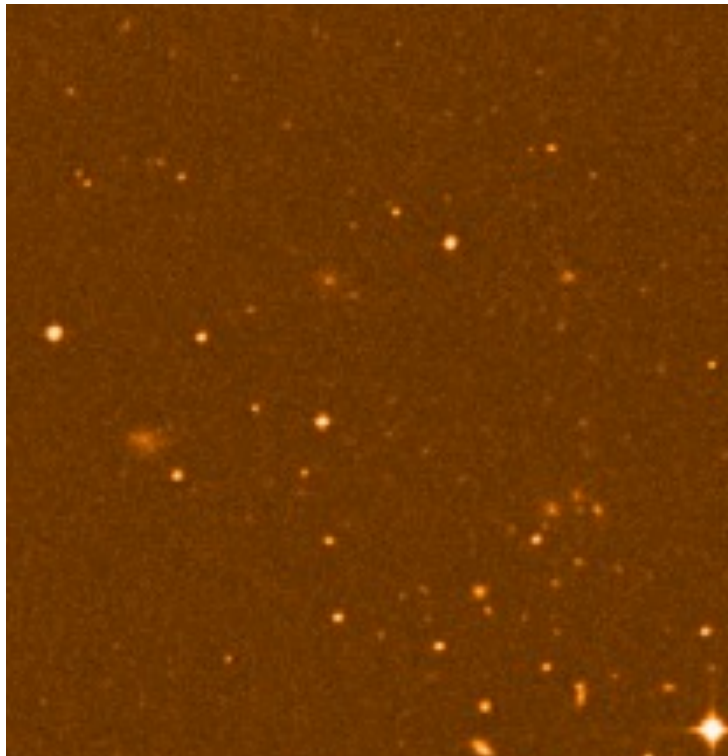
IMACS Image Data

- Data are in good shape
 - Read with IDL FITS readers and PDS_READ
 - Read and displayed every image
- Tested to make sure data could be manipulated and measured
- Files are consistent between the raw and calibrated datasets
- Spot-checked:
 - XML Label information
 - Just contains basic info
 - **Orientation problem**
 - Confirmed (against Gaia DR2) that the calibrated data do contain WCS
- Did not try to reproduce the photometric measurements
 - Done using field stars, which I am not set up to do right now



Image Orientation

- Image is flipped diagonally when displayed as described in the label



DSS frame

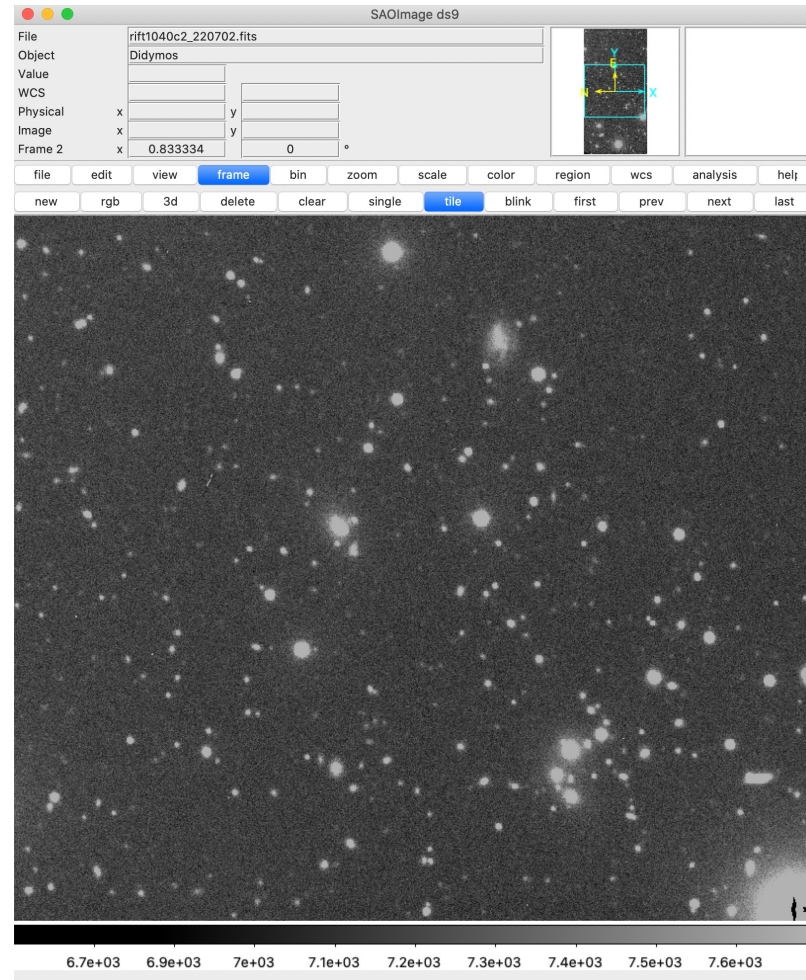


Image rift1040c2_220702

data_lcoimacsddp

IMACS Photometry

- Overview file
 - Short summary of the data reduction and photometry measurements
 - Explicitly define the photometric system of the photometry
 - Sloan-r?, converted to R?

Julian date: Julian date at middle of exposure

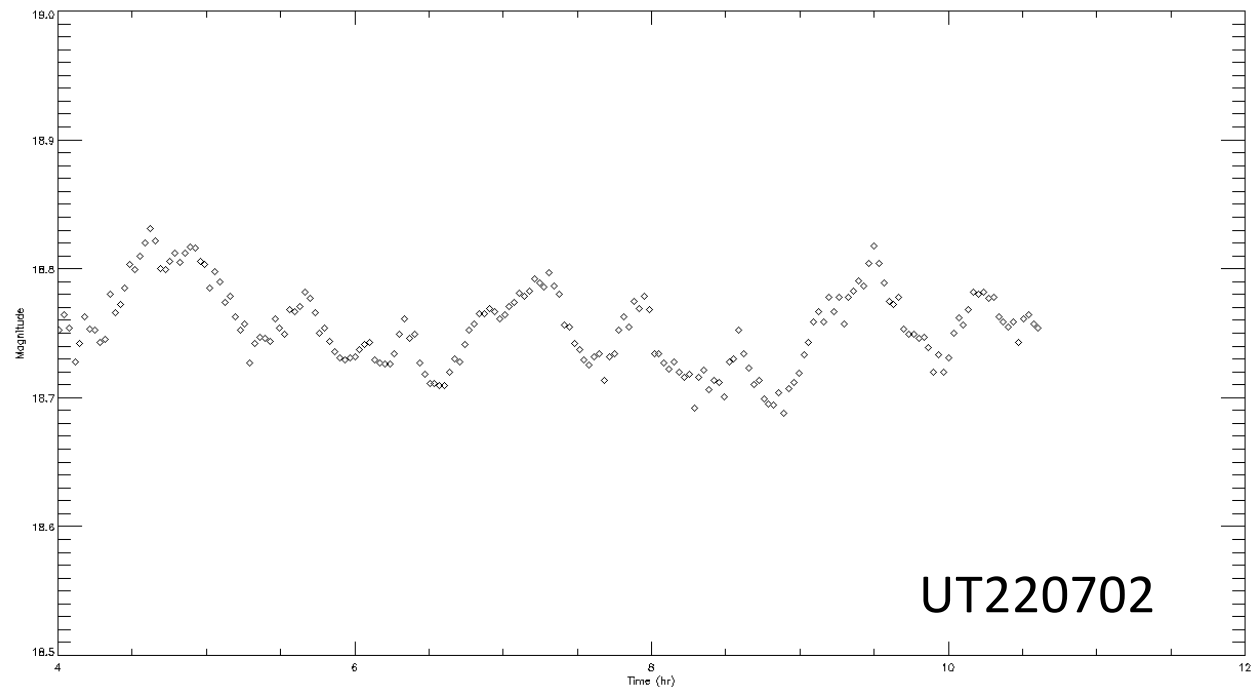
Magnitude: Calibrated magnitude estimate, unitless

Uncertainty: Instrumental magnitude uncertainty, unitless

Flag: Binary flag to mark discrepant data. 0 = discrepant, 1 = non-discrepant.

Filename: File name of the calibrated image where data were measured

- Data: 4 tables of photometry from 4 dates (ASCII)
- Data look like Didymos lightcurves
- Are aperture sizes recorded anywhere?



data_lcoswooperaw

data_lcoswopecal

Swope Raw & Calibrated Images

- Overview files
 - Present a short summary of the Swope info from the SIS
- Raw data: FITS images with detached XML labels
 - Raw images are broken into 4 files, each from a different amplifier
 - 2176 x 2184 pixels
 - 36128 images in 20 directories (by date)
 - 372 Twilight flats
 - 812 Dome flats
 - 34944 Didymos images
- Calibrated data: FITS images with detached XML labels
 - Data from 4 amplifiers are rejoined into one image
 - 4112 x 4096 pixels
 - 8734 images in 20 directories (by date)
 - 8734 Didymos images (two missing)
 - WCS added to each frame

Swope Image Data

- Data are in good shape
 - Read with IDL FITS readers and PDS_READ
 - Read and displayed every image
- Tested to make sure data could be manipulated and measured
- Spot-checked:
 - XML Label information
 - Just contains basic info
 - **Orientation problems**
 - Confirmed (against Gaia DR2) that the calibrated data do contain WCS
- Did not try to reproduce the photometric measurements

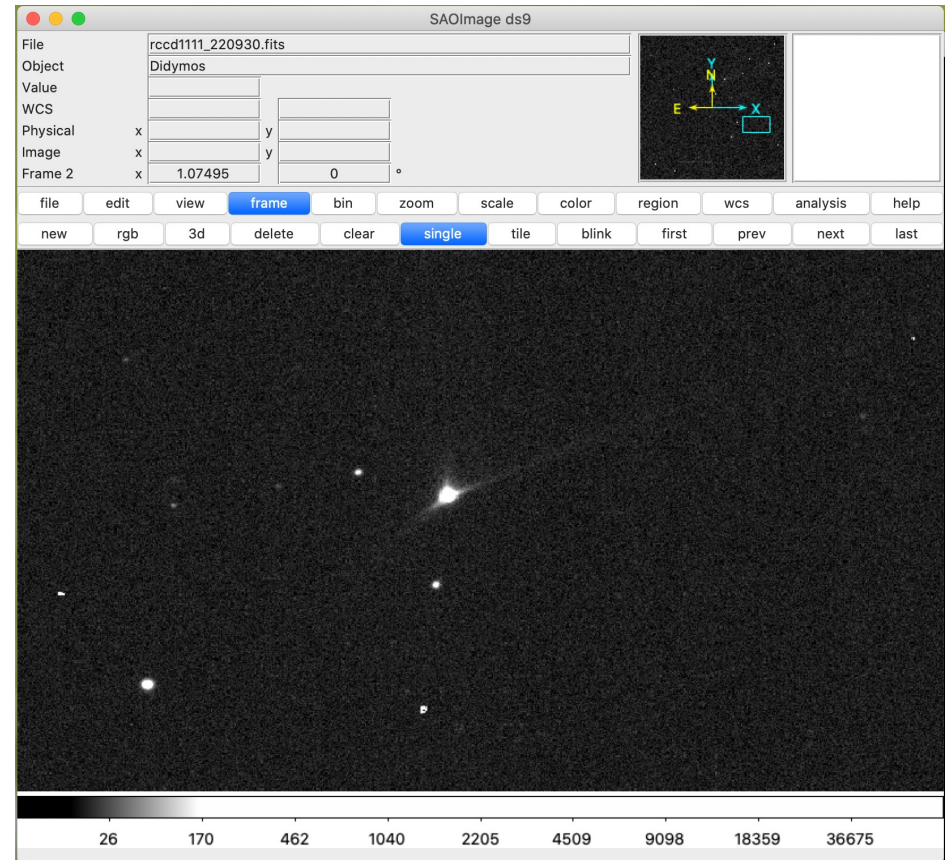
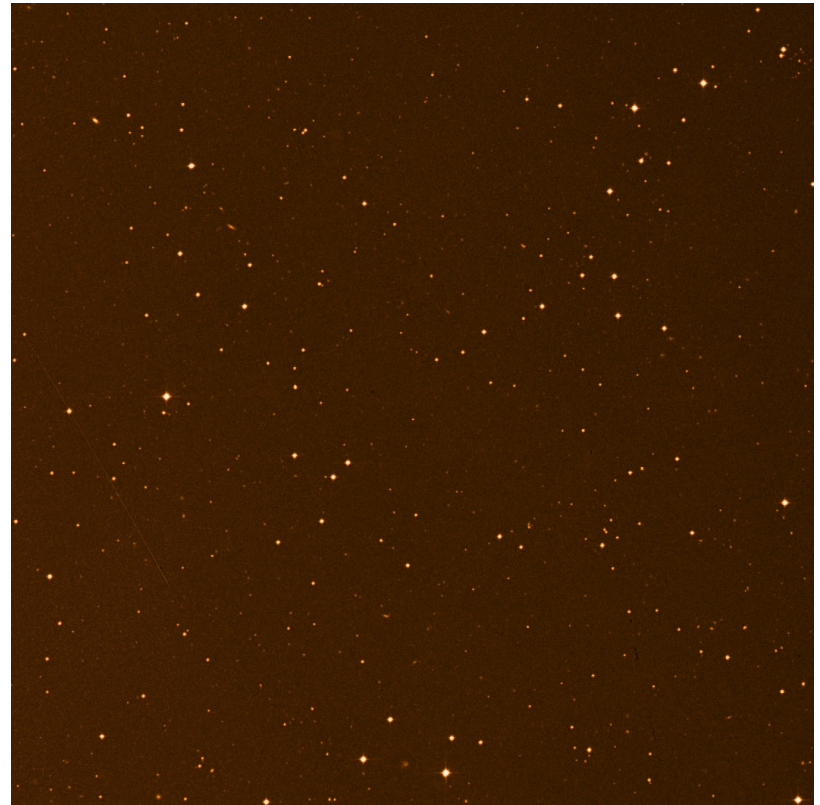


Image Orientation

- Calibrated images are ok
- Image displayed according to the XML header display parameters matches Sky Survey image



Image rccd1010_220825



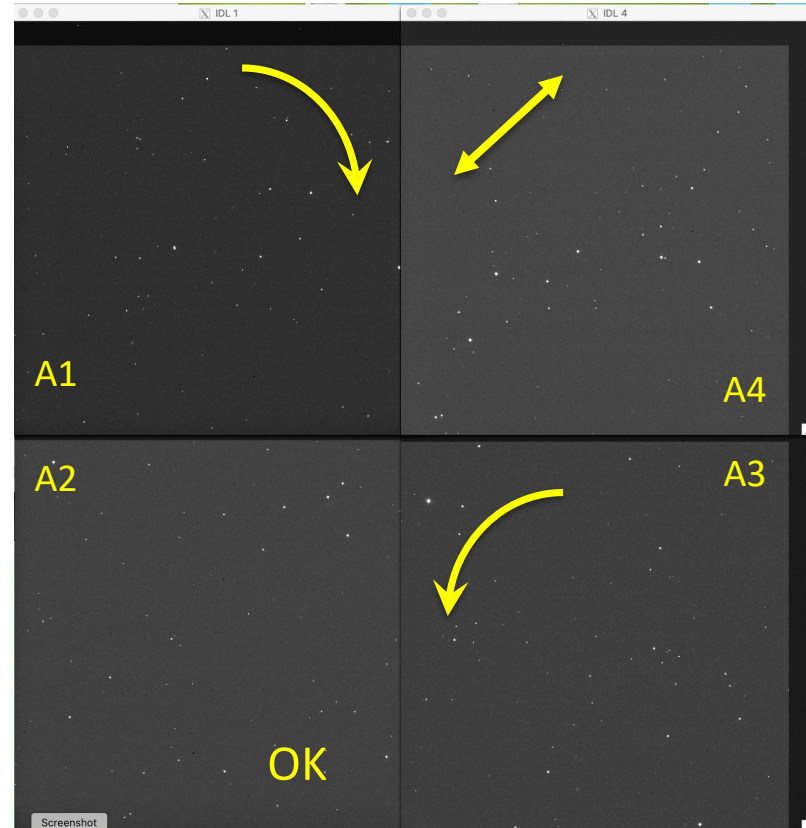
DSS field, N up, E left

Image Orientation

- Raw image quadrants don't match sky orientation
 - line_display_direction and sample_display_direction need to be corrected for each quadrant image?
 - Or each extension needs properly flipped/rotated



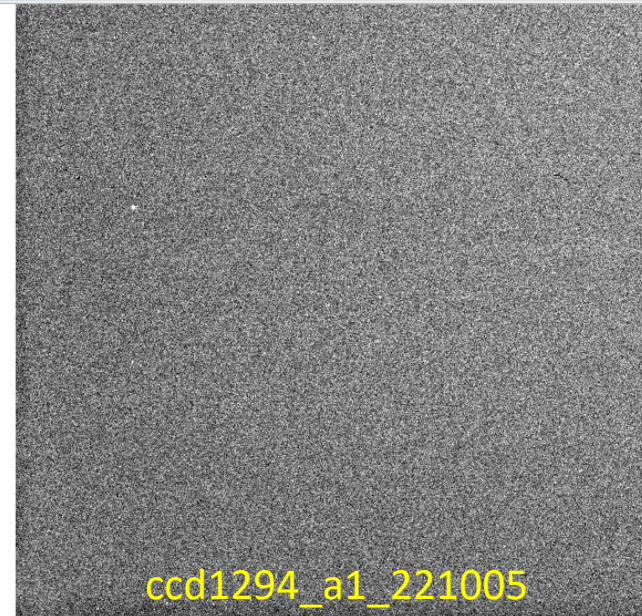
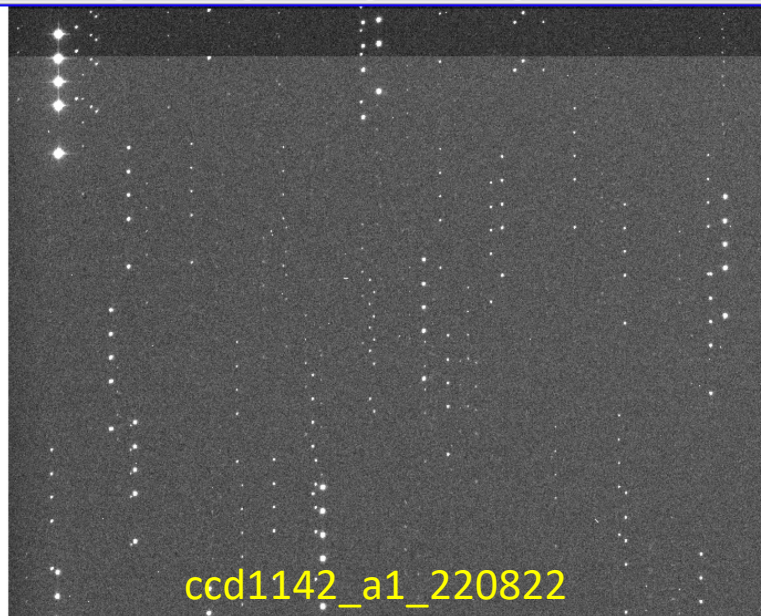
Image rccd1010_220825



Same frame in raw data quadrants

Missing calibrated files

- Two raw frames are not in calibrated data
 - ccd1142_a1_220822
 - Looks like focus mode ?
 - ccd1294_a1_221005
 - Not obvious why it is not included
- Add the frames or document that why are not included



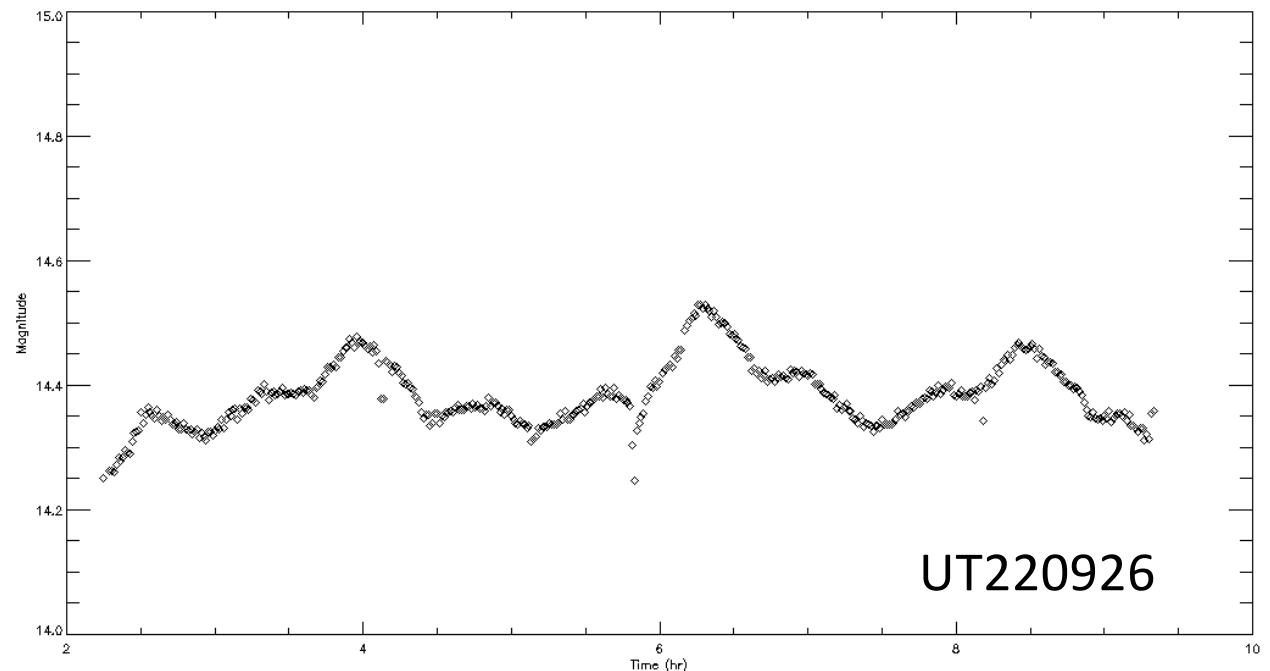
data_lcoswopeddp

SWOPE Photometry

- Overview file
 - Short summary of the data reduction and photometry measurements
 - Explicitly define the photometric system of the photometry
 - Sloan-r?, converted to R?

```
Julian date: Julian date at middle of exposure  
Magnitude: Calibrated magnitude estimate, unitless  
Uncertainty: Instrumental magnitude uncertainty, unitless  
Flag: Binary flag to mark discrepant data. 0 = discrepant, 1 = non-discrepant.  
Filename: File name of the calibrated image where data were measured
```

- Data: 20 tables of photometry from 20 dates (ASCII)
- Spot-checked: Data look like Didymos lightcurves
- Are aperture sizes recorded anywhere?



LCO Issues

- Need to address image orientation issues
- Small error in SIS
- Could use some more discussion / listing of aperture sizes
- Should specify magnitude system of the photometry
- 2 files “missing” from calibrated data

Data are not certifiable