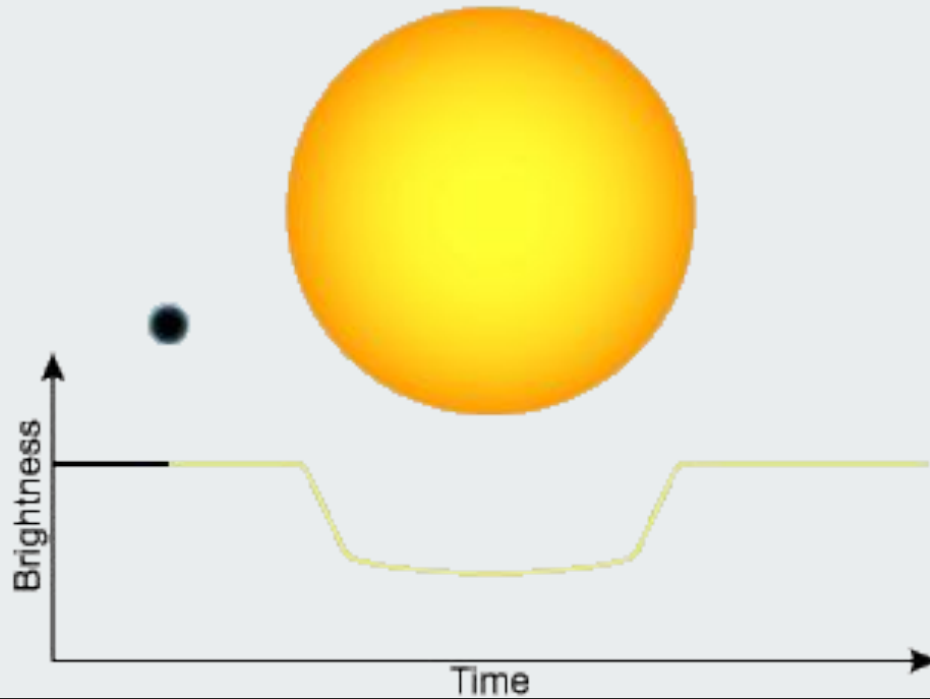


Amateur Exoplanet Observing



Light Curve of a Star During Planetary Transit

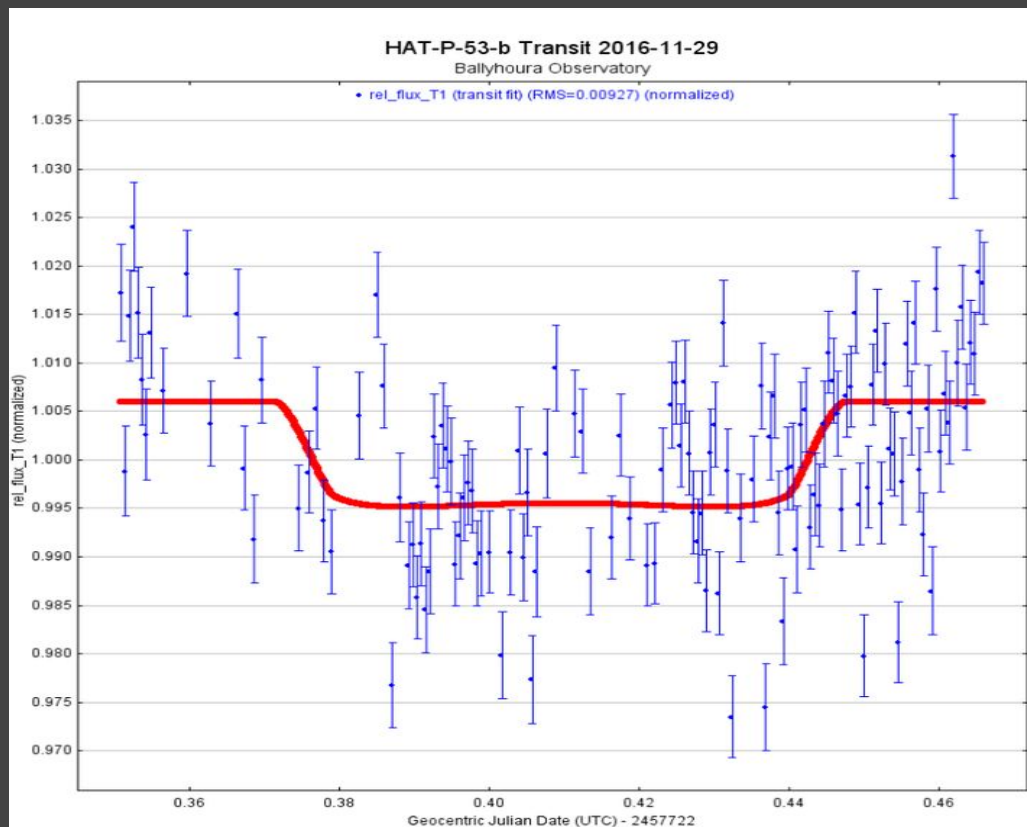


Exoplanet Transits

As seen from North Cork

Using:
Celestron C11
ATIK 383L+ ccd camera

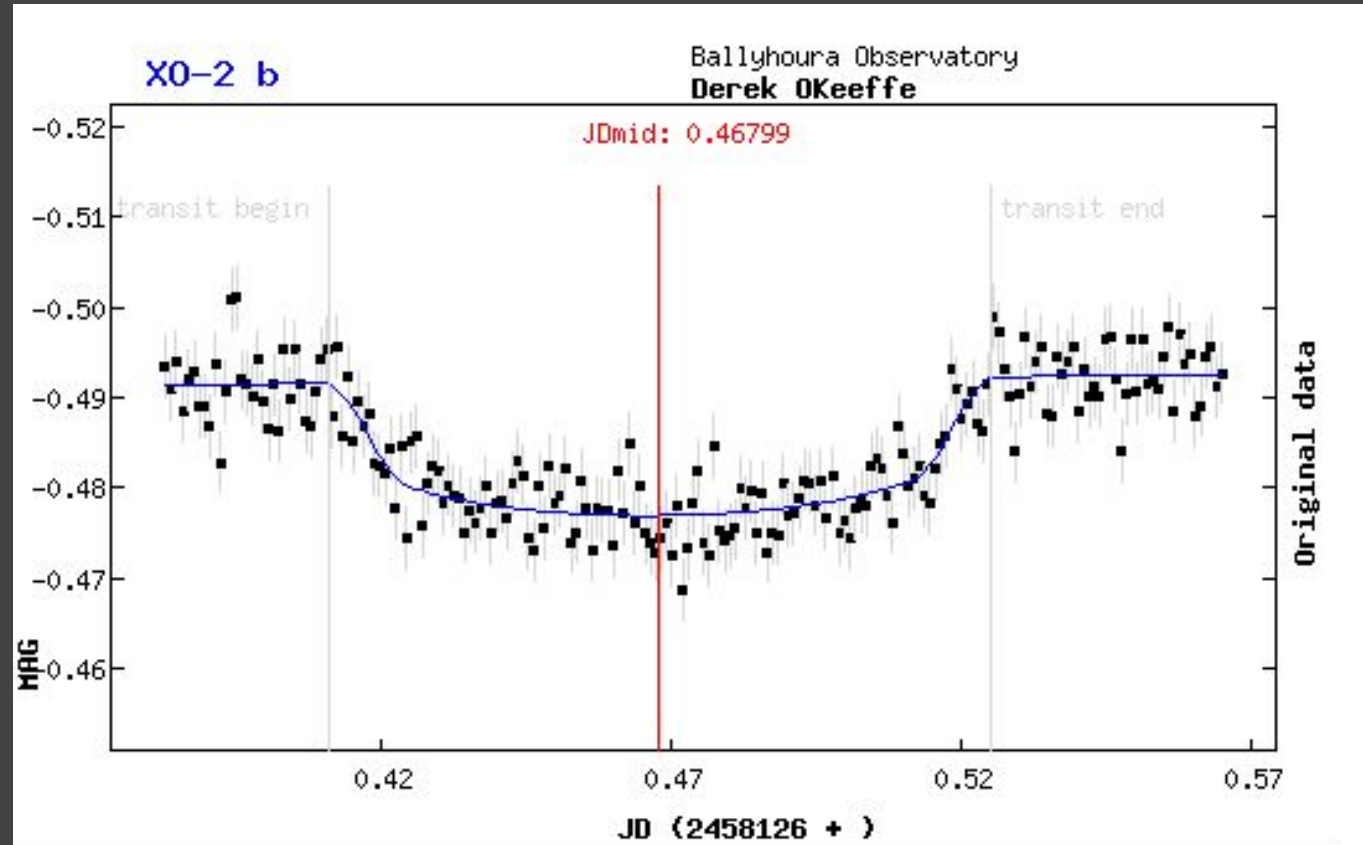
HAT-P-53b



Exoplanet Transits

As seen from North Cork

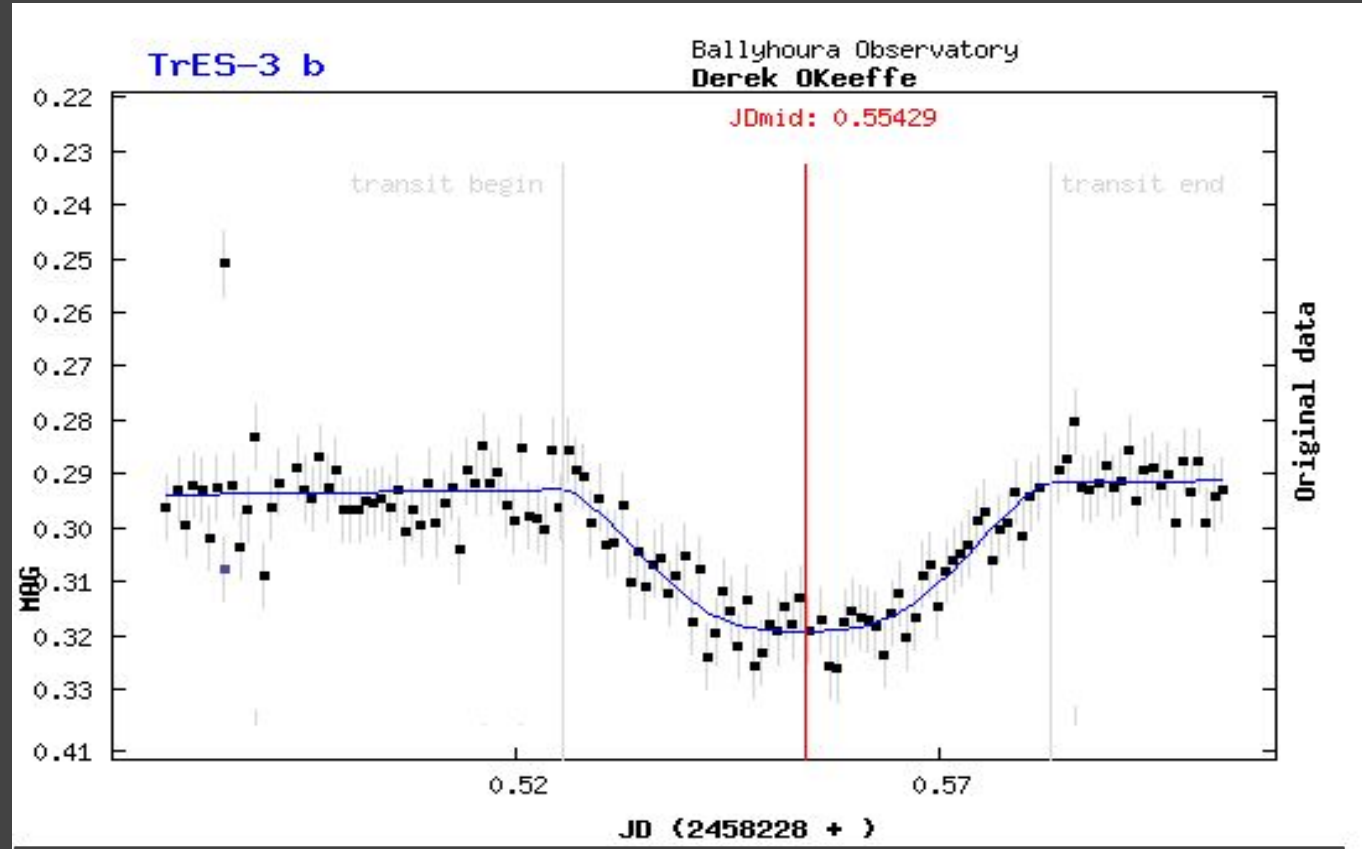
XO-2 b



Exoplanet Transits

As seen from North Cork

TrES-3 b



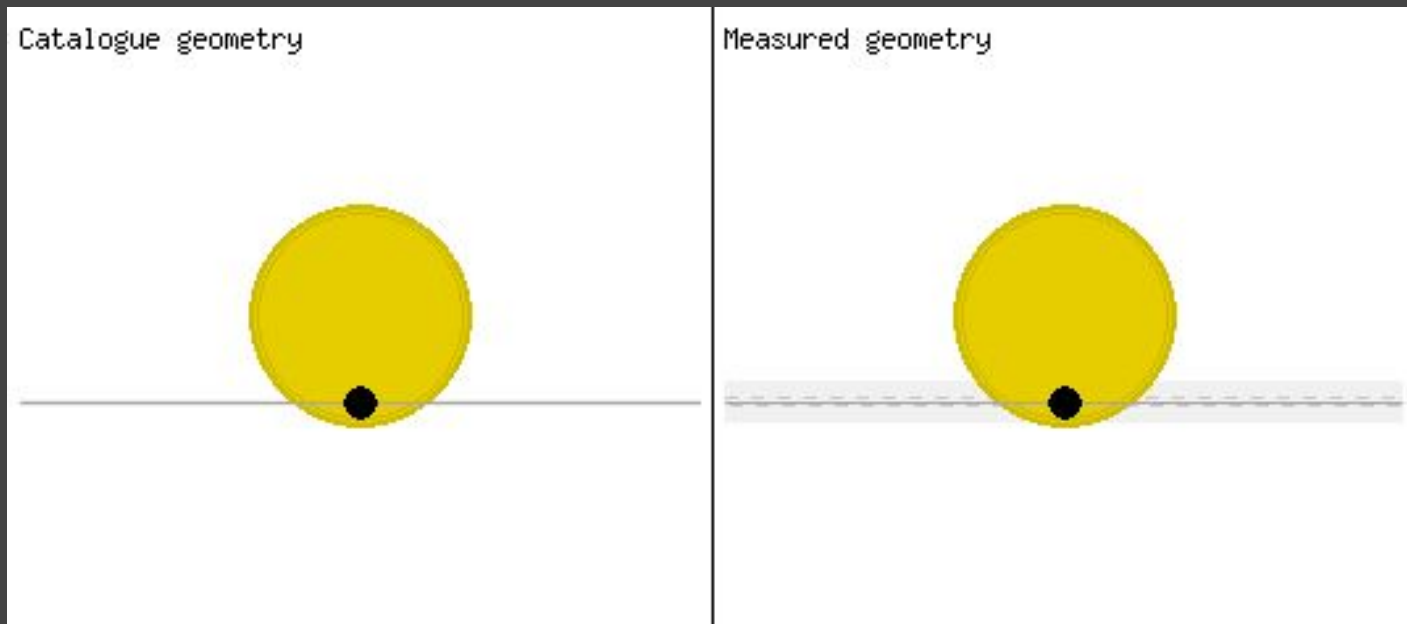
Exoplanet Transits

As seen from North Cork

TrES-3 b

Orbit

Measured



How-To Guide



1. Automation
2. Data Collection
3. Data Reduction

1 Automation



INDI Open Astronomy
Instrumentation



2 Data Collection



1. Plan a target : ETD website
2. >0.01 mag dip
3. Above 30deg altitude
4. Create a schedule 200 x 60sec images
5. Start schedule and go to bed!!

2 Data Collection

ETD website

Transits predictions for ELONGITUDE: -8° and LATITUDE: 52°

OBJECT	BEGIN (UT/h,A)	CENTER (DD.MM. UT/h,A)	END (UT/h,A)	D (min)	V (MAG)	DEPTH (MAG)	Elements Coords
XO-2 b	Lyn 20:44 56°,W	10.05. 22:05 45°,NW	23:26 35°,NW	162	11.18	0.0124	54466.88454+2.61586178°E RA: 07 48 07 DE: +50 13 33
WASP-58 b	Lyr 20:25 26°,NE	10.05. 22:19 41°,NE	0:13 57°,E	227.81	11.66	0.0156	55183.9335+5.01718°E RA: 18 18 48.25 DE: +45 10 19.1
TrES-3 b	Her 22:16 39°,E	10.05. 22:55 45°,E	23:34 51°,E	77.4	12.4	0.0291	54538.58069+1.30618608°E RA: 17 52 07 DE: +37 32 46
Kepler-20 c	Lyr 22:56 37°,NE	11.05. 1:02 55°,E	3:08 74°,SE	252	12.5	0.0011	54971.60758+10.854092°E RA: 19 10 48 DE: +42 20 19
HAT-P-23 b	Del 0:10 18°,E	11.05. 1:15 28°,E	2:21 38°,SE	130.75	12.43	0.0076	54852.26464+1.212884°E RA: 20 24 29.73 DE: +16 45 44.3
WASP-38 b	Her 23:20 41°,SE	11.05. 1:40 49°,S	4:00 39°,SW	279.8	9.4	0.0108	55335.9205+6.871815°E RA: 16 15 50.38 DE: +10 01 57.70
KOI 0135 b	Lyr 0:31 54°,E	11.05. 1:59 68°,E	3:27 81°,SE	175.6	13.958	0.0080	54965.4159+3.024095°E RA: 19 00 57.82 DE: +46 40 05.88
WASP-103 b	Her 1:03 38°,S	11.05. 2:20 38°,S	3:38 34°,SW	155.58	12.1	0.0129	56459.59957+0.925542°E RA: 16 37 15.57 DE: +07 11 00.07

2 Data Collection

INDI Scheduler

The screenshot shows the Ekos - KStars interface with the INDI Scheduler configuration. The target is KIC 08462852. The sequence is /x/EkosSequences/imaging/photometry/5x60PV.esq. The priority is 10 and the profile is Default. The steps are Track, Focus, Align, and Guide, all of which are checked and circled in red. The job startup conditions are set to ASAP. The job constraints include Alt > 40.00, Moon > 15.00, and Weather checked (circled in red). The job completion conditions are set to Sequence completion. The observatory startup procedure includes UnPark Dome, UnPark Mount, and UnCap. The observatory shutdown procedure includes Warm CCD, Cap, Park Mount, and Park Dome (circled in red). The script paths are /home/dokeffe/code/github/bh-observatory/operations/ekos/schedulerStartup.sh and -observatory/operations/ekos/schedulerShutdown.sh.

Object & Sequence Selection

Target: * KIC 08462852

J2000: RA 20h 06m 15s DEC 44° 27' 24"

FITS File:

Sequence: * /x/EkosSequences/imaging/photometry/5x60PV.esq

Priority: 10

Profile: Default

Steps:

- Track
- Focus
- Align
- Guide

	Name	Status	Start Time	End Time	Est. Duration
1	AG Dra	Idle			
2	KIC 08462852	Idle			
3	V2492 Cyg	Idle			
4	V2500 Oph	Idle			
5	DDE 48	Idle			
6	V1117 Her	Idle			
7	MASTER OT J1...	Idle			

Job Startup Conditions

- ASAP
- Culmination Offset -60
- On 12/05/18 16:4

Job Constraints

- Alt > 40.00
- Moon > 15.00
- Twilight
- Weather

Job Completion Conditions

- Sequence completion
- Repeat for 0 runs
- Repeat until terminated
- Repeat until 12/05/18 16:4

Observatory Startup Procedure

- UnPark Dome
- UnPark Mount
- UnCap

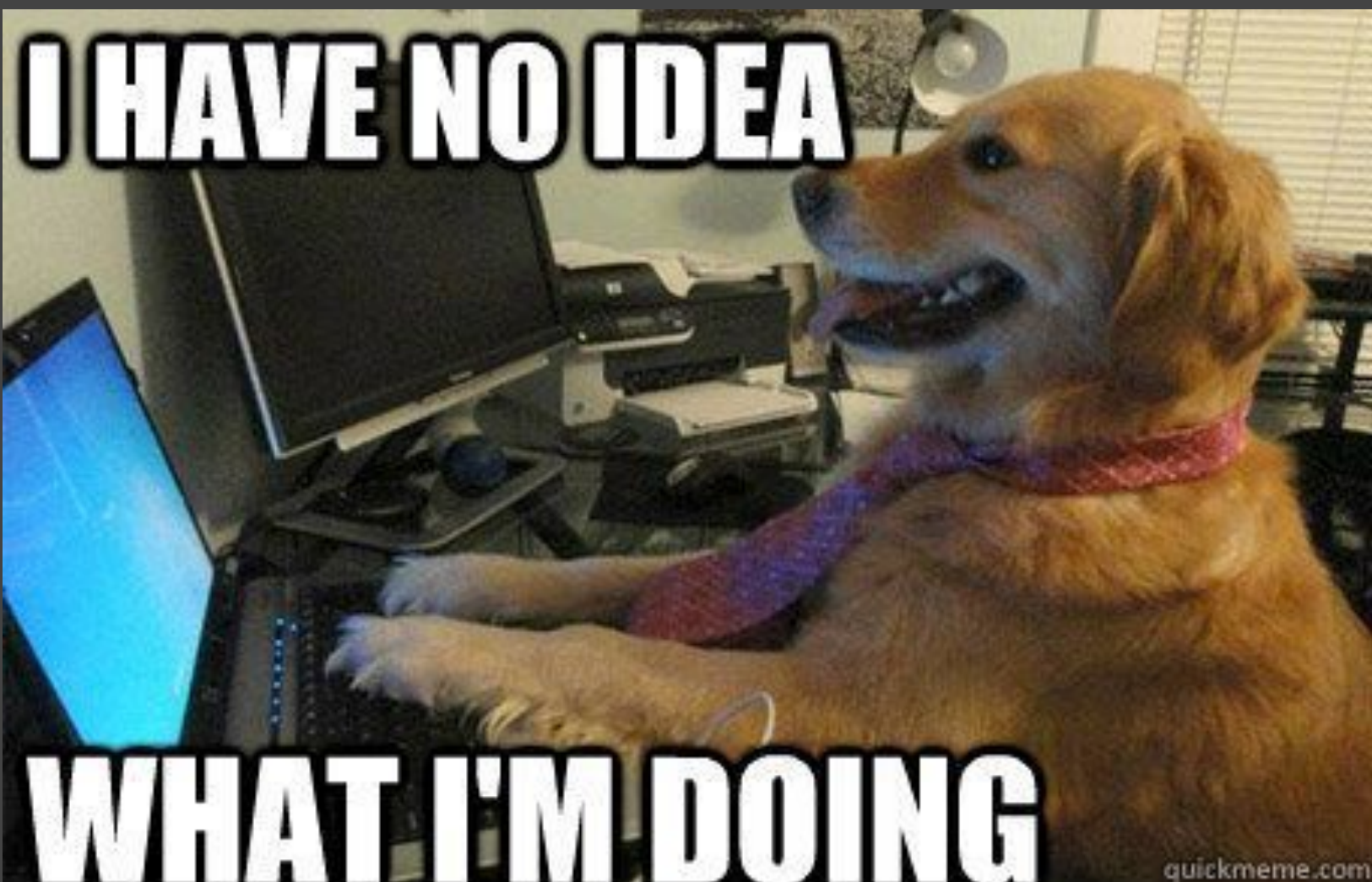
Observatory Shutdown Procedure

- Warm CCD
- Cap
- Park Mount
- Park Dome

Script: /home/dokeffe/code/github/bh-observatory/operations/ekos/schedulerStartup.sh

Script: -observatory/operations/ekos/schedulerShutdown.sh

I HAVE NO IDEA

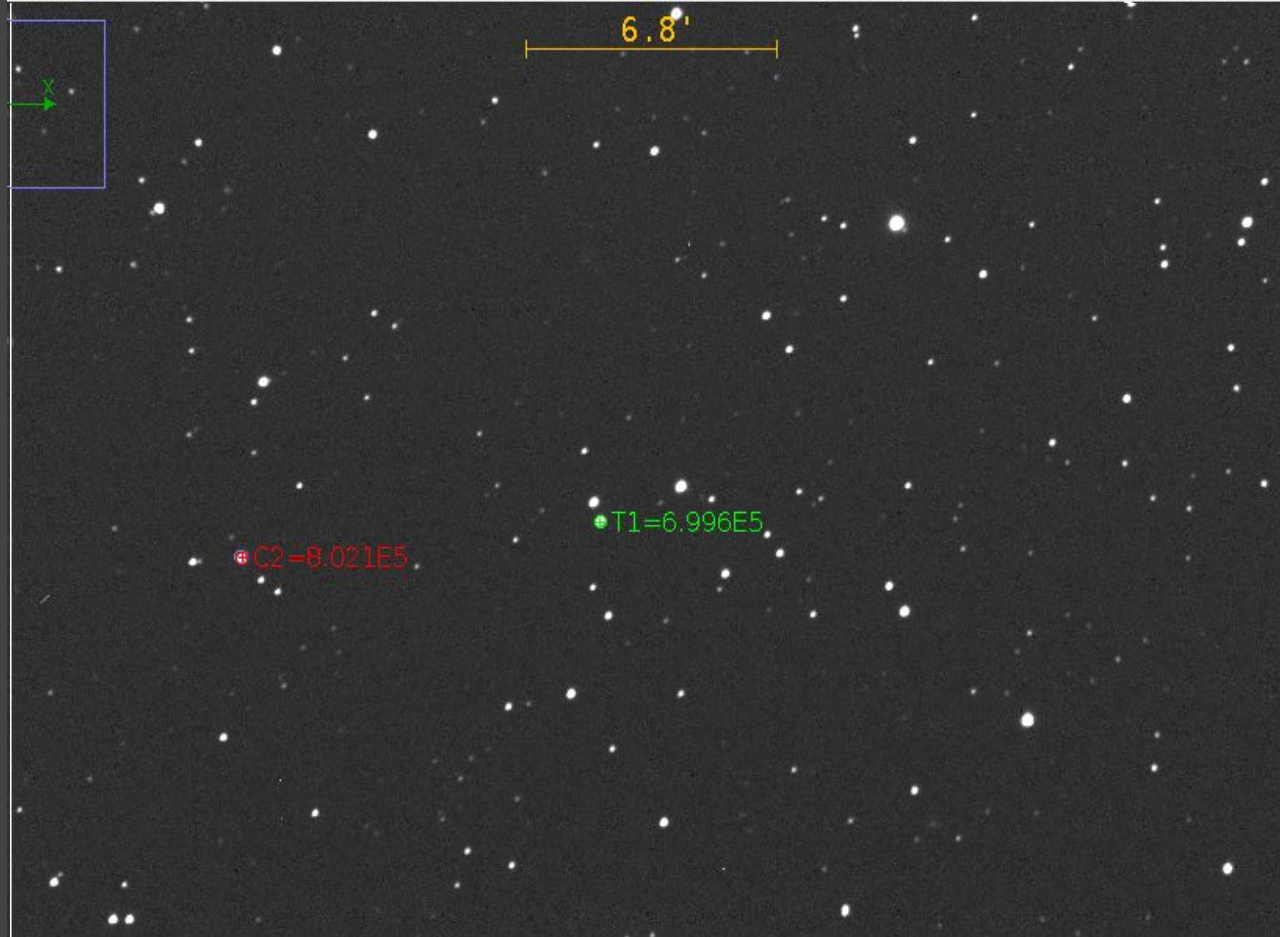


WHAT I'M DOING

3 Data Reduction

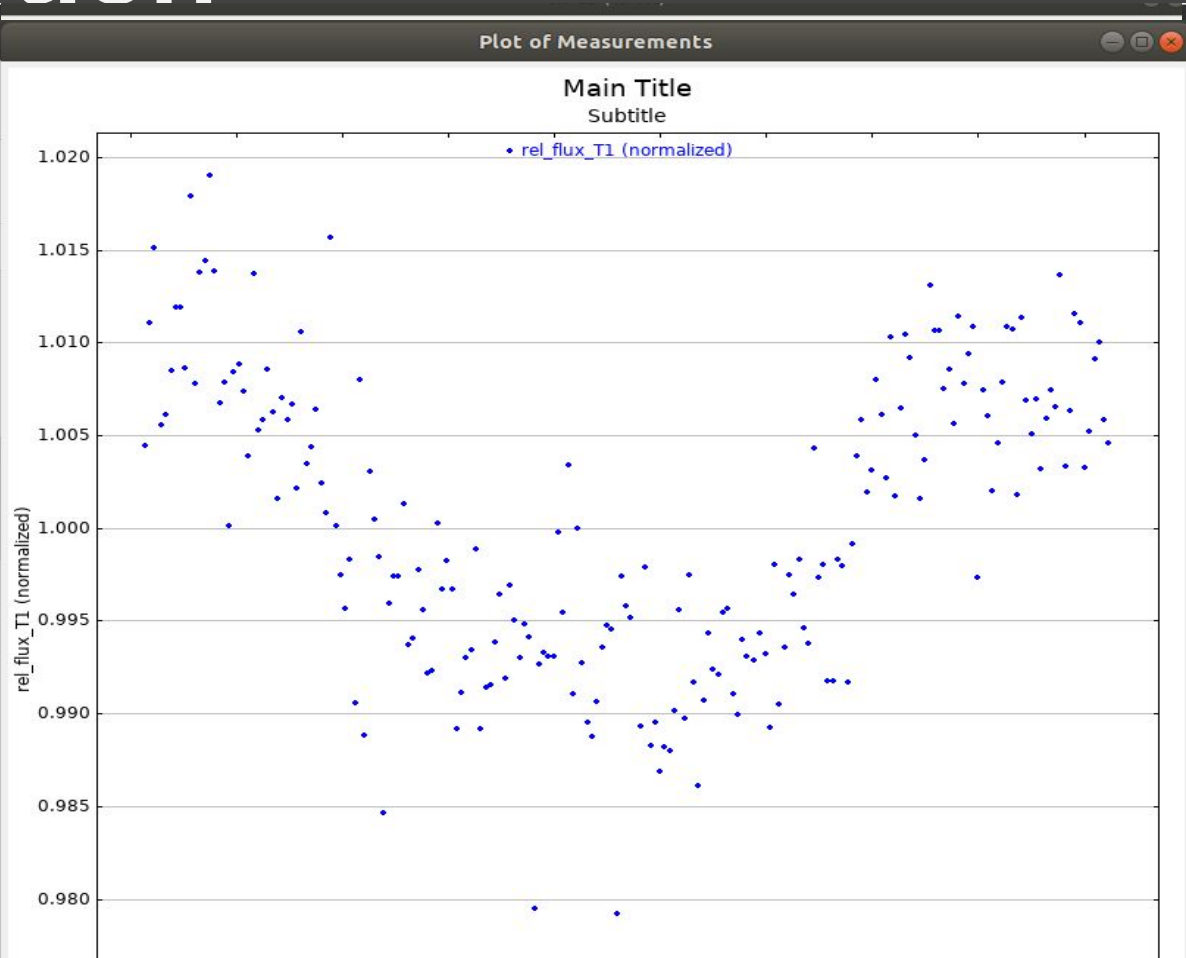


Differential
photometry with
AstroimageJ



3 Data Reduction

Differential
photometry with
AstroimageJ



More info?

Recommended read: *B.L.Gary (2007) Exoplanet observing for amateurs*

http://brucegary.net/book_EOA/x.htm



AAVSO <https://www.aavso.org/>



ETD <http://var2.astro.cz/ETD/predictions.php?delka=-8&submit=submit&sirka=52>



@[BallyhouraStars](https://twitter.com/BallyhouraStars)



<https://github.com/dokeeffe>