

TOM/Marshal Systems

Target and Observation Managers

Rachel Street  LC

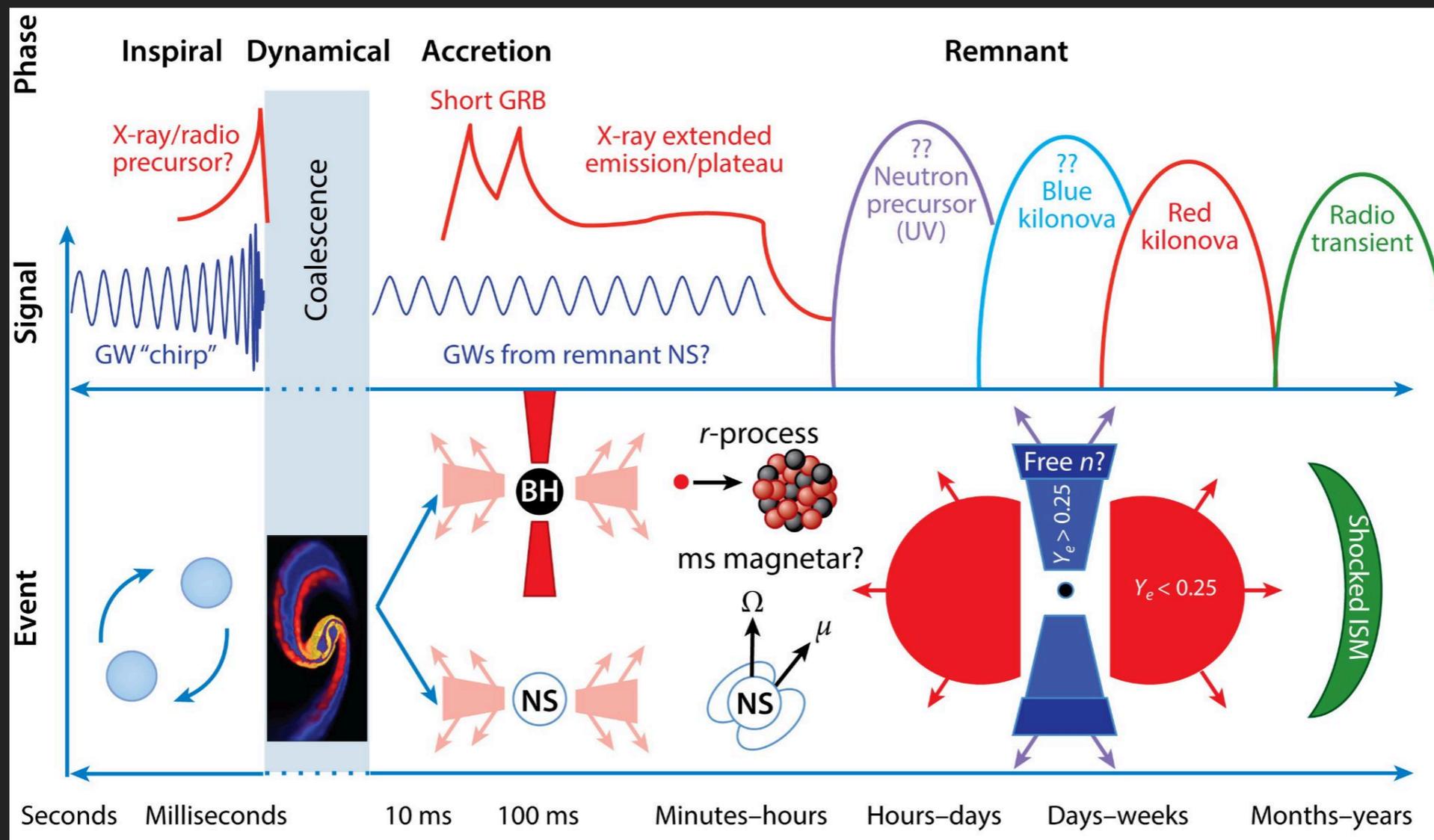


NSF grant number 2209852

Image credit: Uni. Warwick/Mark Garlic, LIGO/Virgo/Kagra

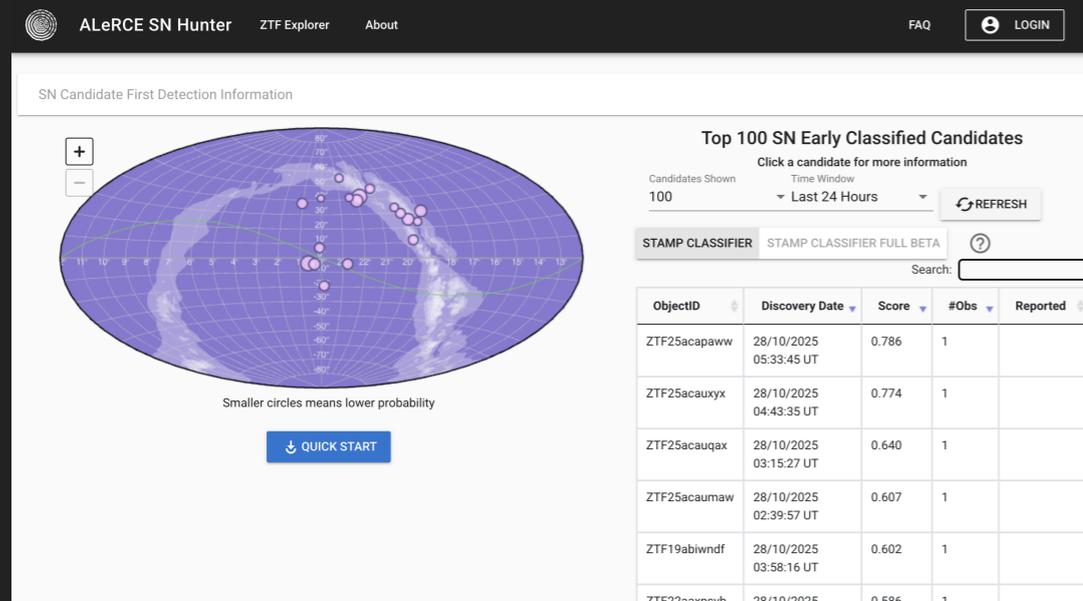
MULTI-MESSENGER ASTROPHYSICS

Characterizing survey discoveries requires information from multiple wavelengths and messengers...often in real-time. *Lots of information.*



TURNING ALERTS INTO ASTROPHYSICS

Combine survey detections with archival data...



SN Candidate First Detection Information

Top 100 SN Early Classified Candidates

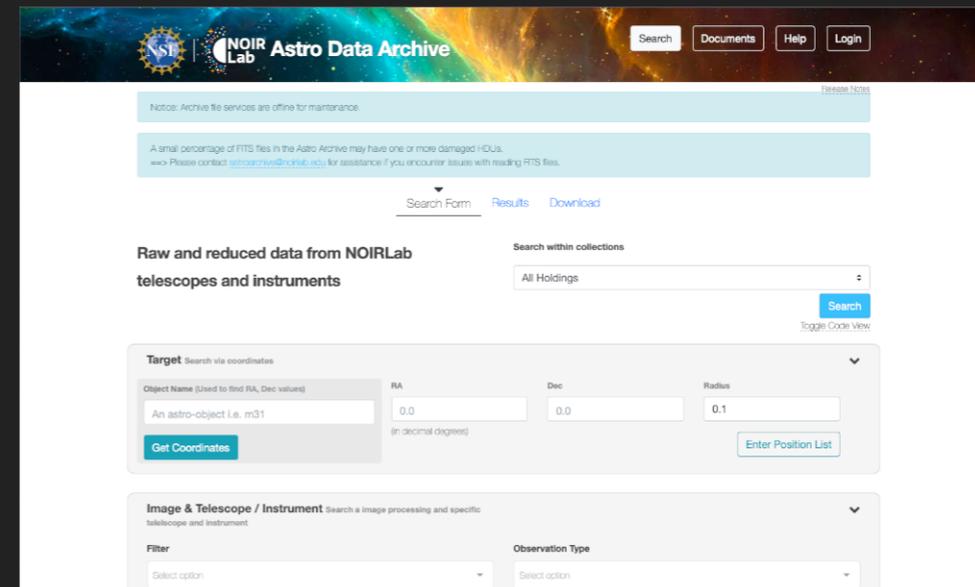
Click a candidate for more information

Candidates Shown: 100 | Time Window: Last 24 Hours | REFRESH

STAMP CLASSIFIER | STAMP CLASSIFIER FULL BETA

ObjectID	Discovery Date	Score	#Obs	Reported
ZTF25acapaww	28/10/2025 05:33:45 UT	0.786	1	
ZTF25acauyx	28/10/2025 04:43:35 UT	0.774	1	
ZTF25acauqax	28/10/2025 03:15:27 UT	0.640	1	
ZTF25acaukaw	28/10/2025 02:39:57 UT	0.607	1	
ZTF19abiwndf	28/10/2025 03:58:16 UT	0.602	1	
ZTF22aaxpsvb	28/10/2025	0.586	1	

+



NOIRLab Astro Data Archive

Search Form | Results | Download

Raw and reduced data from NOIRLab telescopes and instruments

Target Search via coordinates

Object Name (Used to find RA, Dec values): An astro-object i.e. m31

RA: 0.0 | Dec: 0.0 | Radius: 0.1 (in decimal degrees)

Image & Telescope / Instrument Search a image processing and specific telescope and instrument

Filter: Select option | Observation Type: Select option

...follow-up observations often required for characterization

Challenges common to a wide range of science



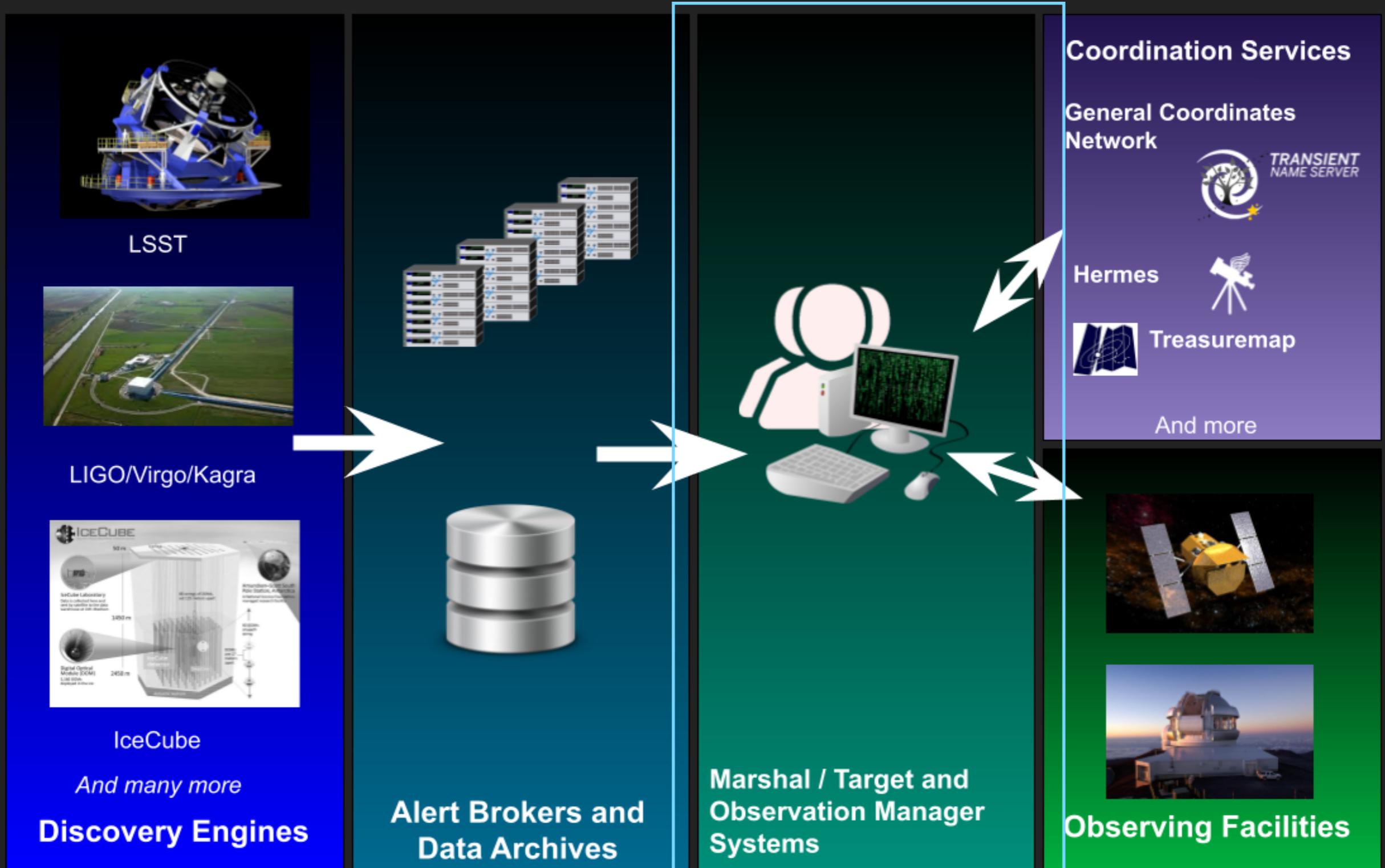
Image credits: Gemini Obs, Swift, Fermi, SALT

SCIENCE PROGRAM COORDINATION

Gather, analyze and visualize discoveries and data

Coordinate observations

Share information



SOFTWARE PACKAGES AVAILABLE

TOM Toolkit

<https://tom-toolkit.readthedocs.io/>



SkyPortal

<https://skyportal.io>

- ▶ Public packages available for the community to help build a system for their science goals
- ▶ Online documentation, resources and TOM public slack channel for support
- ▶ Designed to be customized by research team
 - ▶ E.g. database content, target selection, observing strategy, ...
 - ▶ Integrate with preferred data analysis / inference tools
- ▶ Feature requests encouraged

A FEW EXAMPLES OF TOM SYSTEMS IN THE WILD

Transients

Latest Comments

- Yue Dong about at 2023aku on 2023-01-28
Young DLT40 discovery, NGC 2283, D=10 Mpc, m-M=30
- Jenieve Pearson about dt1616600 on 2023-01-28
Young DLT40 discovery, NGC 2283, D=10 Mpc, m-M=30

Latest Targets

ID	Created
at 2023aku	2023-01-28
dt1616600	2023-01-28
at 2023avb	2023-01-26
dt7790316	2023-01-23
sn 2022pja	2023-01-19

Stellar astrophysics

Black Hole TOM 2.0

Click the image for a main page with current list of targets of interest. (Image courtesy of NASA/ESA/Gaia/DPAC)

About BHTOM and Documentation

Solar System

A11p3Z_Jul02

Observe Observations Manage Data Manage Groups Photometry

Observe

Apply an observation template

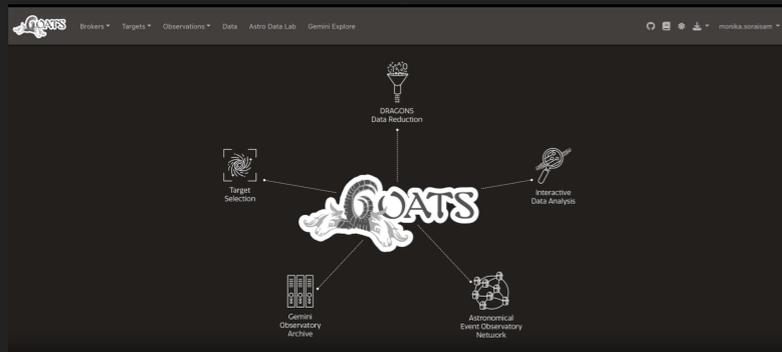
Plan

Start Time

End Time

Maximum Airmass

Survey View



Microlensing Observing Platform

Latest Comments

- Mariusz Hundermark about Z1F25abcwz on 2025-09-22
Chance to be part of Science Verification and Rubin DP2.
- Rachel Street about OGLE-2024-BLG-0034 on 2025-09-16
The FLOYDS spectrum uploaded was reduced with the BANZAI-FLOYDS pipeline but the SN is too low to be useful. In part this is because the target was faint when it ...
- Rachel Street about BOGEM_j172322.38-303752.4 on 2025-09-10
SOAR spectrum obtained on 2025-04-14 but target trace is faint. Automatic pipeline crashes so manual reduction needed.
- Rachel Street about OGLE-2025-BLG-0241 on 2025-09-10
SOAR spectrum from 2025-05-02 uploaded
- Rachel Street about OGLE-2025-BLG-0140 on 2025-09-10
Two epochs of SOAR spectra were obtained for

GEMTOM

Home History Transients Targets Observations Users What is BlackGEM? Live BlackGEM? Feed Discoveries Coming Soon Rachel Street (rstreet) Logout

Night Archive

Search for a Transient

BlackGEM ID Search

Live Feed

Latest Targets

ID	Created
Z1F25abcwz, AT 2025amg	2025-10-17

Recently Modified Targets

ID	Modified
BOGEM_4005630.00-725107.9	2025-10-22

Latest Comments

- Nadia Blagorodnova about AT2025rsi on 2025-09-25
Underluminous target from ZTF, date, link, ra, dec, prefix, id, date_obs, filter, mag_obs, mag_abs, dist, mod, gal, ref

SUPERNOVA EXCHANGE 2

Developers: D.A.Howell, C. McCully,
M. Andrews, J. Farah. C. Pelligrino

Custom UI optimized for streamlined, interactive workflow
Fine grained data access permissions

Michael Lundquist
Nicolas Meza
Yize Dong
Jeniveve Pearson
David Sand

I'm Interested

Add to Interesting Targets

Data Used In:

First name of first author

Last name of first author

Brief description of contents of this paper, i.e. "All photometry and spectra"

Submit

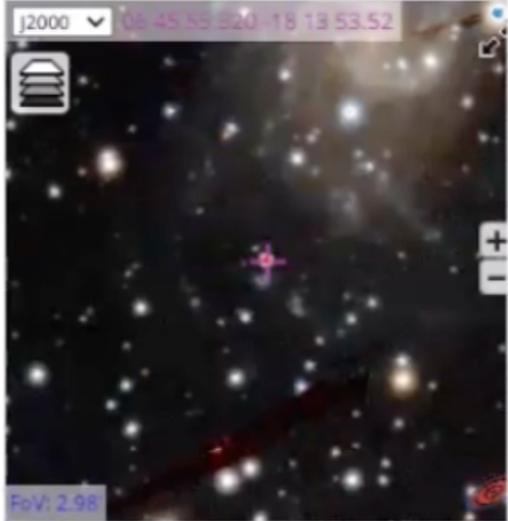
Data Sharing

Reference Status:

Required

Undetermined

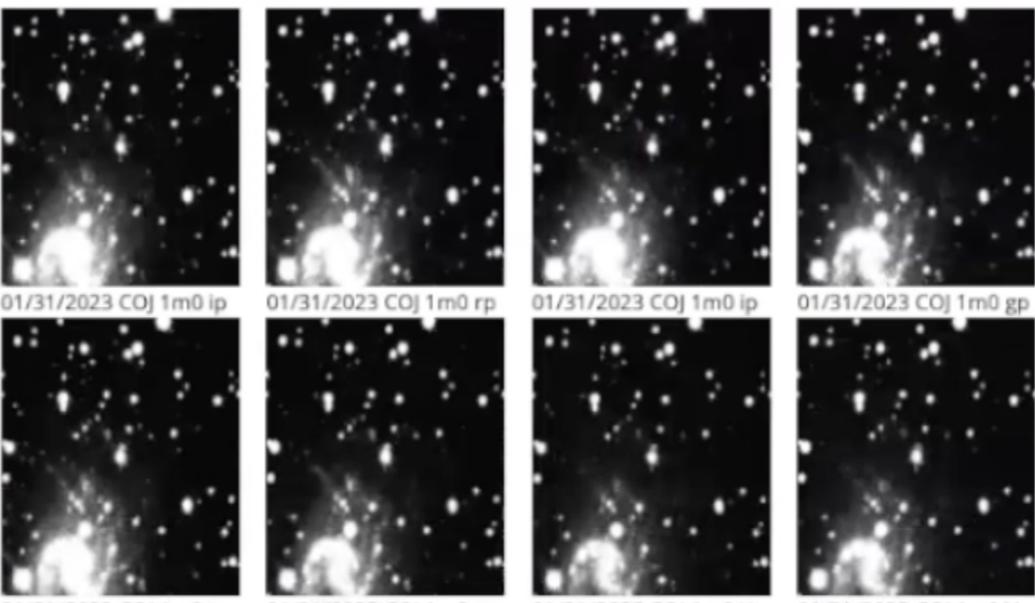
Aladin Viewer



J2000 06 45 59.920 18 13 53.52

Fov: 2.98

Recent LCO Images



01/31/2023 COJ 1m0 ip 01/31/2023 COJ 1m0 rp 01/31/2023 COJ 1m0 ip 01/31/2023 COJ 1m0 gp

01/31/2023 COJ 1m0 rp 01/31/2023 COJ 1m0 gp 01/31/2023 COJ 1m0 V 01/31/2023 COJ 1m0 V

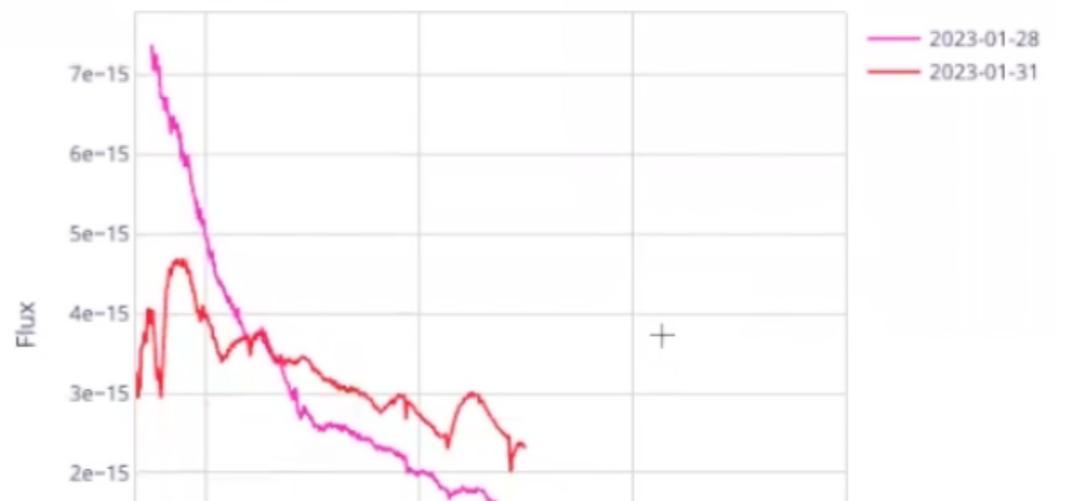
120s 200s 120s 120s

Photometry



Filter	Time (s)	Magnitude
i	120	15.6
r	120	15.6
g	120	15.6
V	120	15.6
B	120	15.6
i	200	15.1
r	200	15.1
g	200	15.1
V	200	15.1
B	200	15.1
i	1200	14.8
r	1200	14.8
g	1200	14.8
V	1200	14.8
B	1200	14.8

Spectroscopy



Flux

2023-01-28

2023-01-31

Multiwavelength, multi-instrument observation UI

Schedule Observations

[Gemini Photometry](#) [Gemini Spectra](#) [SOAR Photometry](#) [SOAR Spectra](#)

David Sand

Data Used In:

Data Sharing

Reference Status:

Required

Undetermined

Not Necessary

Obtained

Hours From Now

- (LCO) Siding Spring
- (LCO) Sutherland
- (LCO) Teide
- (LCO) Cerro Tololo
- (LCO) McDonald
- (LCO) Haleakala

Submit a Photometry Sequence

Delay Start By

Filter	Exposure Time	No. of Exposures	Block No.	Max Airmass*
U	300	2	1	1.6
B	200	2	1	
V	120	2	1	
R	0	2	1	
I	0	2	1	
u	0	2	1	

Minimum Lunar Distance:

Instrument type*:

Proposal*:

Observation Mode*

Days from now

- Moon distance (degrees)
- Moon phase

Submit a Spectroscopy Sequence

Delay Start By

Exposure time*	Acquisition radius
1800	5.0

Max Airmass*:

Guider mode*:

Minimum Lunar Distance:

Guider exposure time*:

Site*:

Proposal*:

Slit*

Observation mode*

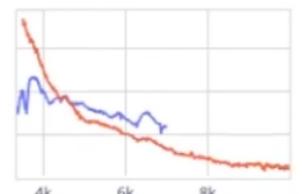
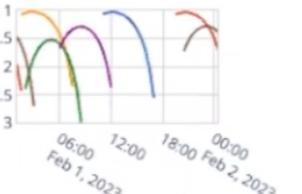
SUPERNOVA EXCHANGE 2

Developers: D.A.Howell, C. McCully, M. Andrews, J. Farah

System tracks obs requests; tools to manage continued observations

Current Reminders

Track this Sequence	Target	Classification	Redshift	Facility and Proposal	Observation Type	Instrument	Cadence	IPP	Max Airmass	Exposures	Reminder in																					
Details	AT 2023axu, SN 2023axu, DLT23a	SN II	0.002805	LCO KEY2020B- 002	Phot (Repeating)	Sinistro	0.25	1.1	1.7	<table border="1"> <thead> <tr> <th>Exposure Time</th> <th>Exposures</th> <th>Block No.</th> </tr> </thead> <tbody> <tr><td>U 300.0</td><td>2</td><td>1</td></tr> <tr><td>B 200.0</td><td>2</td><td>1</td></tr> <tr><td>V 120.0</td><td>2</td><td>1</td></tr> <tr><td>g 200.0</td><td>2</td><td>1</td></tr> <tr><td>r 120.0</td><td>2</td><td>1</td></tr> <tr><td>i 120.0</td><td>2</td><td>1</td></tr> </tbody> </table>	Exposure Time	Exposures	Block No.	U 300.0	2	1	B 200.0	2	1	V 120.0	2	1	g 200.0	2	1	r 120.0	2	1	i 120.0	2	1	0.5 days
Exposure Time	Exposures	Block No.																														
U 300.0	2	1																														
B 200.0	2	1																														
V 120.0	2	1																														
g 200.0	2	1																														
r 120.0	2	1																														
i 120.0	2	1																														

SNEx 2.0
Home Targets Alerts Scheduling Data Users TNS Targets
Search by name or coord
Curtis McCully Logout

SN 2022wpy SN Ia z= 0.0152 04:46:28.004 -04:47:23.68
71.6167 -4.7899

Overview
Details
Observations
Manage Data
Observing Runs
Images
Photometry
Spectroscopy

Known as:

- AT 2022wpy
- SN 2022wpy
- ATLAS22bhuv
- Add a new name

Science Interests:

- Classification
- Ia
- Nearby SNe
- Young SNe

Select Science Tags

Interested Persons:

- J. Craig Wheeler
- Or Graur

Data Used In:

Select all

Share	Telescope	Instrument	Date Observed	Filter	Magnitude	Error	Shared With
<input checked="" type="checkbox"/>			2022-10-05 01:10:03	B	17.5111242552	0.0161250397	
<input checked="" type="checkbox"/>			2022-10-05 02:10:38	V	17.5455807239	0.0216632111	
<input checked="" type="checkbox"/>			2022-10-05 02:10:23	gp	17.456924	0.0102488664	
<input checked="" type="checkbox"/>			2022-10-05 02:10:13	gp	17.455298	0.0121994594	
<input checked="" type="checkbox"/>			2022-10-05 11:10:15	B	17.331792995	0.0105986672	
<input checked="" type="checkbox"/>			2022-10-05 11:10:01	B	17.334036195	0.0115913502	
<input checked="" type="checkbox"/>			2022-10-05 11:10:02	V	17.3428314554	0.0145834721	
<input checked="" type="checkbox"/>			2022-10-05 11:10:28	V	17.3235634554	0.0130031758	
<input checked="" type="checkbox"/>			2022-10-05 11:10:10	gp	17.3233568052	0.0194183136	

Share to

Data sharing via *Hermes*

Portal to transient detections from BlackGEM survey

BlackGEM ID 57300328

BGEM J174330.49-262848.6

RA/Dec: 265.87707597355694 -26.480175120694653

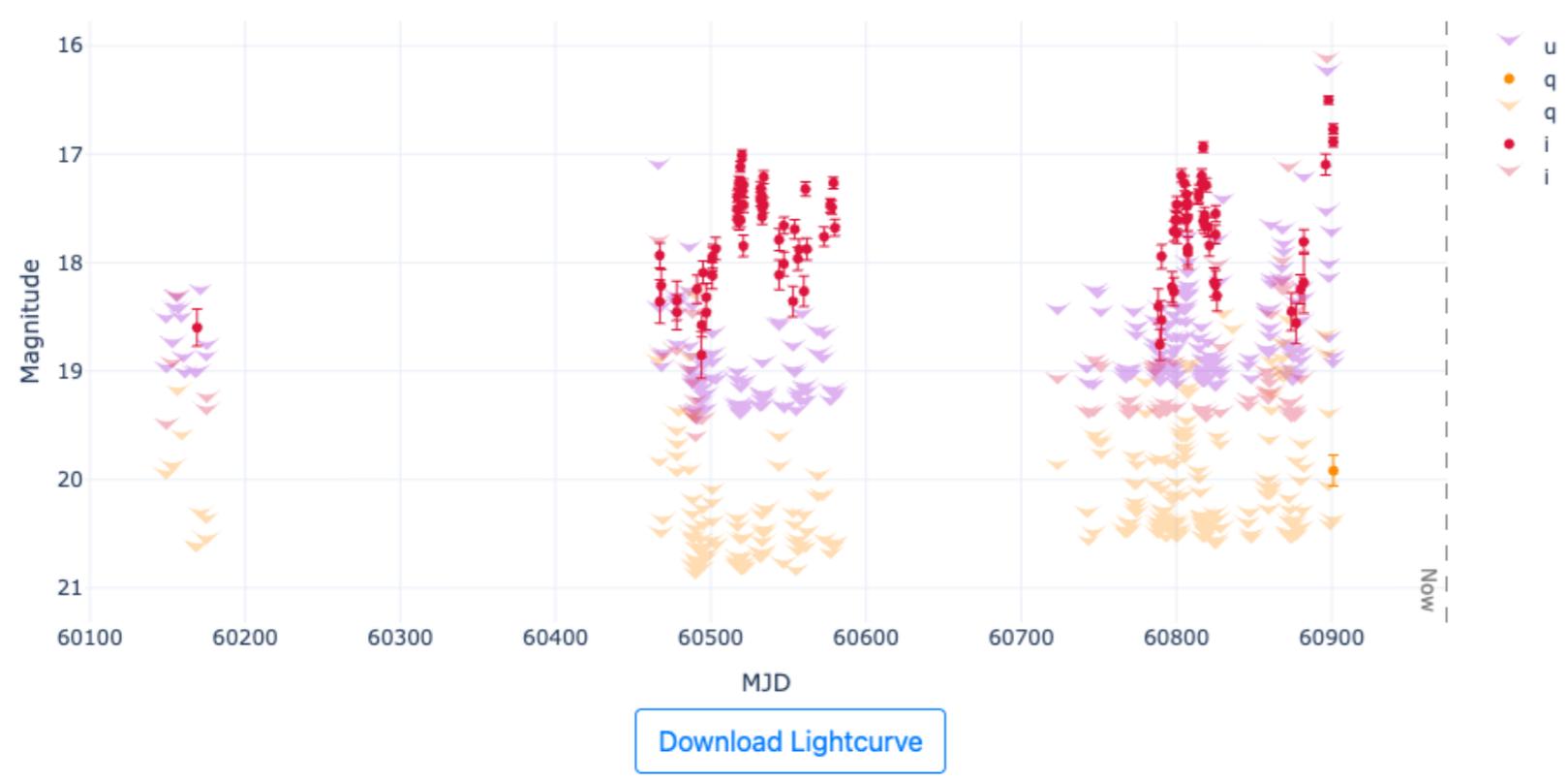
l/b: 1.849672830287222 1.682266548803498

- [Aladin](#)
- [BlackPEARL](#)
- [BlackView](#)
- [NOIRLab](#)
- [SIMBAD](#)
- [VizieR](#)

No TNS Object within 10 arcseconds.

Transient not in GEMTOM
[Add to GEMTOM](#)

Target is in 49 VizieR catalogs
GSC · AAVSO
[Query VizieR](#)



Integration with backend database and pipeline

Survey live feed

GOATS: GEMINI OBSERVING AND ANALYSIS OF TARGETS SYSTEM

Developers: Monika Soriasam, Dan Avner

Browser-based UI for TDAMM workflow:

Target selection, observations, data retrieval, reduction and analysis

Time-domain astronomy made time efficient.

 Brokers ▾ Targets ▾ Observations ▾ Data Astro Data Lab Gemini Explore 🔄 📄 ⚙️ ⬇️ monika.soraisam ▾

AT 2020caa

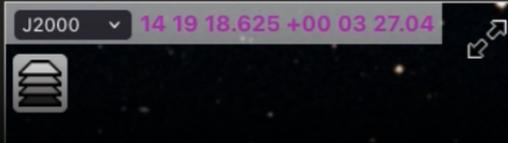
Details	
Names	AT 2020caa
Target Type	SIDEREAL
Permissions	PRIVATE
Right Ascension	214.82760416
	14:19:18.625
Declination	0.057511111
	+00:03:27.04

Recent Photometry

Timestamp	Magnitude
No recent photometry.	

Survey View

J2000 ▾ 14 19 18.625 +00 03 27.04 



Observe Observations **Manage Data** Manage Groups Photometry Spectroscopy

GS-2021A-DD-102-9 @GEM

[View at Observatory »](#)

Created: 2025-08-21 03:13:12 Modified: 2025-08-21 03:13:20
Status: Observed

Retrieve data from the Gemini Observatory Archive (GOA)

This functionality is available once the observation complete, i.e., the status is updated to 'Observed'

[View at Archive »](#)

Observation Class	Any ▾	Observation Type	Any ▾
Raw/Reduced	Any ▾ <small>(Select data by processing state)</small>	QA State	Not Fail ▾ <small>(Quality of results you wish to access)</small>
Filename Prefix	Leave empty for any <small>(Specify the first part of the filename to match by)</small>		
Observation ID	GS-2021A-DD-102-9		

GOATS: GEMINI OBSERVING AND ANALYSIS OF TARGETS SYSTEM

Developers: Monika Soriasam, Dan Avner

Tools for streamlining reductions with DRAGONS

Time-domain astronomy made time efficient.

 Brokers ▾ Targets ▾ Observations ▾ Data Astro Data Lab Gemini Explore monika.soraisam ▾

GS-2021A-DD-102-9

Setup and Manage Reduction Runs

Existing Run | New Run

run-20250821222534 Delete

Created	2025-08-21T22:25:34.716897Z
Version	4.0.0
Directory	/Users/monika.soraisam/Desktop/tomdev/real_goats/goats_data/AT 2020caa/GEM/GS-2021A-DD-102-9/run-20250821222534
Config Filename	dragonsrc
Cal Manager Filename	cal_manager.db
Log Filename	log.log

[View DRAGONS Documentation](#)

Available Recipes and Files

- FLAT (partnerCal) | GCALflat ▾
- BIAS (dayCal) | Bias ▾

Science Reduction

Start Stop

Done

Modify Recipe

Pro-Am collaborations for wide range of stellar astrophysics Target recommendation service

 **BHTOM** [About Us](#) [Targets](#) [Target Grouping](#) [Data](#) [Observatory](#) Rachel Street (rstreet@lco.global) [Logout](#)

AR_Pav

Name	AR_Pav
Ra,Dec	275.11617527052 -66.07859138328 18:20:27.882 -66:04:42.929
Galactic (l,b)	328.535646 -21.604242
Constellation	Pavo
Discovered	2025-06-14 15:47:16
Class	Eclipsing Binary(EB)
Description	well-known eclipsing symbiotic binary with an orbital period of 604.5 days
Phot.Class	Red Giant 75.4%
Last MJD	60971.041379
Last Mag/Filter	11.0 mag [ATLAS(o)]
Target importance (0-10)	1.0
Cadence requested (d)	2.0
Observing priority	1.5
Sun Separation (deg)	69.0

Other names:

ATLAS
ATLAS+J275.11617527052_-66.07859138328

GAIA_DR3
6437030012377624192

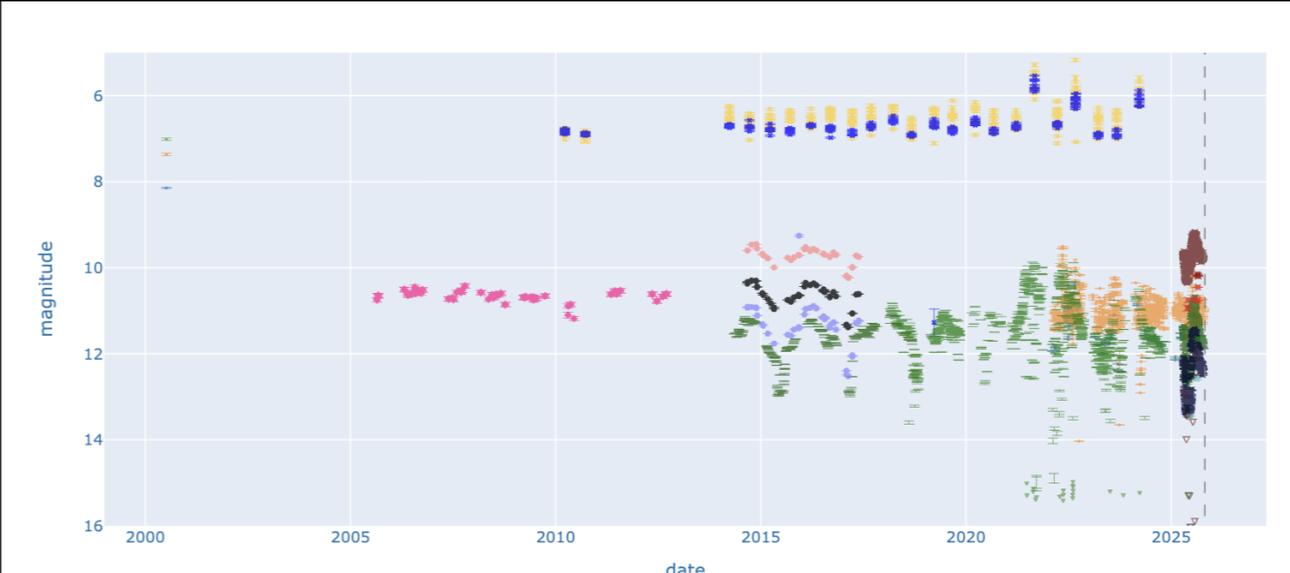
twomass
2MASS_18202786-6604428

AAVSO
1810-66

CRTS
CRTS+J275.11617527052_-66.07859138328

Photometry [Models](#) [Spectroscopy](#) [Publication](#) [Manage Data](#) [Manage Groups](#)

Photometry



Download photometry data [Download radio data](#)

Photometry (per facility)



Legend:

▪ I(GaiaSP)	• ATLAS(c)	• ATLAS(o)	• WISE(W1)	• WISE(W2)
• ASASSN(V)	• ASASSN(g)	• 2MASS(J)	• 2MASS(H)	• 2MASS(K)
• G(Gaia DR3)	• BP(Gaia DR3)	• RP(Gaia DR3)	• V(GaiaSP)	• B(GaiaSP)
• R(GaiaSP)	• U(GaiaSP)	• CRTS(CL)	• i(GaiaSP)	• r(GaiaSP)
• g(GaiaSP)	• ATLAS(o)-LIMIT	• ASASSN(g)-LIMIT	• I(GaiaSP)-LIMIT	• U(GaiaSP)-LIMIT
• V(GaiaSP)-LIMIT	• B(GaiaSP)-LIMIT	• R(GaiaSP)-LIMIT	• NOW	

Data reduction service for 138 contributing observatories

List of observatories

List of your registered observatories/instruments you can use for uploading the data for processing. You should register an observatory in your account if you want a datapoint to be labeled with your name.

Here you can add a new observatory to your list if you are planning to upload images or instrumental photometry for it. You can choose one from the list of already registered observatories, or create a new one. Note that different instrument (e.g. CCD) on the same telescope counts as a different observatory.

[Favorite Observatories](#)

[Observatories](#)

[Add new observatory](#)

Observatory Name	Lon	Lat	Observatory(ONAME)	Comment	Only Instrumental photometry file	D
Adiyaman 60-cm telescope	38.22541	37.751703	Adyu60_Andor-934	PlaneWave 24" CDK on ASA DM16...	False	
Adonis Observatory 25-cm Telescope	2.925382	50.91524	Adonis_G2-1600	Sky-watcher quattro F4 250 mm...	False	
AGN-S50 5-cm	18.5567	53.0939	AGN-S50_IMX462	Seestar S50	False	
AITP-Observatory 43-cm	-68.1799944	-22.9534778	AITP-Observatory_QHY268M	Planewave CDK17 on Astelco NT...	False	
AndreaObservatory	9.222043	45.542616	AndreaObservatory_Only instrumental photometry file camera		True	
Aristarchos 2.3-m	22.198294	37.985587	ARISTARCHOS_TEK2K	Aristarchos 2.3-m telescope	False	



ATLAS (C/2025 N1)

Update
Delete
Ephemeris

Names ATLAS (C/2025 N1)
3I

Target Type NON_SIDEREAL

Permissions OPEN

Orbital Element Scheme MPC_COMET

Epoch Of Elements 60975.844427

Mean Anomaly -11.91671554

Argument Of Perihelion 128.01309366

Eccentricity 6.1372198147

Longitude Of Ascending Node 322.15372908

Inclination To The Ecliptic 175.11289764

Mean Daily Motion 7.2672871098

Semimajor Axis -0.263969958

Epoch Of Perihelion 60977.484202

Perihelion Distance 1.3560717000

Absolute Magnitude 12.3

Slope Parameter 4.5

Tags

orbit_type interstellar

Recent Photometry

Timestamp	Magnitude
No recent photometry.	

Observe
Observations
Manage Data
Manage Groups
Photometry

Spectroscopy

Observe

LCO
GEM
SOAR

Ephemeris for ATLAS (C/2025 N1) at Simon-Denis Telescope, Rubin Observatory (X05)

Date/Time	RA	Dec	Azimuth	Elevation	Mag	r (AU)
2025-11-01T09:00:00.000	200.85869	-6.46716	98.7	-1.9	14.7	1.360
2025-11-02T09:00:00.000	200.30989	-6.29424	97.8	-0.6	14.7	1.363
2025-11-03T09:00:00.000	199.75465	-6.11829	96.9	0.6	14.7	1.368
2025-11-04T09:00:00.000	199.19263	-5.93921	96.0	1.8	14.7	1.373
2025-11-05T09:00:00.000	198.62352	-5.75687	95.0	3.1	14.7	1.379
2025-11-06T09:00:00.000	198.04699	-5.57115	94.1	4.3	14.7	1.386
2025-11-07T09:00:00.000	197.46270	-5.38192	93.1	5.6	14.7	1.394
2025-11-08T09:00:00.000	196.87031	-5.18906	92.2	6.9	14.7	1.403
2025-11-09T09:00:00.000	196.26945	-4.99242	91.2	8.1	14.7	1.413
2025-11-10T09:00:00.000	195.65975	-4.79187	90.2	9.4	14.7	1.424
2025-11-11T09:00:00.000	195.04083	-4.58726	89.2	10.7	14.7	1.436

Post

Non-sidereal targets for Rubin's Solar System Science Collaboration

Integrates with specialized ephemeris calculation software

Current time: 2025-10-26 01:03:38 UTC, JD=2460974.544

Priority Targets

This page lists targets assigned a high priority as either a stellar or a long-tE event. Targets are excluded if they have a non-microlensing classification, or are flagged as a known galaxy, YSO etc. Targets marked in beige are less than 5 days before the predicted peak of brightness. Targets with underlined name in bold are currently observed.

Stellar/planetary Targets

Target	t0 [days] -2460000.0	u0	tE [JD]	Current mag	Baseline mag	TAP Priority
<u>OGLE-2025-DG-0021</u>	977.626±8.025	0.014±0.003	2564.136±332.003	17.186	17.708	142.555±30.634
OGLE-2025-BLG-0839	878.075±1.37	0.026±0.021	1245.78±966.935	17.383	17.475	23.587±19.086
<u>OGLE-2025-BLG-1473</u>	965.143±1.792	0.104±0.01	121.815±5.076	17.642	19.866	14.503±2.138
OGLE-2025-BLG-0674	869.764±0.481	0.005±0.006	799.319±916.162	19.405	19.879	14.34±17.453
OGLE-2025-BLG-1217	963.512±4.29	0.17±0.009	231.088±11.428	17.927	19.82	10.425±0.842

Long tE Targets

Warning: Number of candidate targets returned equals or exceeds the maximum allowed

Target	t0 [days] -2460000.0	u0	tE [JD]	Current mag	Baseline mag	TAP Priority longtE
OGLE-2025-DG-0021	977.626±8.025	0.014±0.003	2564.136±332.003	17.186	17.708	211.144±44.267
OGLE-2025-BLG-0839	878.075±1.37	0.026±0.021	1245.78±966.935	17.383	17.475	165.851±128.925

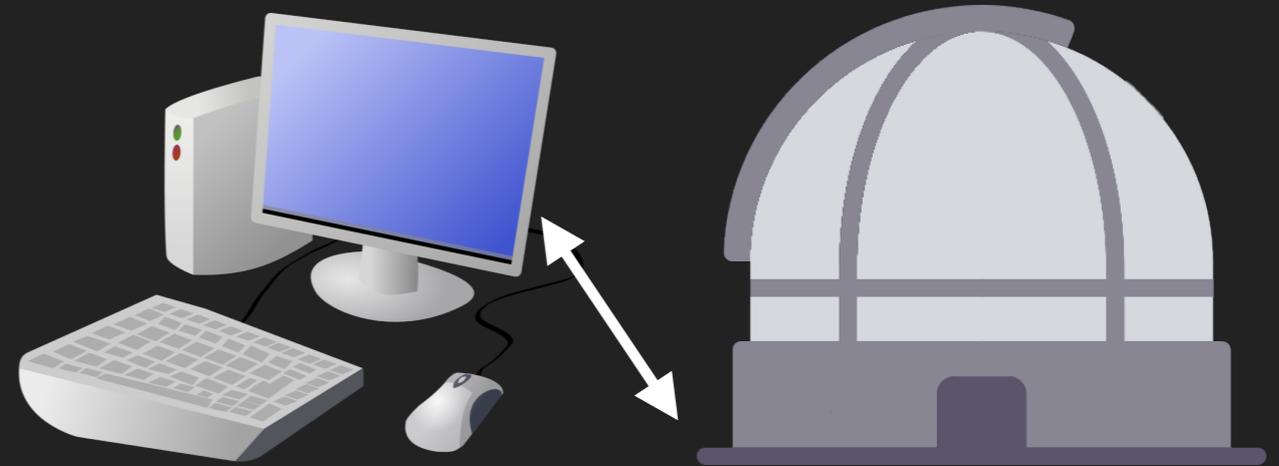
Fully automated
alert-driven
follow-up of
microlensing
events

OBSERVING INFRASTRUCTURE

Long-term monitoring observations benefit from time-domain friendly infrastructure



Queue-scheduled or ToO available at least some of the time



Accepts programmatic requests for observations

Integrates with TOMs/marshals

Common Python library for observations

Facilitates multi-facility follow-up programs

AEON+ ASTRONOMICAL EVENT OBSERVATORY NETWORK

Pan-wavelength, international, collaboration of observatories to support time-domain science



Gemini Observatories

NOIRLab

NRAO

SOAR Telescope

Blanco Telescope

Keck Observatories

Las Cumbres Observatory

Canada-France-Hawaii Telescope

Skynet Telescope Network



Collaborating with
Neil Gehrels Swift Observatory,
ACROSS

South Africa Astronomical
Observatory

Liverpool Telescope

ESO

Rubin In-Kind Telescopes



<https://aeonplus.github.io>

NSF grant number 2432266

Image credits: Keck Obs, Gemini Obs, SOAR, Las Cumbres Obs, Greenbank Obs, CFHT



TOM SYSTEMS AND AEON+

TOMs/marshals are powerful and flexible systems to enable TDAMM science

AEON+ is enabling TDAMM-friendly observations at all wavelengths

