Lasair - The UK: LSST Transient Server

https://lasair.roe.ac.uk

Ken W. Smith

K. W. Smith, R. D. Williams, D. R. Young, A. Ibsen, S. J. Smartt, A. Lawrence, D. Morris, S. Voutsinas, and M. Nicholl
2019, Research Notes of the American Astronomical Society, 3, 26
http://adsabs.harvard.edu/abs/2019RNAAS...3a..26S
Lasair is being used
(2 recent ATels)

SOAR telescope spectroscopic classification of optical transients

ATel #12671; R. Cartier, C. Briceno, D. Gomez, J. Espinoza, O. Estay (CTIO) on 18 Apr 2019; 19:52 UT

Distributed as an Instant Email Notice Supernovae
Credential Certification: Regis Cartier (rgcartier@gmail.com)

Subjects: Optical, Supernovae

As part of the SOAR telescope preparation for the Astronomical Event Observatory Network (AEN), we report the following supernova classifications. The targets were observed by the Zwicky Transient Facility (https://www.ztf.caltech.edu/; Kulkarni et al. 2018, ATel 11266) data stream processed through the Lasair broker (http://lasair.roe.ac.uk/), and by the ATLAS survey, see Tonry et al. (2011, PASP, 123, 58) and Tonry et al. (ATel #8680). The observations were performed on the night of 15 April 2019 at the 4.1-m SOAR telescope equipped with the Goodman High Throughput Spectrograph using the 400 lines/mm grating, and a slit width of 1 arc second, resulting in a spectral resolution of 0.636 nm. Classifications were done with SNID (Blondin & Tonry, 2007, ApJ, 666, 1024).

FDST spectroscopic classification of SN 2019dpu

ATel #12681; M. Pursiainen (University of Southampton), C. Frohmaier (University of Portsmouth - ICG), P. Wiseman (University of Southampton), C. Inserna (Cardiff University), C. P. Gutierrez (University of Southampton), J. Anderson (ESO), C. Angus (University of Southampton), R. Cartier (CTIO), T.-W. Chen (MPE), T. de Jaeger (UC Berkeley), L. Galbany (University of Pittsburg), S. Gonzalez-Gaitan (CENTRA), M. Grayling (University of Southampton), H. Kuncarayakti (University of Turku), J. Lyman (University of Warwick), T. Muller-Bravo (University of Southampton), A. Pastorello (INAF - Padova Astronomical Observatory), R. Roy (IUCAA), T. Schwyer (MPE), M. Smith (University of Southampton), M. Sullivan (University of Southampton) on 23 Apr 2019; 16:03 UT

Distributed as an Instant Email Notice Supernovae
Credential Certification: Philip Wiseman (p.s.wiseman@soton.ac.uk)

Subjects: Optical, Supernovae

The Fast and Dark Side of Transients experiment (FDST; ATel #12362) reports the spectroscopic observation of SN 2019dpu. The target was supplied by the Zwicky Transient Facility (https://www.ztf.caltech.edu/; Kulkarni et al. 2018, ATel 11266) and processed through the Lasair broker (Smith, Williams, et al. 2019, RNAAS, 3, 26; https://lasair.roe.ac.uk/). Classifications were done with SNID (Blondin & Tonry, 2007, ApJ, 666, 1024).

The observations were performed on 2019-04-22 using SPRAT (Piacisk et al 2014) on the Liverpool Telescope (Steele et al. 2004).

Survey Name | IAU Name | RA (J2000) | Dec (J2000) | Disc. Date | Source | Disc Mag | z | Type | Phase
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
EFT19agc9kuv | SN2019dpu | 13:04:18.4 | +33:28:15.7 | 20190412 | EFT | 20.5 | 0.075 | Ia

(1) The redshift is obtained from the SNID fit. The phase obtained from SNID is -7 days.
Transients (SSD) > 10^9 rows

5 x 10^9 rows

HTM Spatial Indexing

SQL Database (12TB SSD)

New Detection + New Object

Read Detections (5 x 10^7 detections)

Spatially Near Existing Object?

no

yes

New Detection + Associate with Existing Object

Transients

> 10^6 rows

Locally Stored Object Catalogues (SSD)

> 5 x 10^6 rows

graceDB / breaker

Web Interface for Scanners

Read PS1 Catalogue Row

Kepler Tag NearPS1UbercalStar

NearGSCFaintStar

Near2MASSFaintPointSource

NearSDSSDR9FaintStar

NearPS1MDGalaxyCore

NearSDSSDR9PhotoGalaxyCore

NearMilliquasQSO

NearSDSSDR9QSO

NearVeronAGN

NearNEDQSO

NearNEDSpecGalaxyCore

NearSDSSDR9SpecGalaxyCore

NearNEDSpecGalaxy

NearSDSSDR9SpecGalaxy

NearNEDGalaxy

NearSDSSDR9PhotoGalaxy

NearSDSSDR9Star

Near2MASSPointSource

NearGSCStar

NearKeplerGalaxy

NearExistingObject no yes

no yes

no yes

no yes

no yes

no yes

no yes

yes yes

yes yes

yes yes

yes yes

yes yes

yes yes

Followup (Marshall)

Powered By Visual Paradigm Community Edition

Object Context Classification

Filter

New Detection + Associate with Existing Object

MPC check

n >= 3

Live Survey Crossmatch

Web Interface for Scanners

Citizen Scientists

History: PS1 and ATLAS Detection Ingest

rsync/wget

Pan-STARRS

FITS tables

7 sq degrees, 60 x 4K x 4K chips

atlas

ASCII tables

29 sq degrees, 1 x 10K x 10K chips
Lasair Prototype + ZTF

- **100K Detections per day**
- **New Detection + Update Existing Object Metadata**
- **Object Exists?**
  - Yes: **New Detection**
  - No: **ncand >= 3**
    - Yes: **New Object + New Detection**
    - No: **Transients**
- **Locally Stored Object Catalogues (SSD)**
- **HTM Spatial Indexing**
- **Database**
- **User Defined Queries**
- **Lightcurves**
- **Watchlists**
- **47 sq degrees, 16 x 6K chips**
Discovery of 9 ASAS-SN Supernovae

ATel #12296, J. Brimacombe (Coral Towers Observatory), J. A. Madeira (Spain), R. Cornett (Meade/Beaver Observatory), N. Castro, A. Clocchiatti (Observatorio Inmaculada del Molino), P. Valley, K. Z. Stanek, C. Thompson (Ohio State), B. J. Shappee (Iowa-Hawaii), T. W.-S. Holoien, J. L. Prieto (Diego Portales: MAS), D. Berzier (LJMU), Subo Dau (PKU), M. Stritzinger, S. Holmboe (Aarhus), G. Bock (Runaway Bay), M. Stone (Sierra Remote Observatories), on 14 Dec 2018, 16:42 UT.

Distributed as an Instant Email Notice Service.

Credential Certification: Patrick Valley (valleyp@osu.edu)

Subjects: Optical, Supernovae, Transient.

During the ongoing All Sky Automated Survey for Supernovae (ASAS-SN), using data from the quadruple 14-cm "Brutus" telescope in Haleakala, "Leavitt" telescope in Fort Davis, Texas, the quadruple 14-cm "F" telescope in Switzerland, South Africa, and the quadruple 14-cm "Cassiopeia" and "Tololo" telescope, Chile, we discovered several new transient sources. Properties of these transient sources and the associated finding charts showing the archival imaging (left) and the cone search image (right) are included in the table below:

### Cone Search

Enter RA and Dec and optionally radius in arcseconds, to search for objects in ZTF in that cone. They can be separated by spaces, commas, semicolons, or vertical bars. They can be in decimal degrees (floating point number), or sexagesimal in the form hh:mm:ss and dd:mm:ss or hh mm ss and dd mm ss. You can also enter an object ID, beginning with 'ZTF'.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZTF18acdyyp</td>
<td>12.012851</td>
<td>16.016165</td>
<td>0.4</td>
</tr>
</tbody>
</table>

[Run Cone Search]
## Context Classification

**MySQL Catalogue Database**

### "Sherlock" Catalogues ($10^{10}$ objects)

<table>
<thead>
<tr>
<th>Description</th>
<th>Number Rows</th>
<th>Visited</th>
<th>NED</th>
<th>Objects</th>
<th>Weight (1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide Star Catalogue 2.3</td>
<td>945,599,417</td>
<td>✓</td>
<td>stars</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PS1 Uterus Star Catalogue</td>
<td>700,861,417</td>
<td>stars</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDSS DR12 Stars and Galaxies from PhotoObjAll Table</td>
<td>474,039,669</td>
<td>stars, galaxies</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2MASS Point Source Catalogue</td>
<td>472,992,970</td>
<td>✓</td>
<td>stars</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>A stream of NED sources -- built as transients matched again</td>
<td>13,703,332</td>
<td>✓</td>
<td>multiple</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>SDSS DR12 Galaxies and QSOs from specObjAll table</td>
<td>3,050,811</td>
<td>galaxies, QSOs</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2MASS Extended Source Catalogue</td>
<td>1,647,569</td>
<td>✓</td>
<td>galaxies</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Million Quasars (MILLIQUAS) Catalog</td>
<td>1,143,111</td>
<td>QSOs, AGN, BL Lac</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalog of Quasars and Active Galactic Nuclei by Veron-Cetty</td>
<td>168,444</td>
<td>QSOs, AGN, BL Lac</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NED-O Galaxy Catalogue</td>
<td>94,959</td>
<td>galaxies</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kepler 2 Campaign Galaxies</td>
<td>11,805</td>
<td>galaxies</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinates parsed from ATels</td>
<td>6,516</td>
<td>multiple</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHE in the Bright Supernova List</td>
<td>6,269</td>
<td>SHE</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN candidates from PSST</td>
<td>5,656</td>
<td>SN Candidates</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transients from CRTS - MLS</td>
<td>5,437</td>
<td>multiple</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transients from CRTS - CSS</td>
<td>5,083</td>
<td>multiple</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN candidates from LSG</td>
<td>3,031</td>
<td>SN Candidates</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalog and Atlas of Cataclysmic Variables</td>
<td>1,800</td>
<td>CVs</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cataclysmic Binaries Catalog</td>
<td>1,721</td>
<td>CVs, LMXB</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galaxies from the IFS survey</td>
<td>1,088</td>
<td>galaxies</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The all-transients stream from ASASSN</td>
<td>1,002</td>
<td>multiple</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate from T0CP pages</td>
<td>836</td>
<td>multiple</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN candidates from the CIGLE survey</td>
<td>735</td>
<td>SN Candidates</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transients from CRTS - SSS</td>
<td>694</td>
<td>multiple</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN candidates from PESSTO users</td>
<td>487</td>
<td>SN Candidates</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The central RR triggers from ASASSN</td>
<td>308</td>
<td>RR Candidates</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HTM Indexing Scheme

![HTM Indexing Scheme](https://github.com/thespacedoctor/sherlock)
"Sherlock": Programmable Algorithms for Event Annotation

Search Module Parameters

- angular separation crossmatch radius
- physical separation crossmatch radius
- source magnitude filtering
- magnitude dependent search radii for bright stars and galaxies

Classifications & Reliabilities

- transient given a predicted classification based on the parameters of the catalogued source it matches against
- transients can be given multiple classifications which are later ranked
- a transient can either be synonymous with (within 0.5"), associated with (>0.5" away) or annotated by a catalogued source

Search Algorithms are written in YAML - plain text

https://github.com/thespacedoctor/sherlock
Object ZTF19aabyuzq

- Classified as SN at distance 2.05 arcsec.
- The transient is possibly associated with SDSS J12413768+481608.0; an r=18.88 mag galaxy found in the SDSS DR12 PhotoObjAll Table catalogue. It's located 0.31 N, 2.03 E (3.9 Kpc) from the galaxy centre. A host photoZ=0.104 (±0.040) implies a transient M = -18.59.
Lightcurve Classification

Integration of RAPID early lightcurve classifier coming soon!

Daniel Muthukrishna

https://astrorapid.readthedocs.io/en/latest/
User can make their own queries and choose private or public

Community provided public queries

Default “stream” queries supplied
Lasair Watchlists

A watchlist is a set of points in the sky, together with a radius in arcseconds. It is assumed to be a list of “interesting” sources, so that any transient that falls within the radius of one of the sources might indicate activity of that source. Each user of the Lasair system has their own set of watchlists, and can be alerted when a ZTF transient is coincident with a watchlist source.

You can create a watchlist of sources by preparing a text file, where each comma-separated line has an identifier for the source, then the RA and Dec in decimal degrees. One way to do this is with Vizier and a spreadsheet program such as Excel or Numbers. Here is an example of the CSV data. The 42 entries are Bl. Lac candidates for TeV observations (Massaro+, 2013)

An “Active” watchlist is one that is compared immediately when new ZTF candidates are ingested, with an alert sent immediately to the owner of the watchlist. (This feature is not yet implemented).

**Up to several thousand objects per list (at the moment)**

**Can be public or private**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Radius</th>
<th>Active</th>
<th>Public</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL Lac for TeV</td>
<td>Bl. Lac candidates for TeV observations (Massaro+, 2013)</td>
<td>0.5 arcsec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM CVn</td>
<td>These are 56 very close binaries of compact objects, from “The physical properties of AM CVn stars: new insights from Gaia DR2”, Ramsey et al, <a href="https://arxiv.org/abs/1810.06548">https://arxiv.org/abs/1810.06548</a></td>
<td>5.0 arcsec</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Near term requirements**
LIGO - Virgo object tagging for O3 (starting soon!)
APIs (e.g. TAP service for querying Lasair)
User defined alert mechanism (e.g. SMS)

Jupyter:
Make Jupyter available to all users - with "Overviews", "How-tos", "Getting started" pages
Provide standard queries for Jupyter notebooks
Allow private areas/folders and the ability to define groups within the Jupyter hub
Have ability for Jupyter notebooks to run automatically.

**Longer term requirements**
Provide a mechanism for allowing lightcurve analysis code to be uploaded
Vizier integration to allow spectra of objects in watch list to be pulled
Model and empirical lightcurve fitting
Lightcurve mashing from user-provided and other surveys
Integrate VISTA and or UKIDSS stamps
EUCLID: optical and NIR images, high-resolution stamps of transient location
HST and Spitzer overlap. Provide postage stamp of the pre-discovery position
Store transmission characteristics of filters for mapping lightcurves
Lasair + LSST

10^7 Alerts / day

New Detection + Associate with Existing Object

New Detection + New Object

Object Exists?

Database

UG Transients (SSD) > 10^9 rows
Locally Scored Object Catalogues (SSD) > 10^11 rows
HTM Spatial Indexing
LSST DR Stars > 10^11 rows

User SQL Queries

```
SELECT o.objID, c.ra, c.dec, o.gPSFMag, o.fPSFMag, c.distance
FROM LSST_transients AS o
JOIN dbo.fGetNearbyObjEq(108.75627, 22.942761, 0.0003) c
ON c.objid = o.objID;
```

User clients

Kafka Producer

Kafka Consumer

10 sq degrees, 3.2 GPixel

graceDB / breaker

LSST Stamps API - TBD

Get Stamps

User Web App

User SQL Queries

ALERT (Format TBD)

API

User clients

Producer?

Consumer?

Filter

K + TensorFlow

User Web App

User clients

[Diagram showing the flow of data from sensors to processing, queries, and user interface elements.]
Lasair

Next Steps

Submit formal Letter of Intent to be an LSST broker (May 15th)

Very large UK compute resource (IRIS) - hardware guaranteed (est 0.5 EB storage by end of survey and millions of hours/year CPU resource)

Certainly large enough to hold the estimated 2.2PB of alert data (https://dmtn-102.lsst.io/DMTN-102.pdf)

Lasair part of the overall U.K. plan for a full data access centre (DAC) with value added software and other data sets (Gaia, VISTA, UKIDSS)

Deploy Lasair onto the new IRIS petascale platform and scale up from ZTF to LSST, including database replication

Continue (in parallel) to explore no SQL technologies (e.g. foundationDB, Cassandra) and big data stacks (e.g. SMACK)
LSST Alert format example

```
namespace: "last",
type: "record",
name: "alert",
fields: {
  "documentId": { type: "long" },
  "objectId": { type: "long" },
  "ra": { type: "float" },
  "dec": { type: "float" },
  "apFlux": { type: "float" },
  "apMeanSb08": { type: "float" },
  "iPSFluxN": { type: "float" },
  "iPSFluxChi2": { type: "float" },
  "iPSFluxMean": { type: "float" },
  "x": { type: "float" },
  "y": { type: "float" },
  "flags": { type: "long" },
  "ra_dec_Cov": { type: "float" },
  "mu": { type: "float" },
  "parallax": { type: "float" },
  "muDec_parallax_Cov": { type: "float" },
  "parallaxVar": { type: "float" },
  "radec": { type: "double" },
  "filterName": { type: "string" },
  "name": { type: "string" },
  "diaObjectId": { type: "long" },
  "ra_dec": { type: "float" },
  "decDec": { type: "float" },
  "raDec": { type: "float" },
  "source": { type: "array" },
  "source": [{
    "ra": { type: "float" },
    "dec": { type: "float" },
    "apFlux": { type: "float" },
    "apMeanSb08": { type: "float" },
    "iPSFluxN": { type: "float" },
    "iPSFluxChi2": { type: "float" },
    "iPSFluxMean": { type: "float" },
    "x": { type: "float" },
    "y": { type: "float" },
    "flags": { type: "long" },
    "ra_dec_Cov": { type: "float" },
    "mu": { type: "float" },
    "parallax": { type: "float" },
    "muDec_parallax_Cov": { type: "float" },
    "parallaxVar": { type: "float" },
    "radec": { type: "double" },
    "filterName": { type: "string" },
    "name": { type: "string" },
    "diaObjectId": { type: "long" },
    "ra_dec": { type: "float" },
    "decDec": { type: "float" },
    "raDec": { type: "float" }
  }]
}
```

```
namespace: "last",
type: "record",
name: "diaObject",
fields: {
  "docId": { type: "long" },
  "name": { type: "string" },
  "diaObjectId": { type: "long" },
  "ra": { type: "float" },
  "dec": { type: "float" },
  "apFlux": { type: "float" },
  "apMeanSb08": { type: "float" },
  "base_CircularApertureFlux_3_0_flux": { type: "float" },
  "base_CircularApertureFlux_3_0_fluxSigma": { type: "float" },
  "base_CircularApertureFlux_4_0_flux": { type: "float" },
  "base_CircularApertureFlux_4_0_fluxSigma": { type: "float" },
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  "base_SquareApertureFlux_360_0_flux": { type: "float" },
  "base_SquareApertureFlux_360_0_fluxSigma": { type: "float" },
  "base_SquareApertureFlux_720_0_flux": { type: "float" },
  "base_SquareApertureFlux_720_0_fluxSigma": { type: "float" }
}
```

https://github.com/lsst-sims/sims_alertsim
Lasair Next Steps

Lightcurves – present assimilated diaSource alerts in diaObjects: providing interactive webpages (linked to database), plots, ability to select ranges, submit user added points. Previous history from Pan-STARRS, DES, Skymapper, ATLAS, CRTS, PTF/ZTF

Postage stamps (if available) – all LSST detections and most recent non-detections. Plus multi-colour images from LSST, near infra-red (VISTA/UKIDSS), H-alpha (VPHAS) and EUCLID, or HST/JWST if space based imaging is available.

Massive catalogue cross-match - with star, galaxy, AGN, x-ray, radio catalogues and provide enhanced classification (e.g. integrating machine learning) via "Sherlock"

Probabilistically classify all transients as: supernova – kilonova – GRB – Tidal Disruption Event – AGN – XRB – CV – eruption star – microlens – orphan (e.g. use of first 24-48hrs lightcurve - rapid rise/decline?)
Lasair Next Steps

In real-time, cross-match to all other wavelength time-domain surveys: gamma-ray, x-ray and radio (e.g. MEERKat/Thunderkat through 4pisky.org, Swift, SVOM, eRosita)

Cross match to all previously known transients: supernovae, transients, gamma ray-bursts, x-ray and radio burst sources (e.g. searching for currently unknown physical links over the time dimension)

Provide absolute mags when likely host spectroscopic (or photoZ) information is available

Multi-messenger cross-matching: 4D coincidence tag for LIGO/Virgo + IceCube

TOM outgest - especially 4MOST and SOXS
Lasair Current Plan

Real-time processing of an alert stream and full functional user interaction – Pan-STARRS and ATLAS
Fully functional database with 10^7 rows, real-time access and interaction by users
Build 1st Generation master catalogue of all-sky sources: USNO, GSC, SDSS, NED, Veron, Milliquas, CVs, MPC
Context and cross-matching classification code: Sherlock V1.0
Machine learning code operational for real-bogus classification
Link fully functional database to a public announcement stream
Hardware specifications for upscale to LSST data rates

QUB server ported to Edinburgh DAC
LASAIR V1.0 running on live stream
Build full master catalogues in DAC
Classification Algorithm development and testing
Build links to multi-wavelength/multi-messenger time domain surveys
Full Integration (with other Phase B WPs)

LASAIR+ ComCam operation and tests
LASAIR+ LSST full camera tests
LSST ComCam commissioning
Full focal plane camera commissioning
User Documentation
LASAIR+ LSST Science Operations

Apr 2017 | Apr 2018 | Apr 2019 | Apr 2020 | Apr 2021 | Apr 2022 | Apr 2023
---|---|---|---|---|---|---
Phase A Project Start
Working version of LASAIR V1.0
Release LASAIR V2.0
Release LASAIR V3.0
Start of LSST science surveys + LASAIR V4.0
Full scale operations

Producers:
Pan-STARRS, ATLAS, ZTF
Gaia DR2, Pan-STARRS DR2, DES, WISE, VISTA, UKIDSS, VST (KIDS, ATLAS, VPHAS)
Sherlock V2.0
LIGO-Virgo, IceCUBE, Swift, Fermi, eROSITA, SVOM, MeerKAT
Machine learning, 4MOST, SOXS spectra
Lasair is being used
(39 ATels - including ePESSTO as of April 25 2019)

SOAR telescope spectroscopic classification of optical transients

ATel #12508; R. Cartier (CTIO), G. Terreran, R. Margut (CTIO)
on 16 Feb 2019; 20:07 UT
Distributed as an Instant Email Notice
Credential Certification: Regis Cartier

FDST spectroscopic classification of SN 2019awc

ATel #12503; C. P. Gutierrez (University of Southampton), C. Frohmaier (University of Portsmouth - ICG), T. Muller-Bravo (University of Southampton), C. Inserra (Cardiff University), J. Anderson (ESO), C. Angus (University of Southampton), R. Cartier (CTIO), T.-W. Chen (MPE), T. de Jaeger (UC Berkeley), L. Galbany (University of Pittsburgh), S. Gonzalez-Gaitan (CENTRA), M. Grayling (University of Southampton), H. Kuncarayakti (University of Turku), J. Lyman (University of Warwick), A. Pastorello (INAF - Padova Astronomical Observatory) M. Pursiainen (University of Southampton), R. Roy (IUCAA), T. Schwery (MPE), M. Smith (University of Southampton), M. Sullivan (University of Southampton), P. Wiseman (University of Southampton).
on 14 Feb 2019; 18:40 UT
Credential Certification: Claudia Gutierrez (c.p.gutierrez-avendano@soton.ac.uk)

Subjects: Optical, Supernovae

We report the following supernova classifications. The targets are Facility (https://www.ztf.caltech.edu/; Kulkarni et al. 2018), through the Lasair broker (http://lasair.roe.ac.uk/), the ESA CASSINI and DPAC (http://gsaweb.ast.cam.ac.uk/alerts), and by the A'PASP, 123, 58) and Tonry et al. (ATel #8680). The observation was February 13 at the 4.1-m SOAR Telescope equipped with the 400 lines/mm grating, and a slit with spectral coverage from 380 nm to 775 nm with a resolution of SNID (Blondin & Tonry, 2007, ApJ, 666, 1024) and Gelato (383).

Subjects: Optical, Supernovae, Transient

The Fast and Dark Side of Transients experiment (FDST; ATel #12362) reports the spectroscopic observation of SN 2019awc. Targets were supplied by the Zwicky Transient Facility (https://www.ztf.caltech.edu/; Kulkarni et al. 2018, ATel 11266) and processed through the Lasair broker (http://lasair.roe.ac.uk/). Classifications were done with SNID (Blondin & Tonry, 2007, ApJ 666, 1024).

The observations were performed on 2019-02-13 using SPRAT (Piascik et al 2014) on the Liverpool Telescope (Gonzalez et al 2004).
First prototype version is running. See https://lasair.roe.ac.uk

User created queries always welcomed

Loi will be submitted

Scaling up to LSST has begun

Other data storage technologies being explored

lasair-help@lists.roe.ac.uk
https://github.com/lsst-uk/lasair/issues