

SNEx: The Supernova Exchange

An LCOGT Supernova Key-Project Collaborative Tool

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The latest version of this document can be found at:

http://secure.lcogt.net/user/supernova/dev/twiki/pub/Main/WebHome/Using_SNEx.pdf

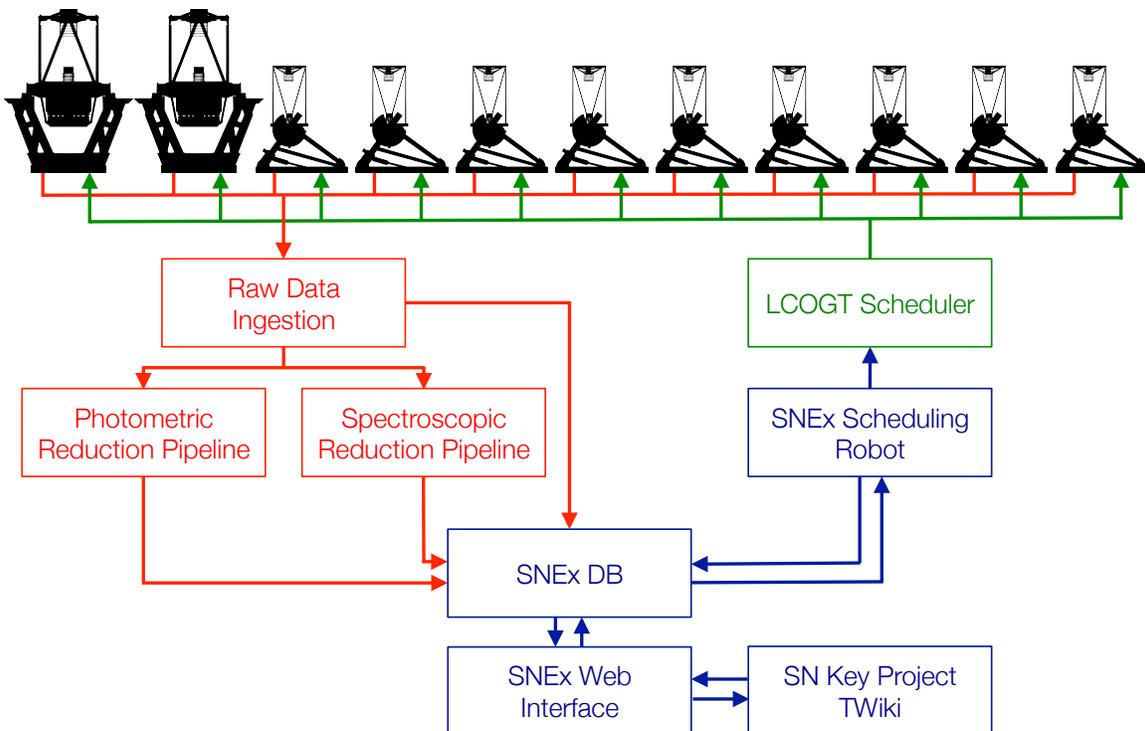
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1 Introduction

The Supernova Exchange (SNEx) is a web-based tool for obtaining, viewing, sharing, and analyzing observations of supernovae (SNe) obtained through Las Cumbres Observatory Global Telescope (LCOGT) Network. SNEx is designed initially for use by members of the LCOGT SN Key Project, with the goal of sharing observation requests and data and for conducting an open exchange of ideas. SNEx replaces the "LCOGT SN Marshal" which is now obsolete.

At the core of SNEx is a MySQL Database, which stores data and links to data files, as well as meta-data about each SN (such as its coordinates, its various names, type, comments posted by users, viewing permissions etc.). This database is queried through custom Python scripts run from cgi files that then create an HTML output delivered to the web browser.

SNEx is fed both raw and reduced data by the LCOGT SN data ingestion and reduction pipelines. These pipelines handle both photometric data (from the LCOGT 1m SBig and Sinistro cameras and the 2m Spectral camera) and spectroscopic data (from the LCOGT 2m Floyds instrument). SNEx will accept external data in the near future.



The public entry page (for non-registered users and users who have forgotten their login credentials) is <http://secure.lcogt.net/user/supernova/dev/public/>

For registered users, the entry page is <http://secure.lcogt.net/user/supernova/dev/cgi-bin/main.cgi>

For assistance regarding topics not covered in this document, please email snex@lcogt.net

2 Requesting a User Account

User accounts are currently given to members of the LCOGT SN Key Project only. If you are eligible for an account, please go to the public link above and request one. You will be required to enter your name, institutional email address and to select the specific groups you would like to be a member of. Please go over this list carefully, as it will influence the data and objects you will be able to see. Note that you can be a member of more than one group.

Users with existing accounts to the “LCOGT SN Marshal” should be able to use their accounts also for SNEEx with the same credentials (and discontinue use of the “LCOGT SN Marshal” pages). You may be requested to update your personal information (name and email address) upon login. Your email address is required if you ever need to reset a forgotten password, for receiving notifications about observing requests and about objects you subscribe to (future capability).

Once your account has been submitted, it will be reviewed by the SNEEx admins. You will receive a notification to the email address provided if your account is created. This notification will include an initial password to access the system via the registered users entry page. For security reasons, please change this password as soon as you log in for the first time.

User accounts are personal. Please do not share your account information with anyone.

3 Objects

3.1 Adding an Object

To add an object, input its name or coordinates in the main search page. If the object does not exist in the system, you will have the option of adding it. You will be required to enter the object name and coordinates and to select its permissions (i.e. to which groups the object will be visible). By default, the groups you are a member of are

selected (or all sharing groups are selected, if you are exclusively a member of sharing groups – see Section 8 for details).

3.2 Searching for an Object

Objects can be searched for by name (or partial name) or by coordinates. Just enter either of these in the main search page. Coordinates can be entered in either hexadecimal or decimal notation.

3.3 The Object Page

If an object is found within 2" of the desired coordinates, or with a name matching the given pattern, then you will be taken to the object overview page. If more than one object matches your search criteria, you will be taken to the disambiguation page, from which you can select the desired object and see its overview page.

The overview page displays the object name, coordinates, type and redshift (if assigned). Type and redshift may be assigned / changed after hovering over the current values. Note that each type also has a "question mark version" down the list, in case it is an uncertain classification.

A list of all other names associated with the same object can be seen on the left. Hover near the "+" sign and click to add a name to the list (e.g. the same object may have a PSN, SN, LSQ and/or PTF name, etc).

A list of all the groups that have permission to see this object is shown. For more information on object permissions see Section 8.

In addition, the overview page displays comments about the object, its observability plot, latest images, an SDSS image of the field and a light curve and spectral plot if data is available. In all plots (photometry, spectroscopy and visibility), it is possible to zoom by selecting a rectangle with the mouse. The "[reset]" button on the top left corner of the plot will reset the zoom. Hovering on a photometric data point will display its information. For targets with a known redshift above 0.01, the absolute magnitude is also shown in the light curve.

The top right corner of the page contains a series of icons, which will load different subpages for this object. You may return to the overview page at any time by clicking the large  icon. The other pages are:

	Photometry Page (under construction)
	Spectroscopy Page – See section 6
	Image Examine Page – See section 5
	Cross Reference Page (under construction)
	Comments Page (under construction)
	Observation Scheduling Page – See section 4
	Batch Download Page (under construction)
	Upload Data (under construction)
	Subscribe to Notifications (under construction)

In addition, the ★ icon can be used to add this object to your favorites (under construction).

4 Requesting Observations

Photometric and spectroscopic observations can be requested in one of two manners: as a single (i.e. one-time) observation or as a sequence of observations with a given cadence (i.e. observations every fixed number of days or hours).

4.1 Submitting a Request for Observations

To request observations, click on the  icon in the top right corner of the object page. You will be able to see if there are any observing sequences currently active for this object. Sequences in black are active, sequences in grey are no longer active, and sequence in green are pending LCOGT approval.

Note that there may be additional sequences, which were requested by a different (non-sharing) group, and are not displayed to you (see Section 8).

Enter the exposure times and number of sub-exposures for each desired filter. The block number should be 1 for all exposures, unless there is a specific reason to split the series to two or more blocks (e.g. the full series would be too long to fit during the visibility window for the object). If this is the case, you may enter a different block number for different filters (e.g. B,V as block number 1 and g,r,i as block number 2 –

this will split the observations into two blocks, each submitted separately and independently of the other).

Fill in the rest of the required observational details (see the Appendix for information on telescopes, instruments and suggested exposure times).

Please carefully go over the list of groups for which to give permissions for the observations. This will set which groups will be able to see the data once it's obtained (see Section 8 for more information regarding permissions).

You must enter at least one science tag for the sequence. The science tags serve as a general (non-binding) declaration of your intentions for this data. Tags do not guarantee exclusivity in using the data (for the tagged purpose or otherwise), but they are required so that observations are triggered with a specific plan in mind about how they will be used.

Submitted observations are sent to a pending queue, where they remain until someone from the LCOGT SN team approves them. The reason for this is that a non-sharing group may already be observing this object, and we wish to avoid duplication of observations. If this is the case, your request for observations will be merged with the existing one, and the data from this point on will be provided to both parties.

LCOGT should approve or merge pending observations within 24 hours (usually much less). If your observations are urgent, or if they have been pre-approved by an LCOGT member, you may use the “pre-approved / urgent observations” check box to skip the pending queue and send your request directly to the telescopes. Use this ONLY if your observations are pre-approved or are urgently needed within 24 hours.

Comments are not required but are strongly encouraged to help keep track of the rationale behind the particular choice of parameters requested.

4.2 Guidance on Submitting Targets

When submitting a target, the motivations should be:

- Will this ever show up in a publication?
- If screening a target: are there recent limits indicating that the target is likely to be young?
- Is the target unusual?
- Is ancillary data being collected somewhere else? This is not essential, but can persuade us to observe a target we otherwise would not.
- Is it close by? Again, this is not critical, but can sway us to observe an otherwise uninteresting target.

We most want to avoid old, “normal” targets. We do want to build a large sample of “normal” SNe, but it is critical that they be observed starting soon after explosion.

For photometry, we typically take observations in BVgri, though other filter combinations may be used.

For UV observations, we recommend using the Johnson U filter and not Sloan u, due to throughput considerations. Once all the SINISTRO cameras are deployed (see Appendix), this may change. In any case, UV observations should only be considered for young and bright targets.

4.3 Tracking Observation Requests

Once your observation sequence has been approved, you may track its progress. To do so, click the text showing the approved sequence in the scheduling page of the relevant object.

This will open a new browser tab with a timeline of submissions of observations to the telescopes. When observations were successfully obtained and ingested back to SNEEx, this will be noted.

Not all observation requests are fulfilled. Reasons for observations not being obtained include bad weather, observability constraints, technical problems or competing requests (also from non-SN programs running on the LCOGT Network).

The SNEEx scheduling robot will re-schedule unfulfilled observing blocks and will try to maintain the desired cadence for the sequence. If your observations fail repeatedly after several consecutive attempts, contact snex@lcogt.net.

LCOGT members will monitor all ongoing observation sequences and will adjust exposure times if necessary, or stop observations if the object is no longer visible.

4.4 The Scheduling Robot

The SNEEx scheduling robot goes over the list of all active and approved observing sequences every 10 minutes, and checks if any observations are required in the next 24 hours (the scheduling robot does not submit observations more than 24 hours in advance).

The robot will submit an observing block to the telescopes if at least one of the following criteria is met:

1. This is a newly approved sequence, and no observation request has yet been sent to the telescopes.

2. A new set of observations is needed in the next 24 hours in order to maintain the desired cadence (if the desired cadence is less than 24 hours, then this criterion is adjusted accordingly).
3. A previous observing block has failed and needs to be attempted again immediately. A block is marked as failed if data in at least one of the requested filters does not appear in the database a few hours (aka a “processing time”) after the block window is over. The current processing time is set to 0.7 days (except for observations with a requested cadence that is less than 24 hours, for which a processing time of 0 is taken). Even if only one of the filters in a block was not obtained, the block is resubmitted in its entirety.

For sequences with cadences of 1 day or more, the observing windows are set to 24 hours. For shorter cadences, the observing windows are set to the length of the cadence (i.e. if a cadence of 8 hours is requested, then the observing windows will be 8 hours each and they will be scheduled back to back).

5 Examining Images

The images obtained for an object can be viewed by clicking the  icon in the top right corner of the object page. You can browse through the images, change the zoom and “stretch” factor, and see the meta-data of each image on the left.

The images on the page are generated in real time from the original fits files. This may cause a few-second delay in displaying each image. The original fits files may be downloaded individually using the link below each image.

6 Viewing and Analyzing Spectra

The spectroscopy page can be accessed by the  icon in the top left corner of the object page.

The spectroscopy page will display a plot of all available spectra, followed by individual plots for each spectrum. Comments referring to a specific spectrum may be added next to it.

In all plots it is possible to zoom by selecting a rectangle with the mouse. The “[reset]” button on the top left corner of the plot will reset the zoom. Wavelength binning can be changed using the proper text box below the plot. Lines of certain elements may be over-plotted by bringing up the line plotting interface. It is also possible to shift the lines by a desired redshift and/or a blueshift expansion velocity.

7 Queries and Reports

Pages are currently being constructed for displaying lists of objects (of a certain type, with certain data coverage, currently being observed, etc).

8 Permissions

Permissions are managed separately for objects and for object data. The permissions of an object define which groups can see the object and are aware of its existence. Data permissions determine which groups can see each photometric data point or spectrum.

Each user belongs to one or more groups. Permissions to vie objects and data are set on a group-level basis (and not individually per user).

8.1 Object Permissions

Object permissions are initially set by the user when adding the object. SNEx administrators can later modify these permissions.

8.2 Data Permissions

Data permissions are set by the user requesting the observations. These permissions can be modified by SNEx administrators when coordinating different observation requests submitted by different groups. Groups that are not permitted to see the data are also not made aware of the existence of the request for an observing sequence.

8.3 Group Types

Following the SN Key Project data sharing policy, two types of groups are defined on SNEx: sharing groups and non-sharing groups.

Data obtained by non-sharing groups is kept proprietary to that group, while data obtained by any of the sharing groups is shared by all sharing groups (and not visible to non-sharing groups).

If you are a member of a sharing group, you will be obligated to share objects, observing requests, and their resulting data with all other sharing groups. You may share objects and data with additional groups at your discretion. If you are a member of a non-sharing group, you will be able to choose specific groups to share your objects and data with. All data and objects must be shared with LCOGT.

9 The SN Key Project TWiki

The SNEEx TWiki can be accessed via the link on the main SNEEx page or by going directly to: <http://secure.lcogt.net/user/supernova/dev/twiki/bin/view/Main/WebHome>.

You should use the same login credentials you use for SNEEx to access the TWiki. However, you do need to create a TWiki profile to be associated with these credentials. A link for creating your TWiki profile is provided in the welcome message at the link above.

The TWiki is like any other, with documents that can be edited by anyone. The data sharing policy can be found there as well as the latest version of this document. Please use the TWiki for any “meta” information regarding the SN Key Project, such as paper updates, your scientific interests, SNEEx feature requests etc.

Appendix A : The LCOGT Network

For a full overview of the LCOGT observing sites, telescopes and instruments see: [Brown et al. 2013, PASP, 125, 1031](#)

A.1. Sites and Telescopes

LCOGT operates nine 1m telescopes and two 2m telescopes. The 2m Faulkes Telescopes are located at Siding Spring, Australia, and Haleakala, Hawaii. There is one northern 1m site at McDonald Observatory in Texas. Other 1m telescopes include: three at CTIO in Chile, three at SAO in South Africa, and two at Siding Spring.



A.2. Instruments

In a few months all 1m sites are expected to have SINISTRO imagers, with a 26.4' (on a side) field of view. Currently all three CTIO telescopes have SINISTRO imagers, and all other sites have SBIGs with a 15.8' (on a side) FOV. For this reason, users must pick either the SINISTRO "network" (currently only CTIO), or the SBIG "network". For now, we favor the SBIG network for most observations.

Regardless of the site, all telescopes have a wide variety of filters, including the Sloan-like ugriz and Johnson-Cousins UBVRI.

The 2m telescopes have robotic FLOYDS low resolution spectrographs. This is a slit spectrograph covering 320 - 1000 nm in a single exposure. The spectrograph is cross-dispersed, and the blue side is in second order. The resolution is $R \sim 300-600$, depending on wavelength.

The two 2m telescopes also have two imagers: Merope and Spectral. Spectral is the preferred imager, and has a 10.5' (on a side) FOV.

A.3. Imaging Exposure Times

The official 1m exposure-time calculator is at http://lcogt.net/files/etc/exposure_time_calculator.html.

For guidance, the following rough values for observations in V-band can be used as a starting point:

Magnitude	Suggested 1m (SBIG/SINISTRO) V-band exposure time (seconds)	Suggested 2m (Spectral) V-band exposure time (seconds)
~21	n/a	300 x2
~20	200 x2	120 x2
~19	120 x2	n/a
~18	60 x2	n/a
<18	30 x2	n/a

For a given V-band exposure time “t” per image, the other filters should be scaled as:

U	4t x2
B	2t x2
V	t x2
R	t x2
I	t x2
u	4t x2
g	2t x2
r	t x2
i	t x2
z	2t x2

These scalings should be adjusted for particularly red or blue objects. In any case it is not recommended to use more than 400 seconds per single exposure.

Please monitor incoming images and notify SNEEx administrators if any exposure times need to be adjusted.

A.4. Spectroscopy Exposure Times

For FLOYDS spectroscopy, we recommend the following exposure times:

Magnitude	Suggested Exposure Time for Classification (seconds)	Suggested Exposure Time for Followup (seconds)
<17	900	1800
~17	1800	2700
~18-19	2700	3600

FLOYDS should not be used for targets fainter than magnitude 19.