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# **GSP Live User Manual**

***Release 1.0.0***

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**Aug 03, 2023**



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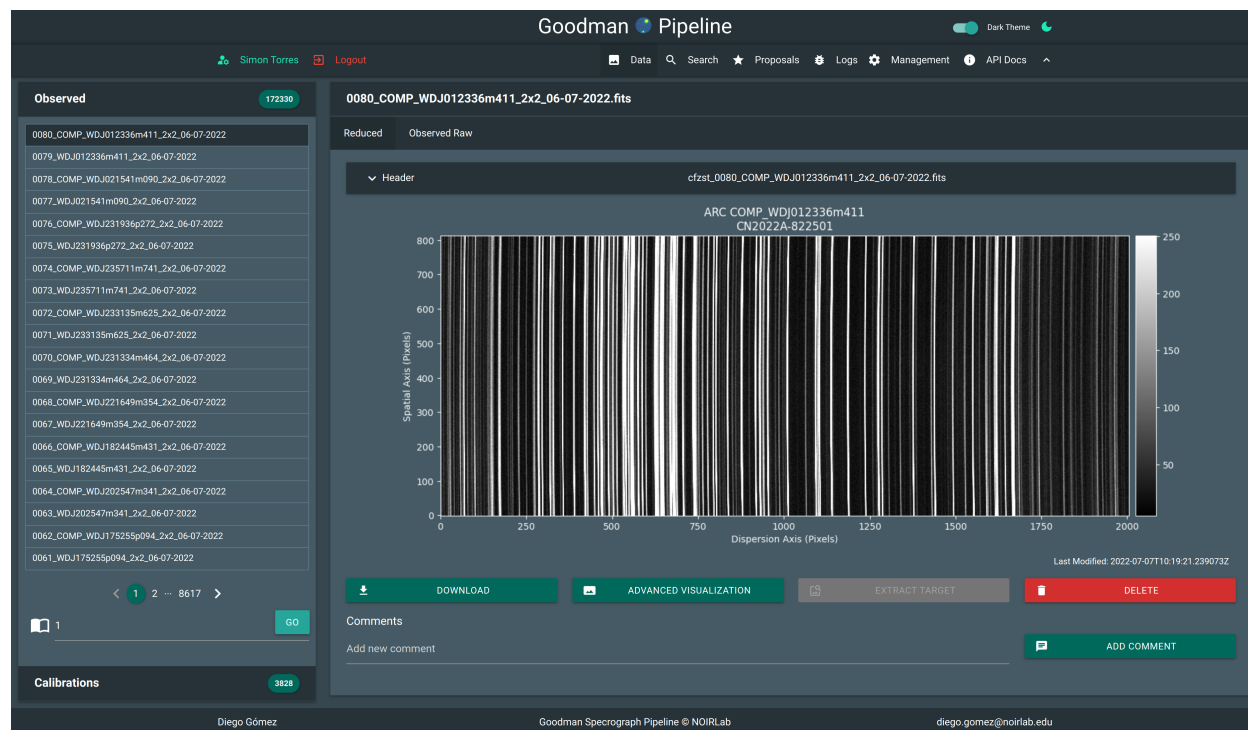




The Goodman Spectroscopic Pipeline Live is a web implementation of the [Goodman Spectroscopic Pipeline](#) package. In summary the reduction process has been broken in several parts that might include more than one step of the full process. Each of these parts has a correspondent web API end point.

All this is nicely presented to the user as a web page where the user can visualize fully reduced spectra just seconds after it was obtained. Also the user has the option of manually triggering certain process blocks.

**Note:** The user get access permission by proposal association. We ask our users not to share their credentials. We aim to make it very easy for PIs to add new collaborators.





## OVERVIEW

We use Django and Django Rest Framework for build our backend API.

The *goodman-pipeline* package processes are very *granulated* as it should be. But for a web application such as ours we found out that the best option was to group many of the processes in blocks as described below. But in an observing run there are many types of files. We have *calibration* and *science* files.

### 1.1 File Types

#### Calibration files:

Calibration files are BIAS and FLAT files. They need to be combined into *master BIAS* and *master FLATs*. Each proposal has also associated a dedicated *data reduction settings* and there can be defined, among other things, what are the minimum number of calibration files required to trigger a combination of a *master BIAS* or *FLAT*.

#### Science files:

Science files are EXPOSE SPECTRUM and ARC though one can argue that ARC are calibration files, in a general sense they are treated as science files in this case.

### 1.2 Process Blocks

#### Reduce

Identifies suitable master flats and master bias and applies the *basic* data reduction process. For spectroscopic data it also trims the non-illuminated areas which produce artifacts. In general the process looks like this:

An EXPOSE files, which is the type given to *imaging data* can have the following process.

**Image Trim Bias Subtract Flatfielding Cosmic Ray Removal**

An SPECTRUM file will have the following:

**Image Trim Slit Trim Bias Subtract Flatfielding Cosmic Ray Removal**

#### Extract

Identifies targets in a SPECTRUM file and finds a suitable and compatible ARC lamps and performs fractional pixel extractions.

**Identify Trace Extract**

#### Wavelength Calibration

Using the extracted lamps it performs the wavelength calibration process using a template lamp from a library and series of cross correlations, then fits a mathematical model, resamples the spectrum to a linear dispersion axis and saves the file.

**Flux Calibration**

This is not implemented yet but it will.

**Astrometric Solution**

This functionality is under development.

## GETTING ACCESS

**Warning:** We allow everyone to have an account. Please don't share your credentials with anyone.

Any astronomer with an observing proposal can have access. Principal Investigators (PIs) can also create users to be added as collaborators to their respective proposals.


The server is protected under a VPN connection that you can get from your Instrument Scientist or by any trusted contact you have at SOAR Telescope.

At the beginning of the semester all PIs are registered with their respective proposals. And they will receive an email that contains a link to set a safe password. Our backend does not allow simple or too common password. In fact you will get the following messages.

- Your password can't be too similar to your other personal information.
- Your password must contain at least 8 characters.
- Your password can't be a commonly used password.
- Your password can't be entirely numeric.


### Password change


Please enter your old password, for security's sake, and then enter your new password twice so we can verify you typed it in correctly.

 Old Password

Password Requirements

1. Can't be similar to your other personal information
2. Must contain at least 8 characters
3. Can't be a commonly used password
4. Can't be entirely numeric

 New Password

 New Password Confirmation

CHANGE PASSWORD



## DATA VISUALIZATION

One of the greatest benefits from having a web user interface (UI) is the great flexibility it provides without having to install any special software and the data is downloaded through channels we use in our everyday life.

### 3.1 Understanding the UI

We will go into details later but for now this is what you see most of the time. It is meant to be simple to understand but we will go into explaining every part.

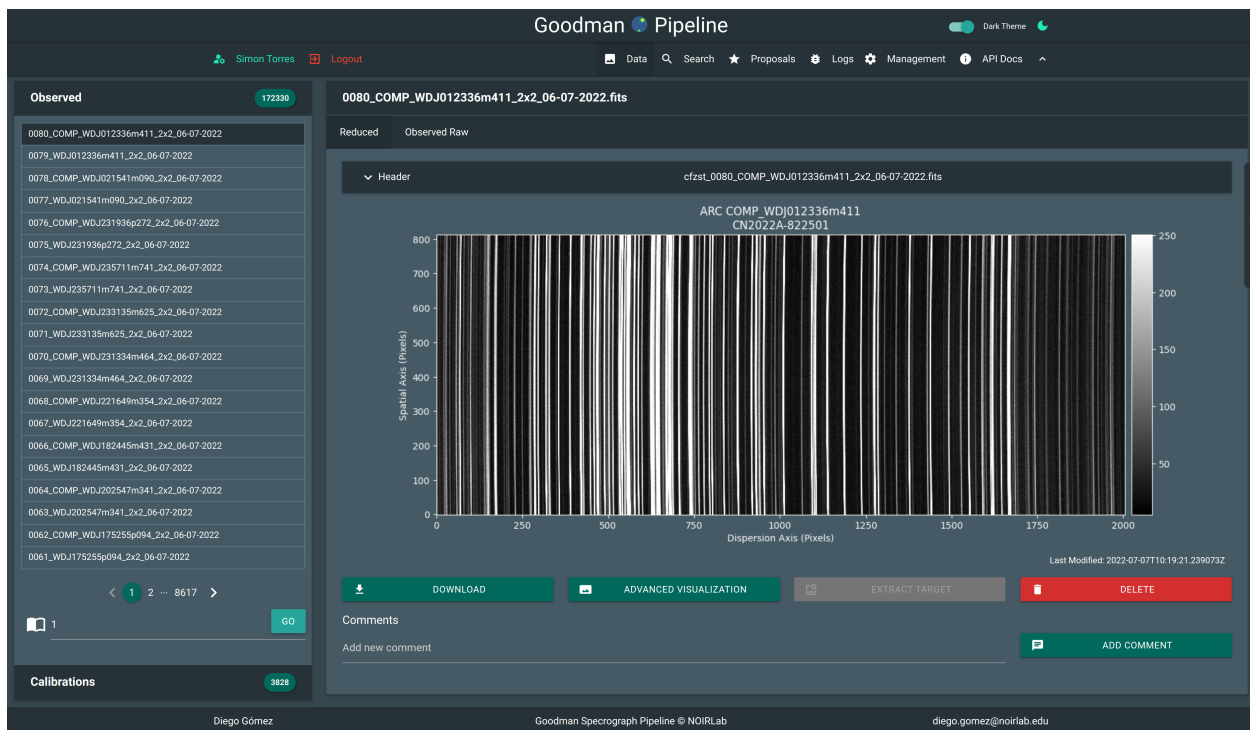


Fig. 1: Data detailed view.

For a detailed exploration we will divide the view in several subsections, for their global position please consider the following image.

Goodman Pipeline

Simon Torres Logout

Data Search Proposals Logs Management API Docs

Data Files 241545

File Name	Proposal ID	Obstype	Wavemode	Filter	Filter 2	Grating	Slit	ROI	Date	Type
cfzst_0080_COMP_WD.J012336m411_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0080_COMP_WD.J012336m411_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0079_WD.J012336m411_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0079_WD.J012336m411_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0078_COMP_WD.J021541m090_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0078_COMP_WD.J021541m090_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0077_WD.J021541m090_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0077_WD.J021541m090_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0076_COMP_WD.J231936p272_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0076_COMP_WD.J231936p272_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0075_WD.J231936p272_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0075_WD.J231936p272_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0074_COMP_WD.J235711m741_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0074_COMP_WD.J235711m741_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0073_WD.J235711m741_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0073_WD.J235711m741_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0072_COMP_WD.J23135m625_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0072_COMP_WD.J23135m625_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw
cfzst_0071_WD.J233135m625_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Reduced
0071_WD.J233135m625_2x2_06-07-2022	CN2022A-822501	ARC	930_M2	NO_FILTER	NO_FILTER	930_SVZY	1.0_LONG_SLIT	Spectroscopic 2x2	2022-07-07	Observed Raw

Filters

- By obstype
- By filter
- By filter\_2
- By grating
- By wavemode
- By slit
- By roi
- By technique
- By date

1 2 12078

GO

Diego Gómez Goodman Spectrograph Pipeline © NOIRLab diego.gomez@noirlab.edu

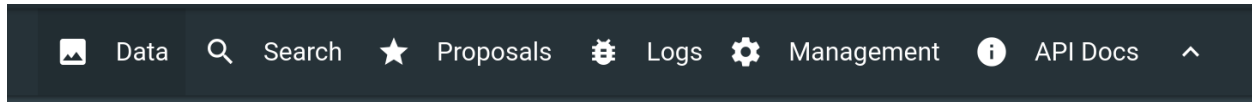
Fig. 2: Search view, implements some filtering functions.



Fig. 3: Detail: 1. Access to user controls and information. 2. Main navigation bar. 3. Quick access to files. 4. Related or child files. 5. Toggle header view. 6. Visualization area. 7. Visualization options. 8. Contextual actions. 9. Comments.



### 3.1.1 Main Navigation Bar



An always present navigation bar allows you to access:

#### Data Visualization

The view where you can visualize data as it arrives as well as trigger actions.

#### Search

Changes to Search view and implements filters.

#### Proposals

Where you can see the proposals details, such as *Title*, *Abstract*, *Principal Investigator* and *Collaborators*. Also you can add or delete collaborators and edit the *Data Reduction Settings*.

#### Logs

Important log messages, not very detailed but the most relevant.

#### Management Menu

This is for staff users only and will be explained in the staff chapter.

#### API Docs

Contains the documentation of the Public API in case you want to develop your own tools.

### 3.1.2 User Controls



By clicking the username button you get access to some user details and settings. Also you can change some preferences.

### 3.1.3 File Index

This area allows you to navigate the files, they are ordered from newest to oldest, if you want to filter the data you should go to **Search**.

In this area you can also see only combined calibration files such as, master BIAS and master FLAT, those are visible to everyone.

The screenshot shows a user profile settings page. The top section, titled 'User Information - [redacted]', contains four input fields: 'First Name' (Simon), 'Last Name' (Torres), 'Email' (simon.torres@spaweb.com), and 'API Token' (a masked string). To the right of the email field is a dropdown menu labeled 'OTHER'. At the bottom right of this section are two buttons: 'CHANGE PASSWORD' (red) and 'APPLY CHANGES' (teal). The bottom section, titled 'Visual Options', features a color map dropdown set to 'Gray' and two toggle switches: 'Show saturated pixels' and 'Show title', both of which are currently turned on (indicated by green checkmarks).

### 3.1.4 Related Files

All files are indexed by its raw parent file. Every file that was derived from that parent it is treated as child and are listed along this section. The buttons are tab handles.

### 3.1.5 Header

Will make the header visible in a searchable table.

### 3.1.6 Visualization Choices

Allows to select a different color map for images, show or not saturated pixels and an image title.

### 3.1.7 Contextual Actions

This area is where you can trigger actions.

#### Download

For download the FITS file.

#### Advanced Visualization

Takes you to another view where you can adjust the sampling limits for images. Or change the color map.

#### Calibrate Flux

It's an action that changes according the type of file that is on display. For instance for a raw file will be **Reduce Raw File**.


#### Delete

Only possible for processed files. Raw files can't be deleted.

**Observed** 172330

0006_Focus-Blue-SP-930_M2-NO_FILTER_05-07-2022
0005_Focus-Blue-SP-930_M2-NO_FILTER_05-07-2022
0004_Focus-Blue-SP-930_M2-NO_FILTER_05-07-2022
0003_Focus-Blue-SP-930_M2-NO_FILTER_05-07-2022
0002_Focus-Blue-SP-930_M2-NO_FILTER_05-07-2022
0001_Focus-Blue-SP-930_M2-NO_FILTER_05-07-2022
0323_WDJ182501-33
0322_WDJ182501-33
0321_WDJ164130-27-084030-46_05-07-2022
0320_WDJ164130-27-084030-46_05-07-2022
0319_ZTF18abedguq_003_05-07-2022
0318_ZTF18abedguq_003_05-07-2022_comp
0317_ZTF18abedguq_003_05-07-2022
0316_ZTF18abedguq_003_05-07-2022
0315_ZTF18abedguq_003_05-07-2022
0314_ZTF18abedguq_003_05-07-2022_comp
0313_ZTF18abedguq_003_05-07-2022
0312_ZTF18abbpvme_05-07-2022
0311_ZTF18abbpvme_05-07-2022_comp
0310_ZTF18abbpvme_05-07-2022

< 1 ... 9 10 11 ... 8617 >

 10 GO

**Calibrations** 3828

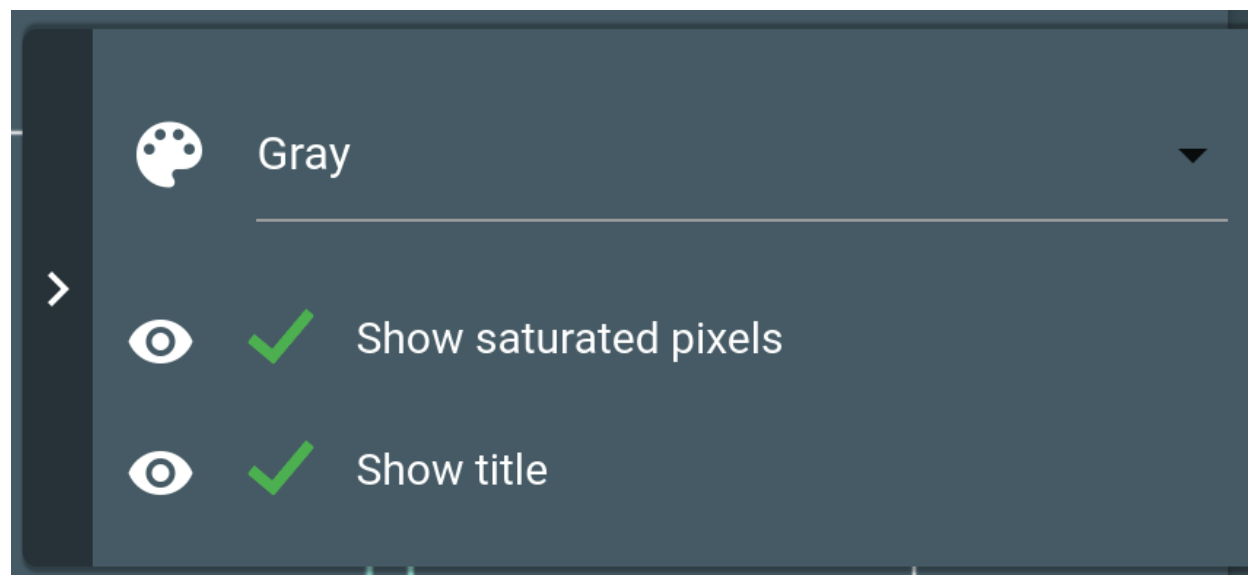
Wavelength Calibrated

Extracted

Reduced

Observed Raw

Header		
wecfzst_0317_ZTF18abedguq_003_05-07-2022_414_ws_1.fits		
Filter header		
Keyword	Value	Comment
SIMPLE	True	conforms to FITS standard
BITPIX	-64	array data type
NAXIS	1	number of array dimensions
NAXIS1	2005	
DATE-OBS	2022-07-05T03:05:47.806	DATE-OBS Format: YYYY-MM-DDThh:mm:ss.sss
DATE	2022-07-05	Date Format is YYYY-MM-DD
TIME	03:05:47.806 to 03:20:47.814	~ Start & Stop of Exposure
TELESCOP	SOAR 4.1m	
INSTRUME	GHTS_RED	
OBJECT	ZTF18abedguq	
NOTES		
INSTCONF	Red	
CAMSWV	Beta 29	
CONSWV	8359,10	
INSTSWV	GSCS 2.0.17.6.6-Alpha	
CAMERA	Si 1110-111	
RA	15:25:05.206	right ascension [hh:mm:ss.sss]
DEC	08:05:26.237	declination [dd:mm:ss.sss]
AIRMASS	1.46	airmass at approx. start of exposure



### 3.1.8 Visualization Area

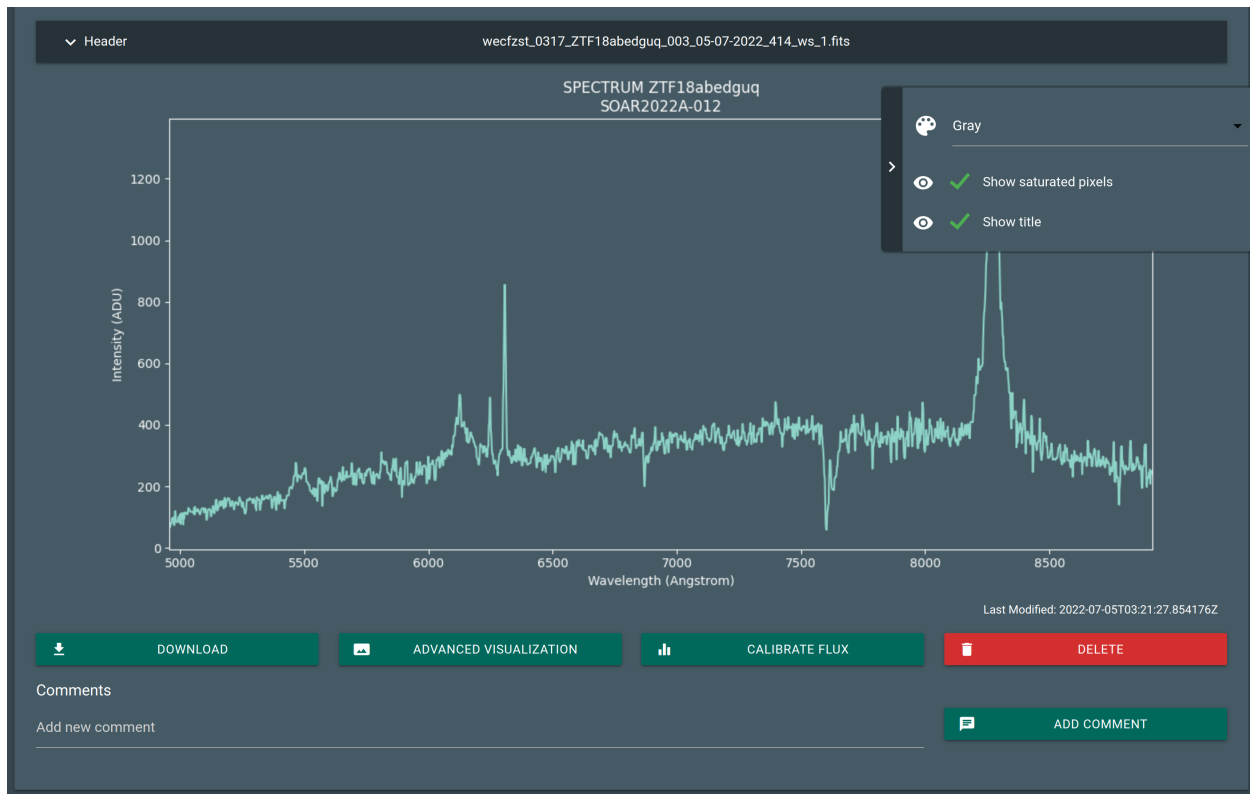


Fig. 4: Example of a static data visualization.

In this area you see the plots or the images. There is an interactive way that uses [Bokeh](#) but is slower. and for now it only allows you to zoom in or out.



## DATA REDUCTION SETTINGS

In your navigation bar click in **Proposals** then the cogs icon.



Now you can change the settings that will be used for this particular proposal in all reduction steps and in every new file.

### Data reduction settings - GHTS\_ENGINEERING

#### General Settings:

Saturation Threshold (% of pixels)

1

Percentage of saturated pixels allowed. Default is 1. This filter is applied only to flat images.

Cosmic ray rejection

DCR

Setting 'default' will automatically choose the method that worked best in our tests. 'dcr' is a method that was developed by Wojtek Pych. 'lacosmic' is astrocrappy's implementation of LaCosmic.

Technique

Spectroscopy

What observing technique was used.

#### Calibrations:

☐ Ignore bias

If set to True the steps were a BIAS correction is required will be skipped.

☐ Ignore flats

If set to True the steps were a FLAT correction is required will be skipped.

Minimum Number of Bias

10

Minimum number of BIAS files required to trigger the build of a Master Bias

Minimum Number of Flats

10

Minimum number of FLAT files required to trigger the build of a Master Flat

#### Flat Normalization:

Flat Normalization

Simple Fit

'mean' will calculate an overall mean to the image and normalize by it. 'simple' will calculate the median dispersion profile (collapses the spatial axis) and fit a Chebyshev polynomial of order 15 by default. 'full' is only for experimental purposes and it takes too long to process.

Flat Normalization Order

15

Order of the Chebyshev model to fit to the dispersion axis in flat normalization.

#### Spectroscopic Target:

Extraction Type

Fractional Extraction

Only 'fractional' is implemented.

Target Fit Model

Moffat

Mathematical model to fit to the spatial profile of a spectroscopic target.

Maximum Number of Targets

3

Maximum number to detect in a single image.





## COLLABORATORS

Click in **Proposals** and then the *Person* + icon.



Now you can add or remove collaborators for all the proposals you have permissions to do so. If you are a collaborator you can't add or remove other collaborators.

Proposal List

GHTS\_ENGINEERING

SOAR Observer

1

SOAR Observer

0

Richard Lee

2

Luisa Hernandez

1

Francisco Morales

1

Sally Whittington

1

Markus Hunderbush

1

Wendy Paez

1

W. Lee

1

Andy Howell

1

Luisa Hernandez

1

Guillermo Toranzo

1

Ryan Foley

1

Francisco Morales

2

Francisco Morales

2

Richard Whittington

0

SOAR Observer

1

SOAR Observer

1

Richard Whittington

1

Guillermo Toranzo

0

<

1

2

3

4

>

3

GO

Collaborators - GHTS\_ENGINEERING

✉

Collaborator Email

+

Name

Email

SOAR Observer

soarobserver@ghs.com



## API DOCUMENTATION

More on this can be found on *Developer's Guide* chapter. You can get here from clicking **API Docs** in the navigation bar.

In this section you can even try the API if you are authenticated.

Schemes  
HTTP

Django Login Authorize

Filter by tag

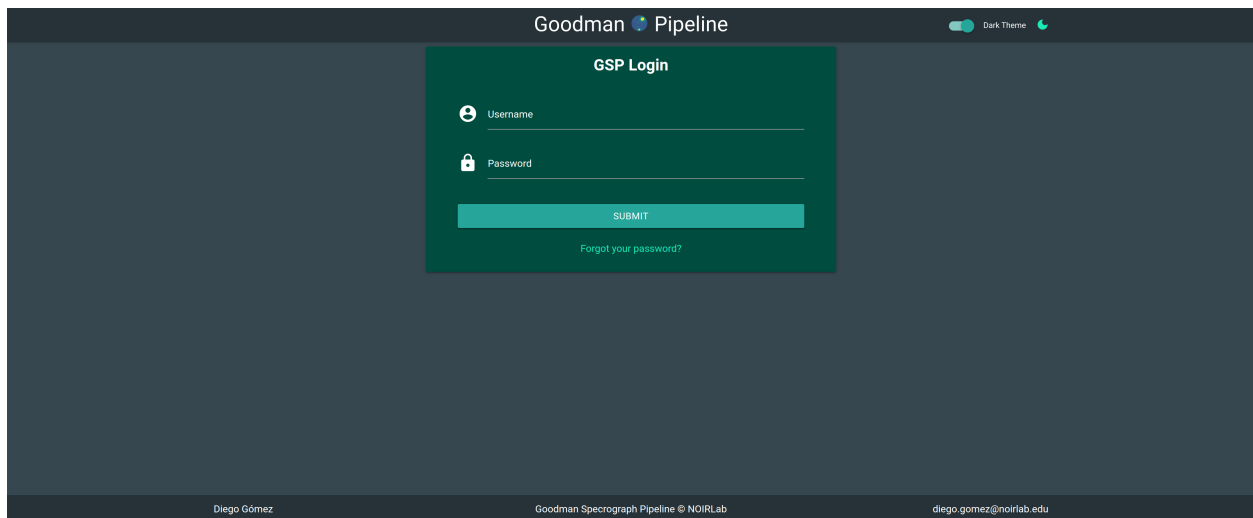
api

GET	/api/	Get API status	api_list	🔒
POST	/api/email/	Sends e-mail notifications	api_email_create	🔒
GET	/api/files/	Get a list of files.	api_files_list	🔒
POST	/api/files/	Adds a new file to the database	api_files_create	🔒
DELETE	/api/files/	Deletes files, it can't be a raw data.	api_files_delete	🔒
POST	/api/files/calibrations/		api_files_calibrations_create	🔒
GET	/api/files/header/	Obtains the header of a FITS file	api_files_header_list	🔒
POST	/api/files/reclassify/	Re identify observed technique	api_files_reclassify_create	🔒
POST	/api/files/reduce/	Runs default reduction procedure using reduction settings	api_files_reduce_create	🔒
POST	/api/files/spectrum/calibrate/wavelength/		api_files_spectrum_calibrate_wavelength_create	🔒
POST	/api/files/spectrum/extract/		api_files_spectrum_extract_create	🔒
GET	/api/files/visualize/	Creates visualizations for fits files.	api_files_visualize_list	🔒

Fig. 1: Public API documentation.



## SCREENSHOTS



Goodman Pipeline

Simon Torres Logout

DataSearchProposalsLogsManagementAPI Docs

All Observing Proposals

PI	SOAR ID	Title	Abstract	
Charles Hagelin	CN2022A-822501	Title not provided	No abstract available	<a href="#">as Details</a>   <a href="#">as Table</a>
Frederick Heiter	SOAR2022A-013	Use of PPA, HST and the observatory	One of the main scientific obj...	<a href="#">as Details</a>   <a href="#">as Table</a>
London Marshall	SOAR2022A-012	Long-term observations of red...	One of the properties characte...	<a href="#">as Details</a>   <a href="#">as Table</a>
Reuben Hogg	SOAR2022A-011	Searching for bright white dwarfs	We propose a spectroscopic sur...	<a href="#">as Details</a>   <a href="#">as Table</a>
Patricia Geras	SOAR2022A-010	Optical confirmation of redshift...	About 1 in 10 galaxies can be ...	<a href="#">as Details</a>   <a href="#">as Table</a>
London Marshall	SOAR2022A-009	Spectroscopic follow-up of red...	Old, metal-poor (MP) stars all...	<a href="#">as Details</a>   <a href="#">as Table</a>
Roger Linder	SOAR2022A-008	The progenitor of SN 1987A	We propose to identify the pro...	<a href="#">as Details</a>   <a href="#">as Table</a>
Carole Roth	SOAR2022A-007	Characterizing nearby dwarf galaxies	The recently selected ESA miss...	<a href="#">as Details</a>   <a href="#">as Table</a>
Frederick Heiter	SOAR2022A-006	White dwarf follow-up to the	We propose to obtain new spect...	<a href="#">as Details</a>   <a href="#">as Table</a>
J.J. Hermes	SOAR2022A-005	Confirming the planetary habit...	We propose to obtain low-resol...	<a href="#">as Details</a>   <a href="#">as Table</a>
David Hogg	SOAR2022A-004	Following Spectroscopy of the...	Changing-look AGN offer direct...	<a href="#">as Details</a>   <a href="#">as Table</a>
Todd Marshall	SOAR2022A-003	Optical Spectroscopy of a Red...	This proposal aims for taking ...	<a href="#">as Details</a>   <a href="#">as Table</a>
Julia Krumholz	SOAR2022A-002	White Supernovae with the G...	Observations of nearby superno...	<a href="#">as Details</a>   <a href="#">as Table</a>
Reuben Hogg	SOAR2022A-001	Young Supernova Experiment	The Young Supernova Experiment...	<a href="#">as Details</a>   <a href="#">as Table</a>
Michael Katz	SOAR2021B-012	WASP-123: A System of Nearby Planets	We are aiming to complete a la...	<a href="#">as Details</a>   <a href="#">as Table</a>
Wesley Dwyer	SOAR2021B-011	The Edge of the Galaxy	Where does the Galaxy end? Rec...	<a href="#">as Details</a>   <a href="#">as Table</a>
London Marshall	SOAR2021B-010	Spectroscopic follow-up of red...	Extremely metal-poor (EMP) sta...	<a href="#">as Details</a>   <a href="#">as Table</a>
London Marshall	SOAR2021B-009	Long-term observations of red...	One of the properties characte...	<a href="#">as Details</a>   <a href="#">as Table</a>
Roger Linder	SOAR2021B-008	Searching for First Supernovae...	Tidal disruption events (TDEs)...	<a href="#">as Details</a>   <a href="#">as Table</a>
J.J. Hermes	SOAR2021B-007	Confirming the planetary habit...	We propose to obtain low-resol...	<a href="#">as Details</a>   <a href="#">as Table</a>

Diego Gómez Goodman Spectrograph Pipeline © NOIRLab diego.gomez@noirlab.edu

Goodman Pipeline

Simon Torres Logout

DataSearchProposalsLogsManagementAPI Docs

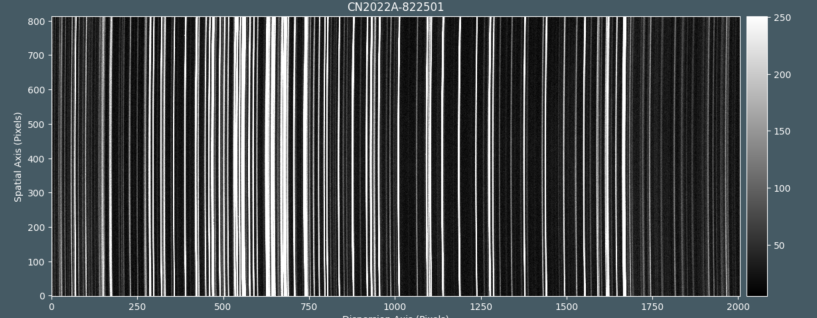
Observed 172330

0080\_COMP\_WD J012336m411\_2x2\_06-07-2022.fits

Reduced Observed Raw

cfzst\_0080\_COMP\_WD J012336m411\_2x2\_06-07-2022.fits

ARC COMP\_WD J012336m411  
CN2022A-822501



Spatial Axis (pixels)

Dispersion Axis (pixels)

Last Modified: 2022-07-07T10:19:21.239073Z

DOWNLOAD

ADVANCED VISUALIZATION

EXTRACT TARGET

DELETE

Comments

Add new comment

ADD COMMENT

Calibrations 3828

Diego Gómez Goodman Spectrograph Pipeline © NOIRLab diego.gomez@noirlab.edu

Goodman Pipeline

Dark Theme

Simon Torres Logout

DataSearchProposalsLogsManagementAPI Docs

Observing Proposals

CN2022A-822501

Claudia Aguilera

Title not provided

SOAR2022A-013

Francesco Massaro

AN OPTICAL VIEW OF THE UNKNOWN GAMMA-RAY SKY

SOAR2022A-012

Lorena Hernandez

Long-term observations of extremely variable AGN: probing disk models

SOAR2022A-011

Nicolas Teyss

Searching for bright AGNs towards the Large Magellanic Cloud

SOAR2022A-010

Patricia Arevalo

Optical confirmation of newborn AGN

SOAR2022A-009

Lorena Morano

Spectroscopic follow-up of candidates extremely metal-poor stars selected from the photometric survey S PLUS

SOAR2022A-008

Rogio Carter

The progenitor of G272.2-3.2

SOAR2022A-007

Carrie Hall

Characterizing newly discovered distant comets to prepare for the ESA Comet Interceptor mission

SOAR2022A-006

Frederick Walter

Noise that Refuse to Die

SOAR2022A-005

J.J. Hermes

Confronting the planetary hypothesis for emission in some white dwarfs

SOAR2022A-004

David Harnan

Follow-Up Spectroscopy of X-ray-Selected Changing-Look AGN Discovered With eROSITA

SOAR2022A-003

Tamara Mundana

Optical Spectroscopy of A Drastically Fading Quasar

SOAR2022A-002

Griffin Hammerstein

Infant Supernovae with the Global Supernova Project

SOAR2022A-001

Georgios Dimitriadis

Young Supernova Experiment

SOAR2021B-012

Michael Koss

BASS: A Census of Nearby Powerful AGN

SOAR2021B-011

Alia Dawson

The Edge of the Galaxy

SOAR2021B-010

Lorena Morano

Spectroscopic follow-up of metal-poor stars selected from the photometric survey SkyMapper

SOAR2021B-009

Lorena Hernandez

Long-term observations of extremely variable AGN: probing disk models

SOAR2021B-008

Steven Bernard

Observing the First Spectroscopically Discovered Tidal Disruption Events with DESI

SOAR2021B-007

J.J. Hermes

Confronting the planetary hypothesis for emission in some white dwarfs

<1234>

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Diego Gómez

Goodman Spectroscopic Pipeline @ NOIRLab

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The screenshot displays the Goodman Pipeline web application interface. At the top, the header shows the user 'Simon Torres' with a 'Logout' button, and navigation links for 'Data', 'Search', 'Proposals', 'Logs', 'Management', and 'API Docs'. A 'Dark Theme' toggle is also present.

The main content area features a list of observations, each with a circular icon, a title, a subtitle, and a list of collaborators. The observations are:

- SOAR2020B-008: *Cesar Becerra*, Observation of Orion PMS stars
- SOAR2020B-007: *Nicholas Law*, Real-Time Transient Characterization with Eviscope
- SOAR2020B-006: *Lorena Hernandez*, Probing disk models in extremely variable active galactic nuclei
- SOAR2020B-003: *Francisco Masera*, HUNTING GAMMA-RAY BLAZARS WITH OPTICAL SPECTROSCOPIC OBSERVATIONS
- SOAR2020B-001: *Samy Milonogiannis*, An Autonomous Strategy and Coordination Engine for Next-Generation Surveys of NSF's OIR Lab
- TOM2020A-005: *Markus Hindermark*, Probing the population of black holes and planets in the Milky Way with microlensing

The detailed view for TOM2020A-005 is shown below the list:

**Probing the population of black holes and planets in the Milky Way with microlensing**

*Markus Hindermark*

Collaborators:

- Simon Torres*

Abstract:

Observing a variable source of transient light, matter and energy over a long time, in case of a sufficiently good alignment of a source star, a lens star, and the observer, multiple images are formed, comparable at all wavelengths. The phenomenon is known as microlensing. gravitational microlensing. The observed images lead to an increase in the observed brightness of the source. Microlensing events are rare and unpredictable, making the observation of a given event a challenge. However, the microlensing phenomenon is ubiquitous, and the observation of a given event can be used to probe the population of black holes and planets in the Milky Way. In this project, we aim to develop a microlensing detection and analysis pipeline, which can be used to detect and analyze microlensing events. The pipeline will be used to analyze data from the Goodman Pipeline, which is a next-generation survey of NSF's OIR Lab. The pipeline will be used to analyze data from the Goodman Pipeline, which is a next-generation survey of NSF's OIR Lab. The pipeline will be used to analyze data from the Goodman Pipeline, which is a next-generation survey of NSF's OIR Lab.

The bottom of the interface shows a pagination bar with the number '3' and a 'GO' button.





**Data reduction settings - GHTS\_ENGINEERING**

### General Settings:

Saturation Threshold (% of pixels)  
1  
Percentage of saturated pixels allowed. Default is 1. This filter is applied only to flat images.

Cosmic ray rejection  
DCR  
Setting 'default' will automatically choose the method that worked best in our tests. 'dcr' is a method that was developed by Wojtek Pych. 'lacosmic' is astrocrappy's implementation of LaCosmic.

Techinque  
Spectroscopy  
What observing technique was used.

### Calibrations:

☐ Ignore bias  
If set to True the steps were a BIAS correction is required will be skipped.

☐ Ignore flats  
If set to True the steps were a FLAT correction is required will be skipped.

Minimum Number of Bias  
10  
Minimum number of BIAS files required to trigger the build of a Master Bias

Minimum Number of Flats  
10  
Minimum number of FLAT files required to trigger the build of a Master Flat

### Flat Normalization:

Flat Normalization  
Simple Fit  
'mean' will calculate an overall mean to the image and normalize by it. 'simple' will calculate the median dispersion profile (collapses the spatial axis) and fit a Chebyshev polynomial of order 15 by default. 'full' is only for experimental purposes and it takes too long to process.

Flat Normalization Order  
15  
Order of the Chebyshev model to fit to the dispersion axis in flat normalization.

### Spectroscopic Target:

Extraction Type  
Fractional Extraction  
Only 'fractional' is implemented.

Target Fit Model  
Moffat  
Mathematical model to fit to the spatial profile of a spectroscopic target.

Maximum Number of Targets  
3  
Maximum number to detect in a single image.

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Chapter 7. Screenshots

## ADDING NEW USERS

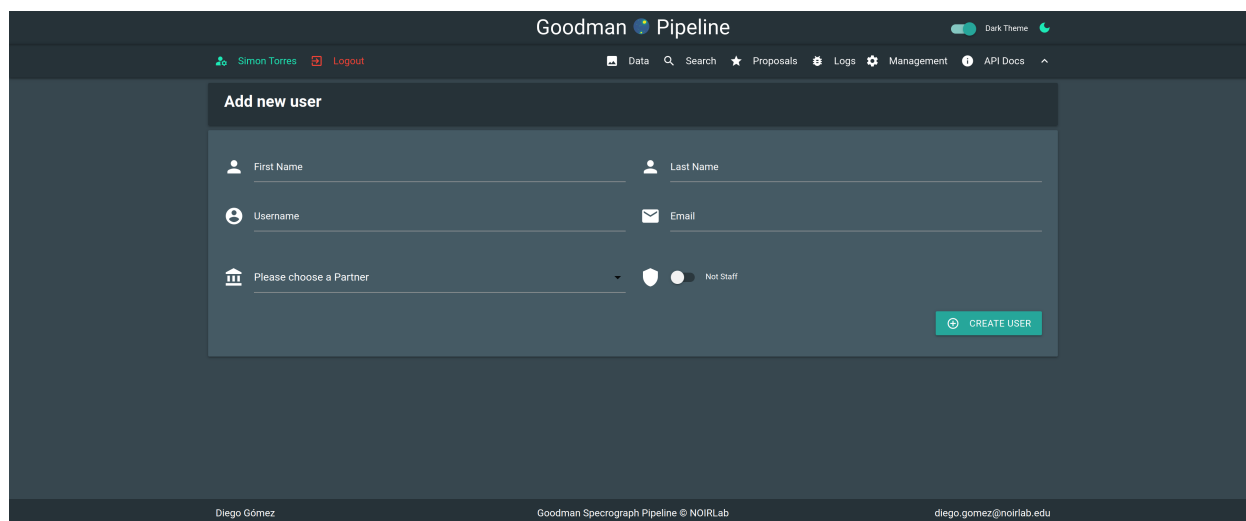
**Warning:** This section is meant for **staff** users only

There are several ways you can access the user creation form. The faster would be:

### Management Add User

Another way that will take you to the same form is:

Management Manage Users click **Add new**



The screenshot shows the 'Add new user' form in the Goodman Pipeline application. The form is titled 'Add new user' and is located within the 'Management' section of the application. It contains several input fields: 'First Name', 'Last Name', 'Username', 'Email', and a dropdown menu for 'Please choose a Partner'. There is also a toggle switch for 'Not Staff'. A 'CREATE USER' button is located at the bottom right of the form. The application header shows the user 'Simon Torres' and a 'Logout' button. The footer contains the text 'Diego Gómez', 'Goodman Spectrograph Pipeline © NOIRLab', and 'diego.gomez@noirlab.edu'.

Fig. 1: Add new user form

**Note:** Staff users can only be added from a super user account for now.

And the last one would be through Proposals's Collaborators



## ADDING NEW OBSERVING PROPOSALS

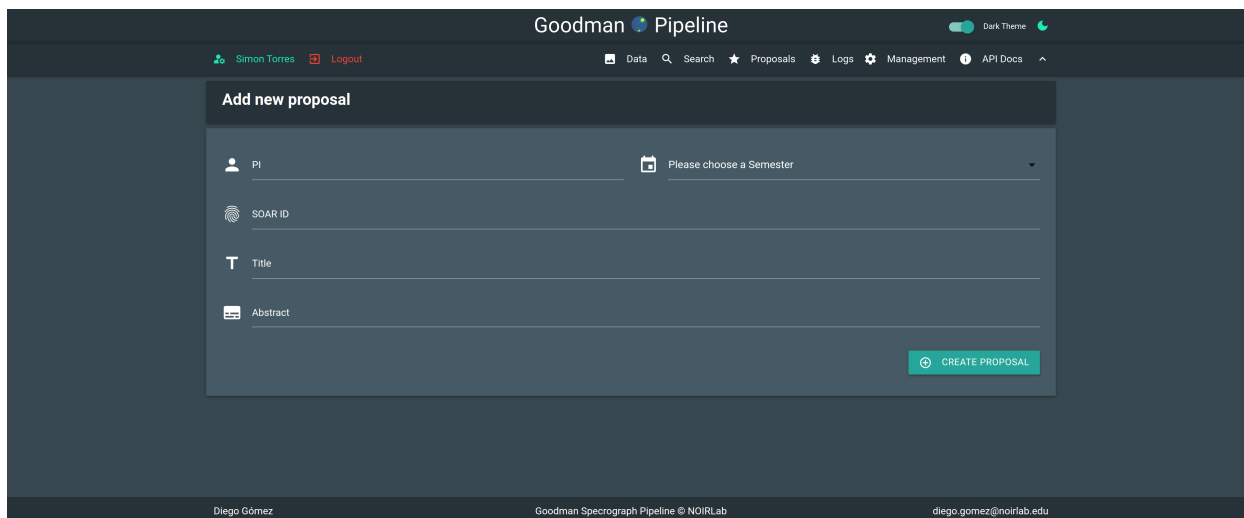
**Warning:** This section is meant for **staff** users only

If you created a user as described in [Adding new Users](#) you will be redirected to the *proposal creation form*. However, there are other ways too.

**Management Add Proposal**

and

**Management Manage Proposals** click **Add new**



The screenshot shows the 'Add new proposal' form in the Goodman Pipeline application. The form is titled 'Add new proposal' and is located in the center of the screen. It has a dark blue header with the text 'Goodman Pipeline' and a 'Dark Theme' toggle. The form itself is a light blue box with a dark blue border. It contains several input fields: 'PI' (with a person icon), 'Please choose a Semester' (with a calendar icon and a dropdown arrow), 'SOAR ID' (with a fingerprint icon), 'Title' (with a 'T' icon), and 'Abstract' (with a document icon). A green 'CREATE PROPOSAL' button is at the bottom right of the form. The footer of the application shows 'Diego Gómez', 'Goodman Spectrograph Pipeline © NOIRLab', and 'diego.gomez@noirlab.edu'.

Fig. 1: Add new proposal form

Make sure the SOAR ID is correct or PI or collaborators will not be able to see their data. The *Soar id* default value is set automatically depending on current semester and count.



## OVERVIEW

The Public API is thoroughly documented using swagger.

The screenshot displays the Swagger UI for the Public API. At the top, there's a 'Schemes' dropdown menu set to 'HTTP'. To the right are two buttons: 'Django Login' and 'Authorize' with a lock icon. Below these is a 'Filter by tag' input field. The main content area is titled 'api' with a dropdown arrow. It lists 12 API endpoints, each with a method (GET, POST, DELETE), a URL, a description, and a name with a lock icon. The endpoints are: 1. GET /api/ (Get API status, api\_list), 2. POST /api/email/ (Sends e-mail notifications, api\_email\_create), 3. GET /api/files/ (Get a list of files, api\_files\_list), 4. POST /api/files/ (Adds a new file to the database, api\_files\_create), 5. DELETE /api/files/ (Deletes files, it can't be a raw data, api\_files\_delete), 6. POST /api/files/calibrations/ (api\_files\_calibrations\_create), 7. GET /api/files/header/ (Obtains the header of a FITS file, api\_files\_header\_list), 8. POST /api/files/reclassify/ (Re identify observed technique, api\_files\_reclassify\_create), 9. POST /api/files/reduce/ (Runs default reduction procedure using reduction settings, api\_files\_reduce\_create), 10. POST /api/files/spectrum/calibrate/wavelength/ (api\_files\_spectrum\_calibrate\_wavelength\_create), 11. POST /api/files/spectrum/extract/ (api\_files\_spectrum\_extract\_create), 12. GET /api/files/visualize/ (Creates visualizations for fits files, api\_files\_visualize\_list).

Method	URL	Description	Name
GET	/api/	Get API status	api_list
POST	/api/email/	Sends e-mail notifications	api_email_create
GET	/api/files/	Get a list of files.	api_files_list
POST	/api/files/	Adds a new file to the database	api_files_create
DELETE	/api/files/	Deletes files, it can't be a raw data.	api_files_delete
POST	/api/files/calibrations/		api_files_calibrations_create
GET	/api/files/header/	Obtains the header of a FITS file	api_files_header_list
POST	/api/files/reclassify/	Re identify observed technique	api_files_reclassify_create
POST	/api/files/reduce/	Runs default reduction procedure using reduction settings	api_files_reduce_create
POST	/api/files/spectrum/calibrate/wavelength/		api_files_spectrum_calibrate_wavelength_create
POST	/api/files/spectrum/extract/		api_files_spectrum_extract_create
GET	/api/files/visualize/	Creates visualizations for fits files.	api_files_visualize_list

Fig. 1: Public API documentation.





## API EXAMPLES

**Warning:** Always trust the API docs page instead because it is updated along the API itself.

### 11.1 Get the list of raw files

```
import requests

api_key = 'some-fake-api-key-that-does-not-work'

# define request headers
headers = {'Authorization': f'Token {api_key}',
           'Content-Type': 'application/json'}

#define parameters
# 0: Raw files
# 1: Calibration Files (Master flats or bias)
# 2: Reduced files
# 3: Extracted 1D spectrum
# 4: Wavelength calibrated
# 5: Flux Calibrated
parameters = {"data_type": "0"}

# remotehost should be replaced with the actual host
# also the url can be composed as http://remotehost/api/files/?data_type=0
# in that case you don't need to pass the params argument.
response = requests.get(
    url='http://remotehost/api/files/',
    params=parameters,
    headers=headers)

if response.status_code == 200:
    json_response = response.json()

# alternatively you can use response.raise_for_status() and catch any exception

from request.exceptions import HTTPError

try:
```

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```

response.raise_for_status()
except HTTPError as http_error:
    log.exception(http_error)

```

Will produce a response like this. In this particular case the results have been truncated to just a couple of results.

```

{
  "count": 545,
  "next": "http://remothost/gsp/api/files/?data_type=0&page=2",
  "previous": null,
  "results": [
    {
      "id": 952,
      "created": "2021-02-18T10:22:10.340053-03:00",
      "last_modified": "2021-02-18T10:22:13.470928-03:00",
      "original_file": "0001_GHTS_B_400m1_2x2_18-02-2021.fits",
      "original_file_id": 952,
      "parent_file": "0001_GHTS_B_400m1_2x2_18-02-2021.fits",
      "parent_file_id": 952,
      "file_name": "0001_GHTS_B_400m1_2x2_18-02-2021.fits",
      "directory_name": "/pipeline/data/20210218/RAW",
      "full_path": "/pipeline/data/20210218/RAW/0001_GHTS_B_400m1_2x2_18-02-2021.
→fits",
      "obstype": "LAMPFLAT",
      "object": "DFLAT",
      "filter": "NO_FILTER",
      "filter_2": "NO_FILTER",
      "grating": "400_SYZY",
      "slit": "1.0_LONG_SLIT",
      "cam_targ": "11.6",
      "grt_targ": "5.8",
      "obsra": "17:38:33.320",
      "obsdec": "-48:23:59.899",
      "gain": "1.4",
      "rdnoise": "4.74",
      "roi": "Spectroscopic 2x2",
      "wavemode": "400_M1",
      "proposal_id": "calibrate",
      "observation_id": null,
      "configuration_id": null,
      "block_id": null,
      "image_id": 1,
      "date": "2021-02-18",
      "data_type": "0",
      "normalized": false,
      "technique": "Spectroscopy",
      "saturation_value": 49928
    },
    {
      "id": 900,
      "created": "2020-11-26T21:30:52.692308-03:00",
      "last_modified": "2020-11-26T21:30:55.204647-03:00",

```

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```

    "original_file": "0354_Orion-Burst_26-11-2020_comp.fits",
    "original_file_id": 900,
    "parent_file": "0354_Orion-Burst_26-11-2020_comp.fits",
    "parent_file_id": 900,
    "file_name": "0354_Orion-Burst_26-11-2020_comp.fits",
    "directory_name": "/pipeline/data/20201126/RAW",
    "full_path": "/pipeline/data/20201126/RAW/0354_Orion-Burst_26-11-2020_comp.
    ↪fits",
    "obstype": "ARC",
    "object": "ZTF20actqfpc",
    "filter": "NO_FILTER",
    "filter_2": "GG455",
    "grating": "400_SYZY",
    "slit": "1.0_LONG_SLIT",
    "cam_targ": "16.1",
    "grt_targ": "7.5",
    "obsra": "05:34:22.372",
    "obsdec": "-5:24:52.448",
    "gain": "1.48",
    "rdnoise": "3.89",
    "roi": "Spectroscopic 2x2",
    "wavmode": "400_M2",
    "proposal_id": "SOAR2020B-008",
    "observation_id": 1,
    "configuration_id": 1,
    "block_id": 0,
    "image_id": 34304,
    "date": "2020-11-26",
    "data_type": "0",
    "normalized": false,
    "technique": "Spectroscopy",
    "saturation_value": 69257
  },
  {
    "id": 895,
    "created": "2020-11-26T19:37:53.519510-03:00",
    "last_modified": "2020-11-26T19:37:55.892156-03:00",
    "original_file": "0353_Orion-Burst_26-11-2020_comp.fits",
    "original_file_id": 895,
    "parent_file": "0353_Orion-Burst_26-11-2020_comp.fits",
    "parent_file_id": 895,
    "file_name": "0353_Orion-Burst_26-11-2020_comp.fits",
    "directory_name": "/pipeline/data/20201126/RAW",
    "full_path": "/pipeline/data/20201126/RAW/0353_Orion-Burst_26-11-2020_comp.
    ↪fits",
    "obstype": "ARC",
    "object": "ZTF20actqfpc",
    "filter": "NO_FILTER",
    "filter_2": "GG455",
    "grating": "400_SYZY",
    "slit": "1.0_LONG_SLIT",
    "cam_targ": "16.1",

```

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```

        "grt_targ": "7.5",
        "obsra": "05:34:22.372",
        "obsdec": "-5:24:52.448",
        "gain": "1.48",
        "rdnoise": "3.89",
        "roi": "Spectroscopic 2x2",
        "wavmode": "400_M2",
        "proposal_id": "SOAR2020B-008",
        "observation_id": 1,
        "configuration_id": 1,
        "block_id": 0,
        "image_id": 34304,
        "date": "2020-11-26",
        "data_type": "0",
        "normalized": false,
        "technique": "Spectroscopy",
        "saturation_value": 69257
    }
}

```

## 11.2 Add Collaborator to Proposal

```

import requests

api_key = 'some-fake-api-key-that-does-not-work'

# define request headers
headers = {'Authorization': f"Token {api_key}",
           'Content-Type': 'application/json'}

#define payload
payload = {
    "email": "user@server.net",
    "action": "add"
}

# remotehost should be replaced with the actual host
response = requests.get(
    url='http://remotehost/api/proposals/collaborators/5/',
    data=payload,
    headers=headers)

if response.status_code == 200:
    json_response = response.json()

```

You get a serialized version of the proposal database instance.

```
{
  "id": 5,
  "soar_id": "calibrate",
  "semester": "2020A",
  "title": "Calibrations",
  "abstract": "How calibrations will be handled.",
  "user": {
    "id": 3,
    "username": "observer",
    "last_login": "2020-10-24T18:56:45.976000-03:00",
    "first_name": "Observer",
    "last_name": "Observer",
    "email": "observer@observatory.cl",
    "is_staff": true,
    "is_active": true,
    "date_joined": "2019-11-13T10:26:23-03:00"
  },
  "collaborators": [
    {
      "id": 41,
      "username": "user",
      "last_login": null,
      "first_name": "",
      "last_name": "",
      "email": "user@server.net",
      "is_staff": false,
      "is_active": true,
      "date_joined": "2021-03-24T15:32:23.329399-03:00"
    }
  ]
}
```

Since the user did not exists a new user was created.