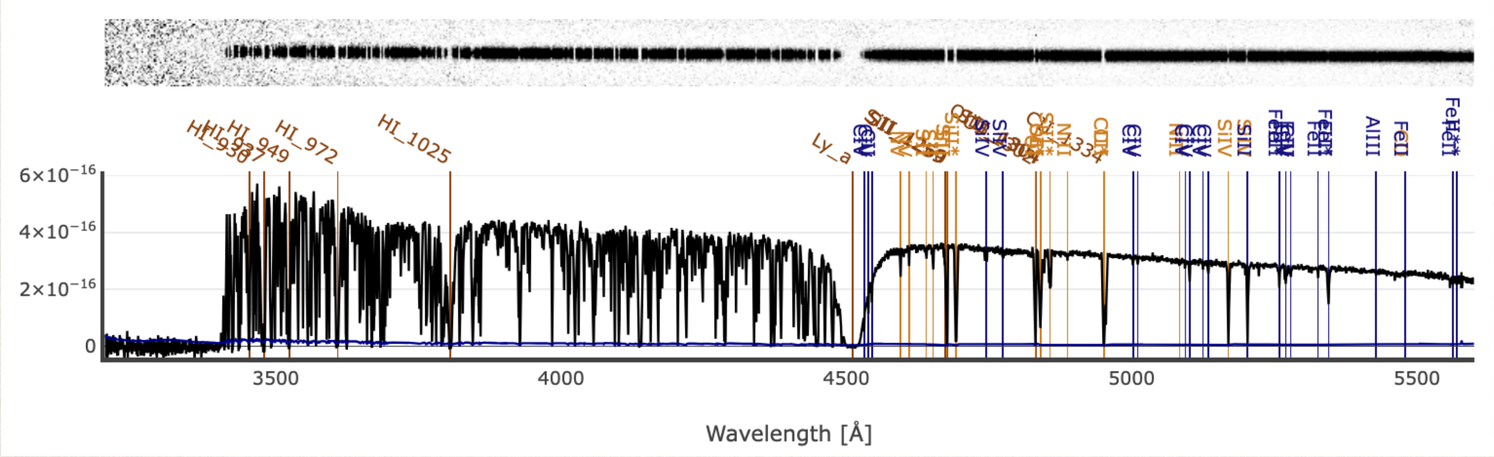
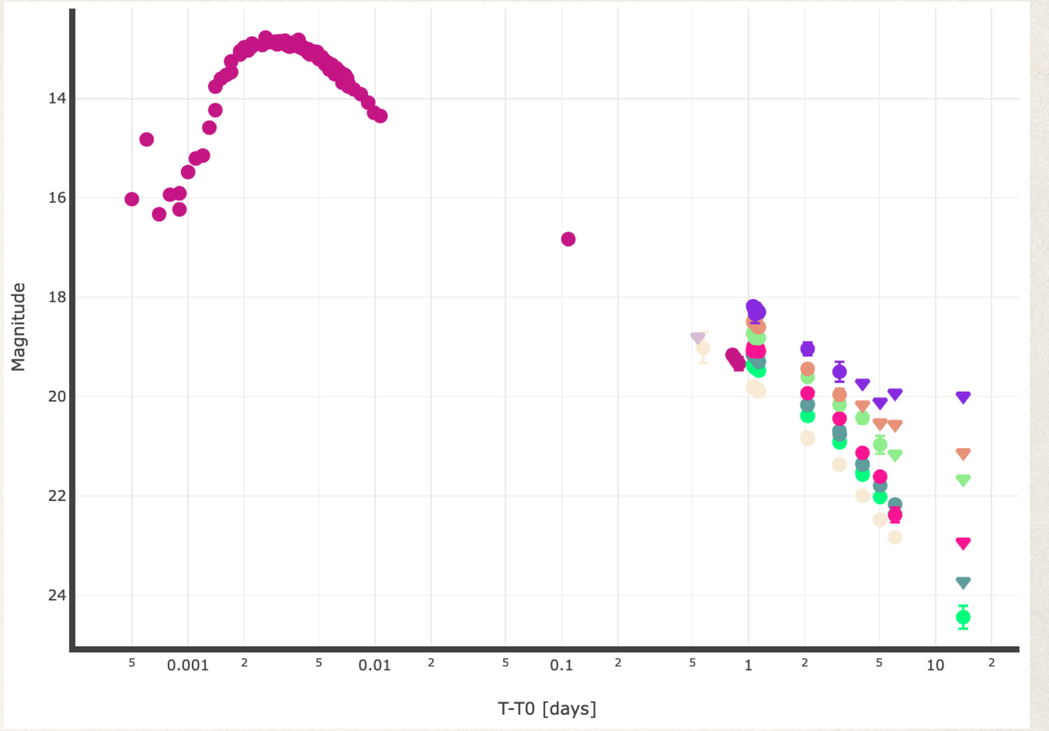
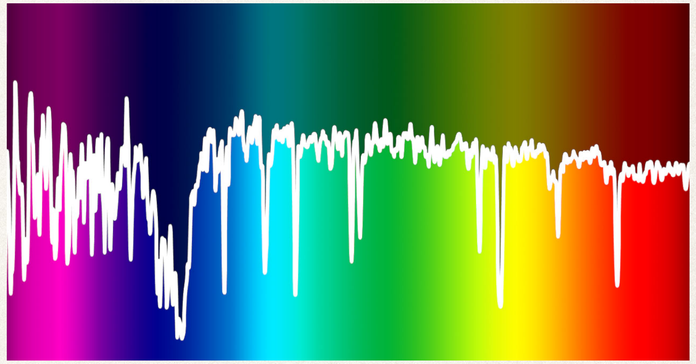




GRBSpec & GRBPhot
Gamma-ray burst databases

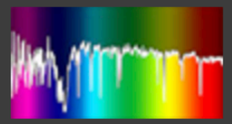


Antonio de Ugarte Postigo (CNRS-LAM)

2 December 2025

A spectroscopy database?

- Hundreds of GRB afterglow spectra from tens of different facilities
- Spectra reduction is complex
- Having access to large samples
- Collaborative effort
- Combine both GRB information and observations



Welcome to the GRBSpec database!

GRBspec is a database of GRB spectra that compiles spectra of gamma-ray bursts (GRBs) and their host galaxies. It is a collaborative effort in which users are invited to upload their data. Please register to be able to upload and download data. **GRBSpec is free!**

Database statistics

868 spectra
1857 GRB's, **290** with associated spectra
2148 uploaded files

When using GRBspec for a publication please cite: **"de Ugarte Postigo et al.: GRBSpec: a multi-observatory database for gamma-ray burst spectroscopy, SPIE, 9152 (2014), adsabs.harvard.edu/abs/ 2014SPIE.9152E..0BD"** and include in the acknowledgements: **"This work made use of the GRBspec database grbspec.eu"**.

This work is produced with the support of a 2016 Leonardo Grant for Researchers and Cultural Creators, BBVA Foundation. Previous funding was received from the Marie Curie Career Integration Grant programme (FP7-PEOPLE-2012-CIG 322307) and the Spanish research projects AYA2012-39362-C02-02, AYA2014-58381-P and AYA2017-89384-P.

What to store? GRB information

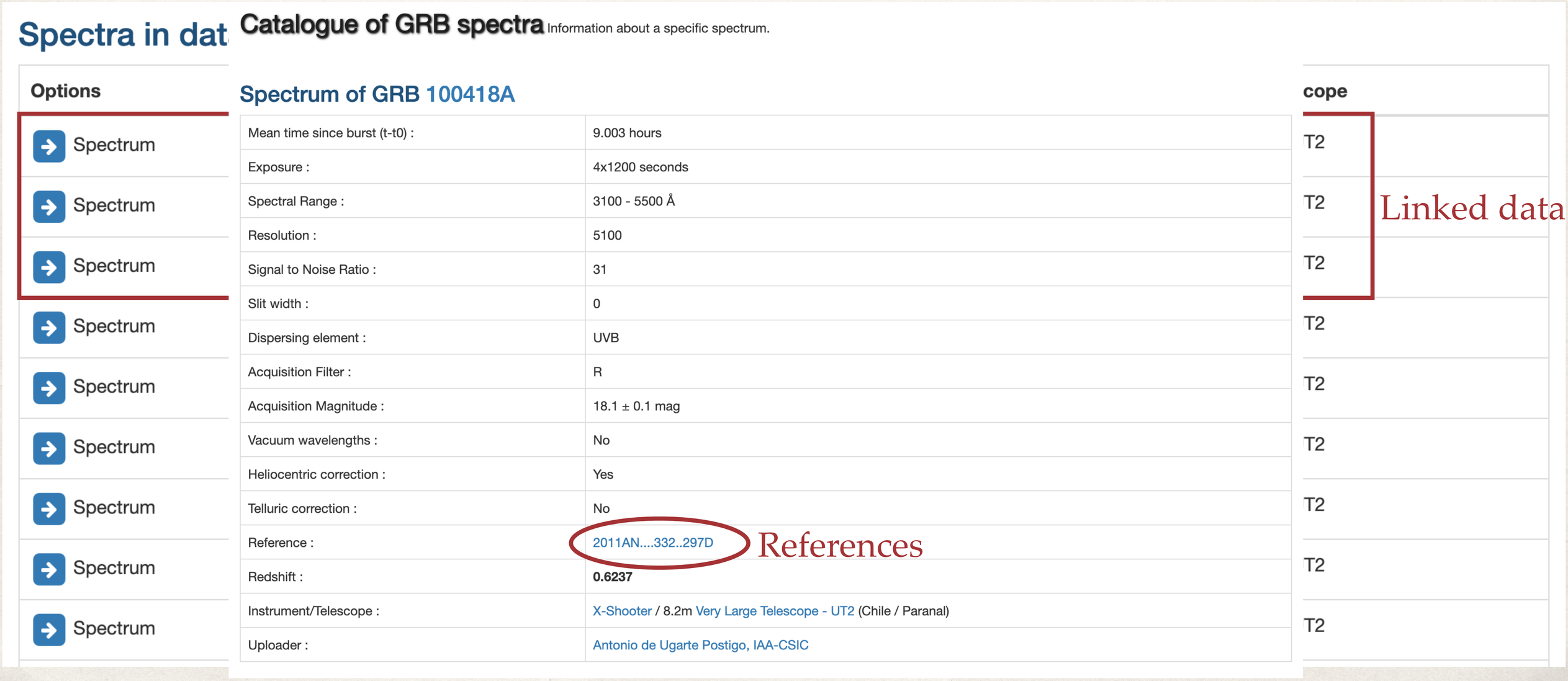
Catalogue of GRB spectra Searching for spectra in the database.

Automatically updated from mission tables (*Swift, Fermi*)

GRB 100418A

Detected by :	Swift
T0 :	21:10:08 UT
T90 :	7 seconds
RA (J2000.0) :	17:05:27.12
DEC (J2000.0) :	+11:27:42.48
Position error :	± 0.5''
Recalculated Galactic *L, B*	31.7, 28.1
SWIFT BAT fluence (15-150 keV) :	3.4± 0.5 10-E7 erg/cm2
SWIFT BAT 1-sec Peak Photon Flux :	1± 0.2 ph/cm2/sec";
Primary redshift :	0.6237

What to store? Spectroscopic observations



Spectra in dat

Catalogue of GRB spectra Information about a specific spectrum.

Options

- Spectrum
- Spectrum
- Spectrum
- Spectrum
- Spectrum
- Spectrum
- Spectrum
- Spectrum
- Spectrum
- Spectrum

Spectrum of GRB 100418A

Mean time since burst (t-t0) :	9.003 hours
Exposure :	4x1200 seconds
Spectral Range :	3100 - 5500 Å
Resolution :	5100
Signal to Noise Ratio :	31
Slit width :	0
Dispersing element :	UVB
Acquisition Filter :	R
Acquisition Magnitude :	18.1 ± 0.1 mag
Vacuum wavelengths :	No
Heliocentric correction :	Yes
Telluric correction :	No
Reference :	2011AN....332..297D
Redshift :	**0.6237**
Instrument/Telescope :	X-Shooter / 8.2m Very Large Telescope - UT2 (Chile / Paranal)
Uploader :	Antonio de Ugarte Postigo, IAA-CSIC

References

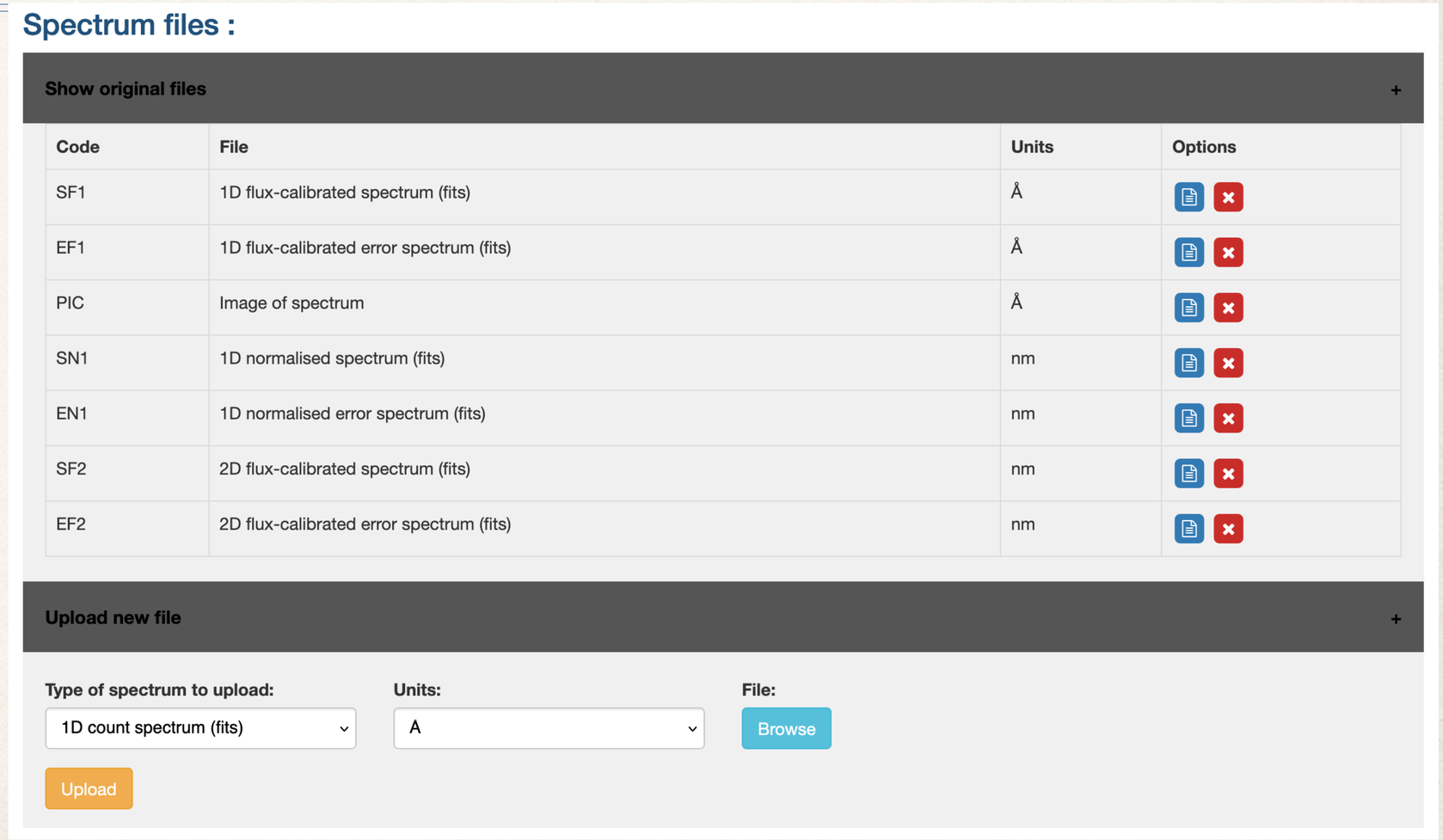
cope

T2
T2
T2
T2
T2
T2
T2
T2
T2
T2

Linked data

What to store? Spectral data files

- 1D spectra: ASCII or fits files
  - Count
  - Normalised
  - Flux calibrated
- 2D spectra: fits files
  - Count
  - Flux calibrated
- Plot image (no longer in use)



What to store? Spectral measurements

Fluxes :

No flux measurements are available

Add new values of flux measurements +

Observed λ (Å):	FLUX:			Due to:	Z:
5364.35	6.37	±	0.53	unknown 0	2.21

Add Flux

Column densities :

No column density measurements are available.

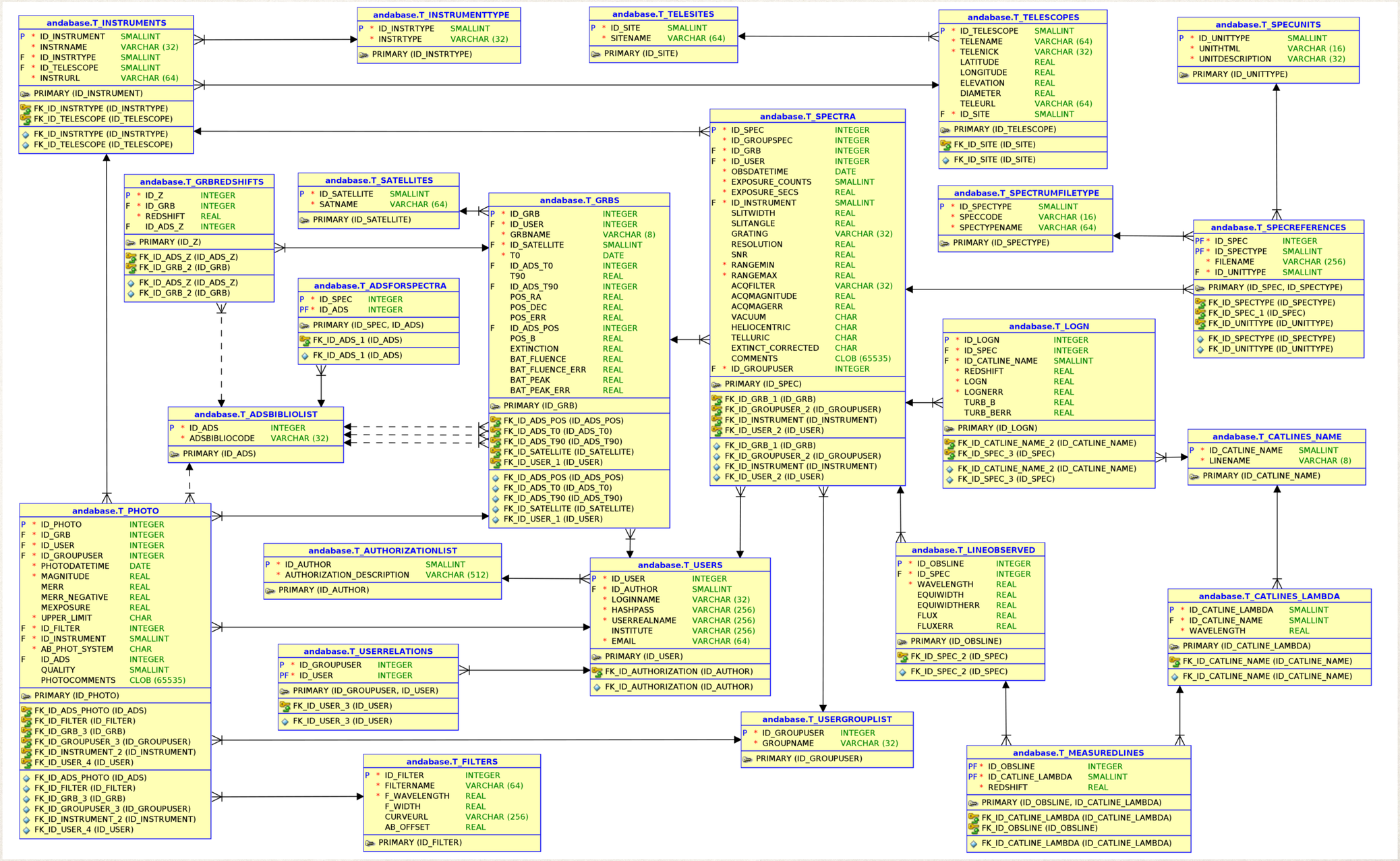
Add new values of column densities +

Element:	Z:	column density log N:			B:		
AlII	2.21	6.37	±	0.53	6.37	±	0.53

Add Log N

Database structure

- MySQL
- PHP
- Javascript
- Plotly



User management

- Data are available to registered users (limited access without login)
- Different levels of access: Guest, Uploader/Downloader, Administrator
- Security of passwords
- Users and collaborations
- Data ownership:
  - Public data
  - Collaboration data (access limited to collaborators)

Search engine

Catalogue of GRB spectra

Searching for spectra in the database.

GRB Name: 970228A

Satellite: Select the satellites

Date: Select the range

Restframe search

T90 [s]: Min 5.3 Max 40.1

RA [deg] Min: Min 155.34 Max 167.1

DEC [deg]: Min -30.4 Max 55.1

Galactic b [deg]: Min 12.3 Max 90

E(B-V) Extinction: Min -0.4 Max 1.1

Redshift z : Min 0.55 Max 4.2

Show individual spectra (multiplot)

Time since GRB, t-t0 (hr): Min 0 Max 24

Spectral resolution: Min 500 Max 1000

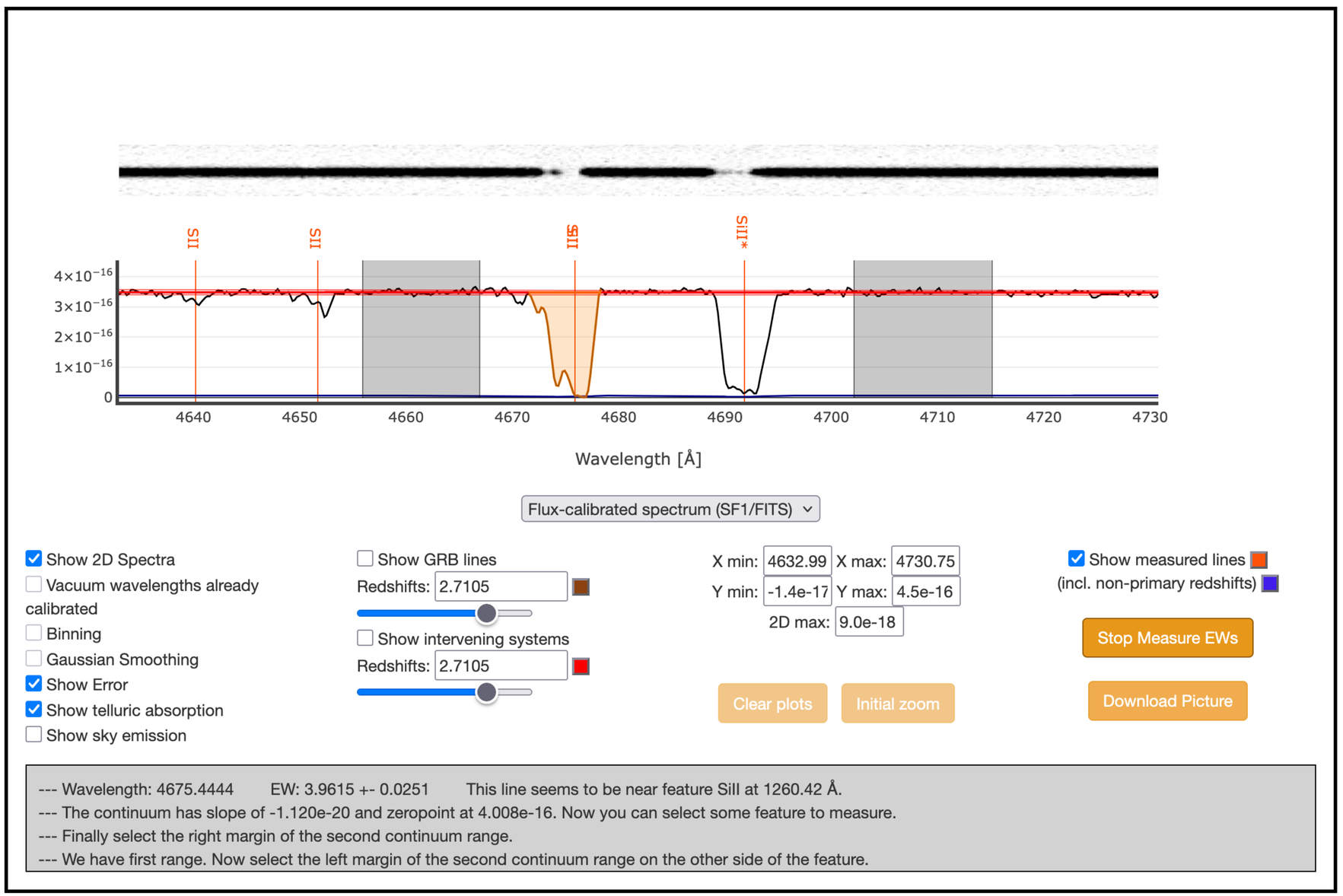
Signal to noise ratio: Min 3 Max 100

Spectral range

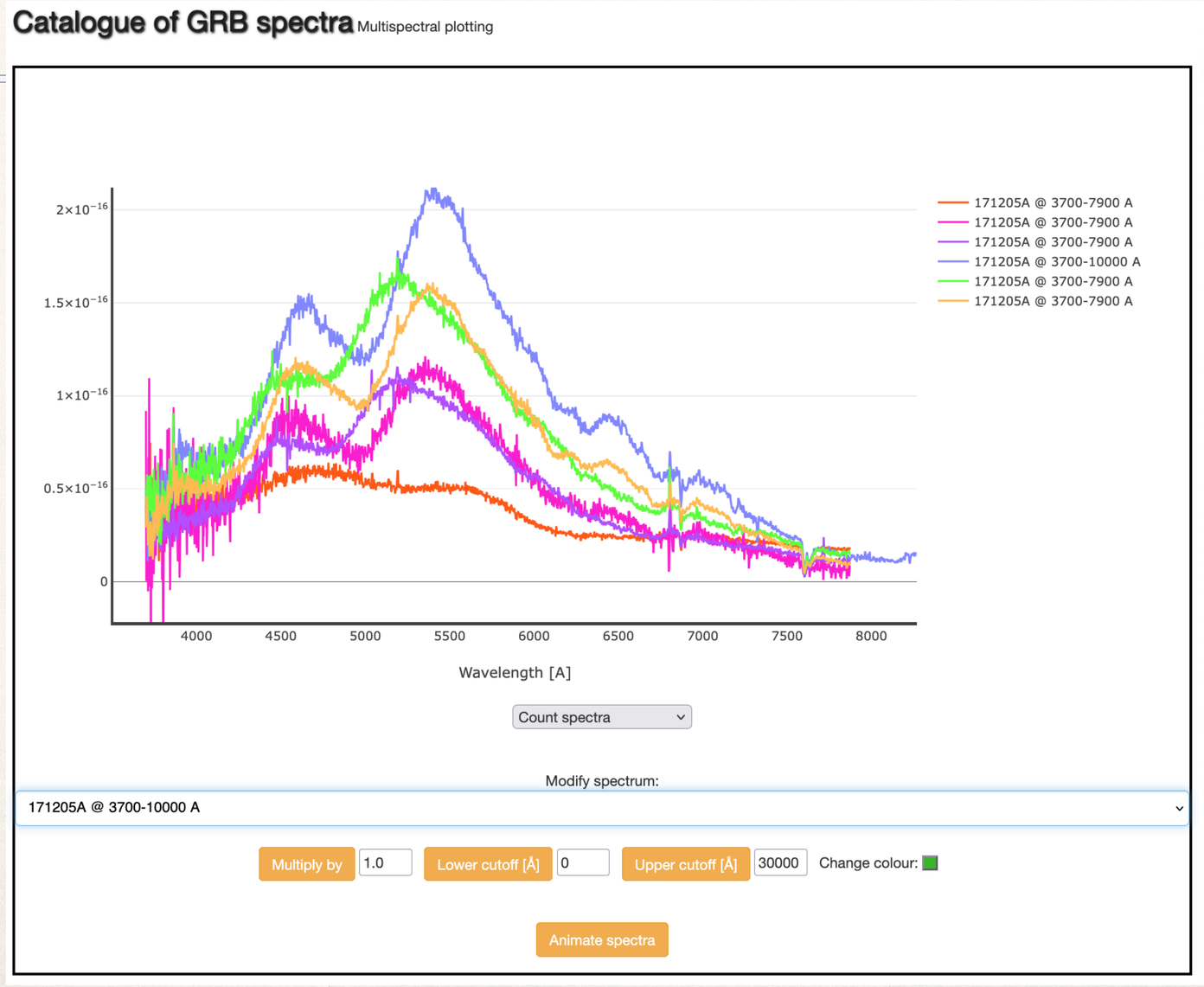
Exposure time

Submit

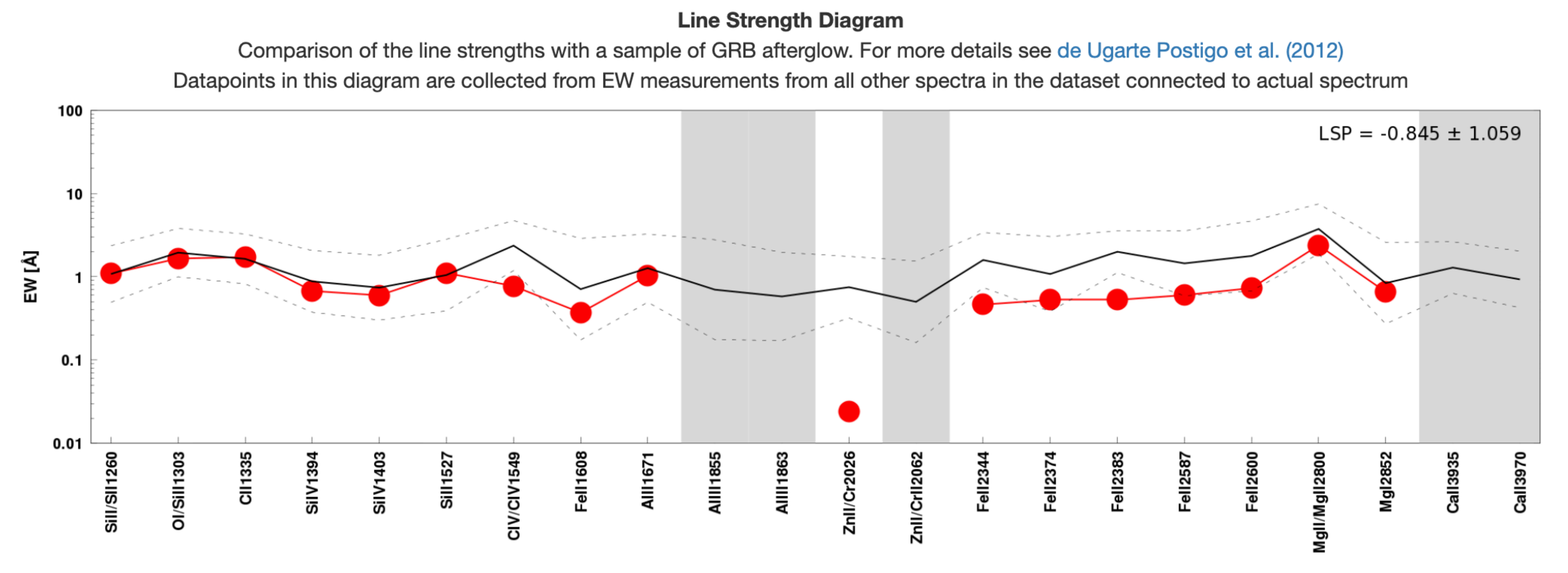
Plotting (and measuring) tool



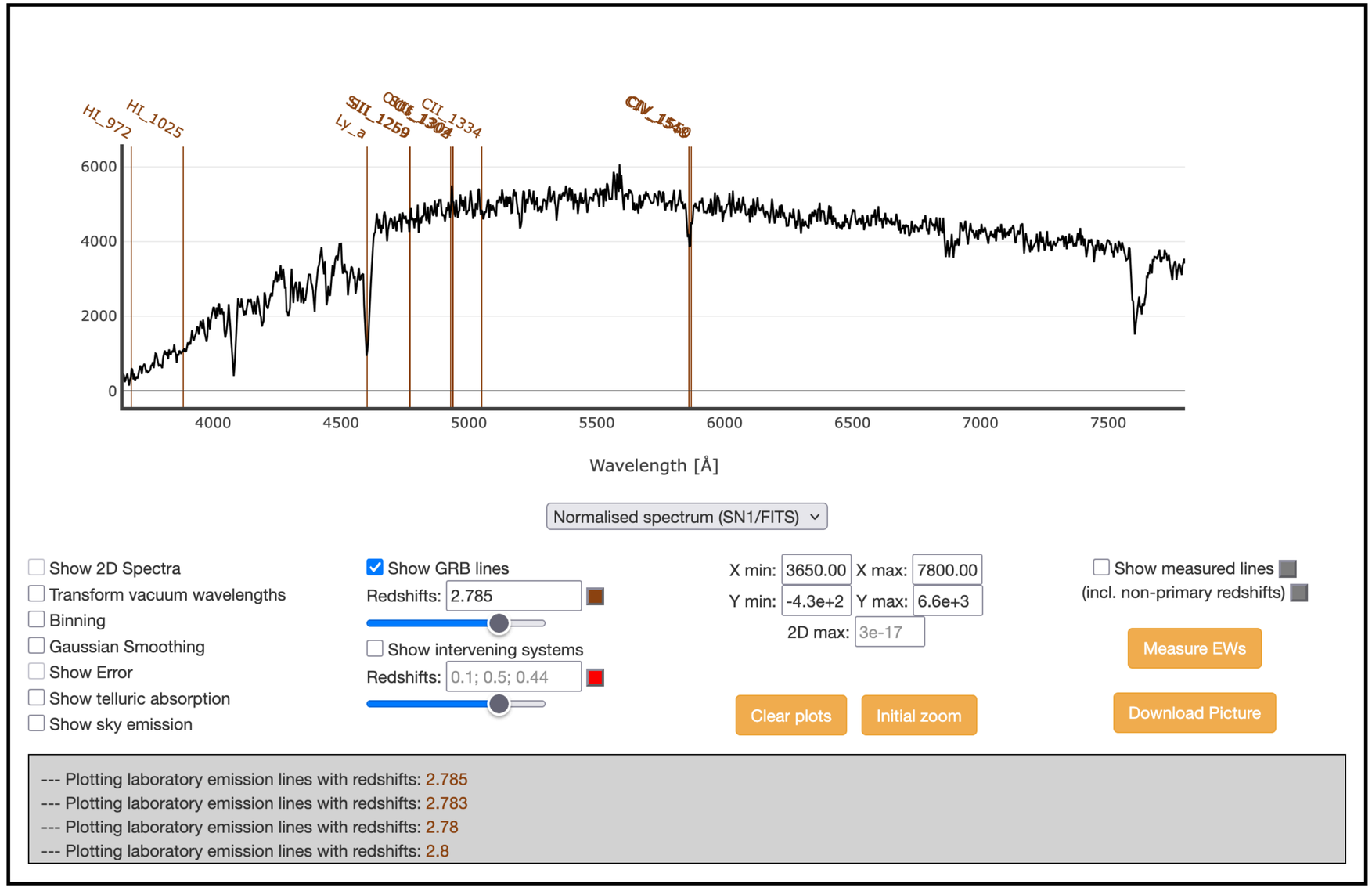
Multi-spectra plot



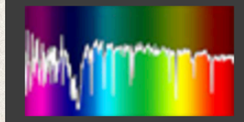
Line strength diagram tool



Sandbox: tool for quick spectral analysis



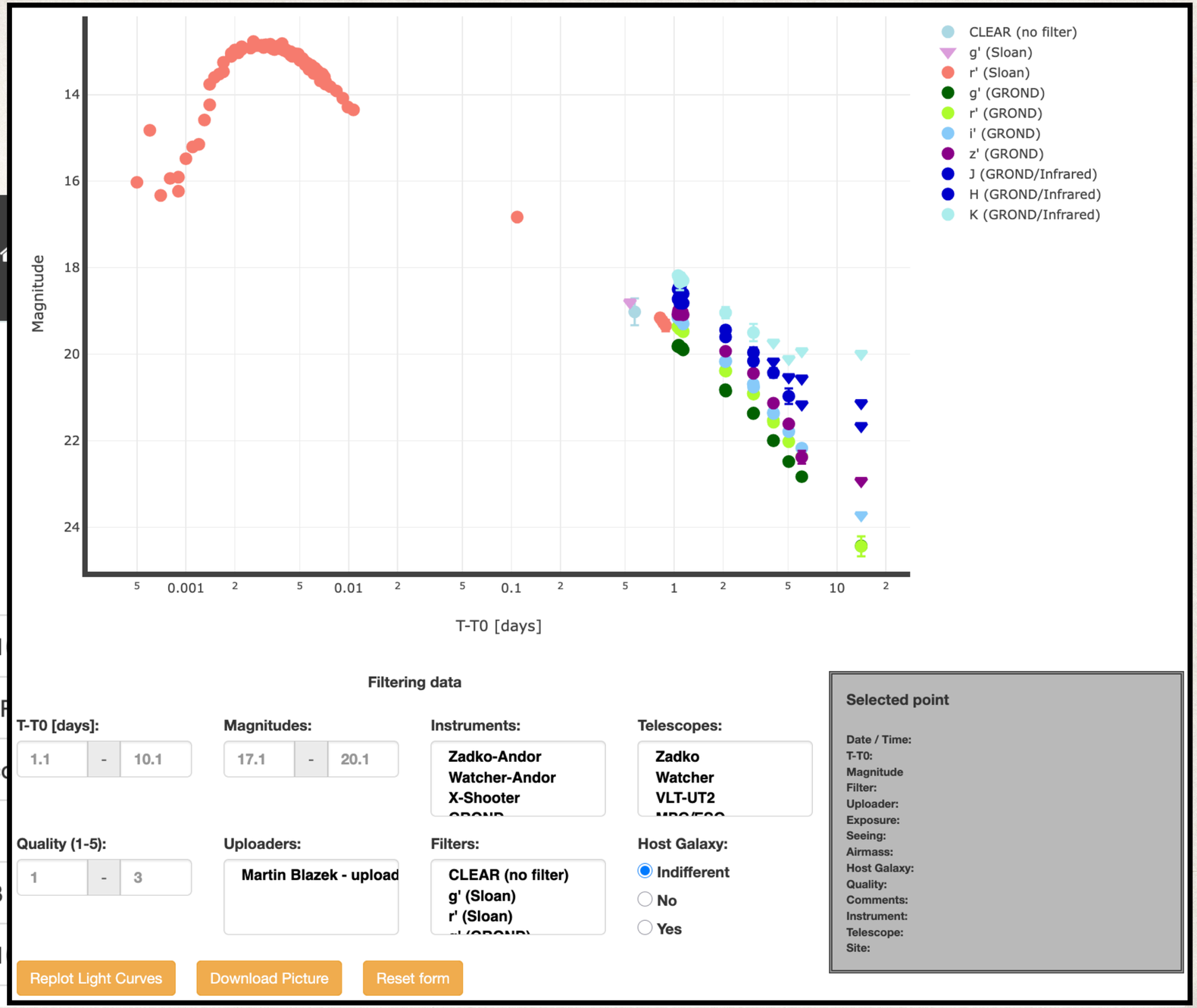
Photometric data



GRBPhot Catalogue of GRB Photometry

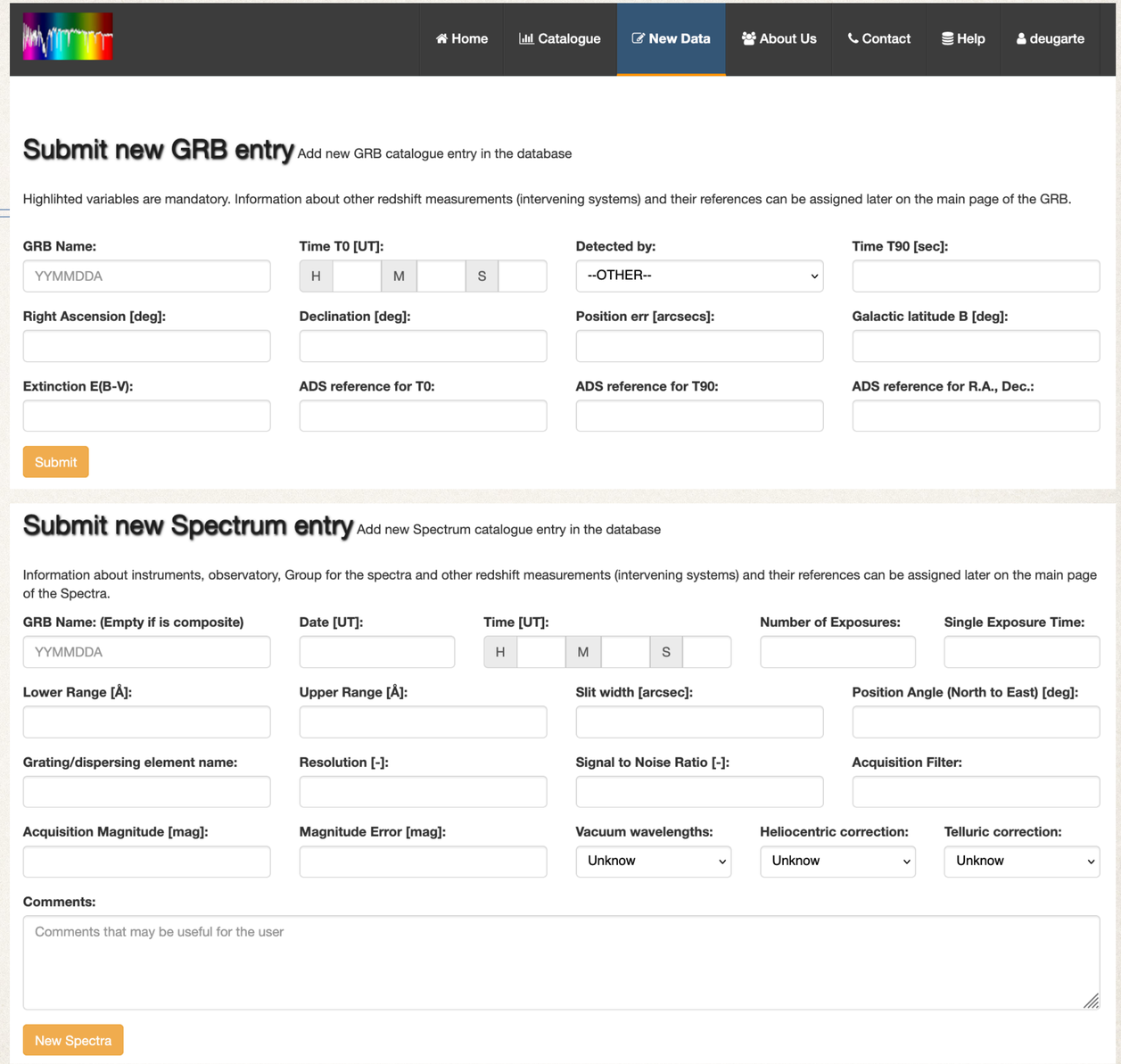
Photometry of GRB 161023A

T0 :	2016-1
Detected by :	INTEGR
T90 :	44 secc
Number of data points :	187
Magnitudes :	12.773
Time period :	2016-1



Data uploading

- GRB information
  - **Automatically from mission tables**
  - Manually using a simple form
- Spectra uploaded manually:
  1. Short form with observation data
  2. Manual upload of spectra files
- Tables and photometric data
  - Bulk through JSON formatted files
  - Manual upload



Current status

- Hosted at a foreign institution
- No funding since 2020: Not maintained
- Registration tool not working
- New GRBs not being updated

To Do…

- Transfer to a server in LAM
- Urgent maintenance updates (users and automatic GRB ingestion)
- Add radio and X-ray light curves (as part of the photometric database)
- Light curve analysis tools: Light curve fits (slopes, breaks, similar to XRT)
- SED analysis tool (something like Ny Avo's tool?)
- Host COLIBRÍ light curves?

Conclusions

- Database combining high-energy information with spectroscopy and photometry
- Collaborative effort
- Powerful search engine
- Potential to create extensive statistical samples
- Display and analysis tools
- Measurement tables