

# The Point of Interest Alert Broker

Nina Hernitschek (CITEVA, Universidad de Antofagasta)



Rubin Science Assembly, April 9 2026

# The Idea

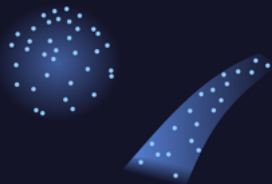


**Point of Interest:** An alert broker to **enable users to get updates on variable star observations within interesting regions.**

## predefined

known stellar streams, dwarf galaxies and globular clusters

(frequently updated)



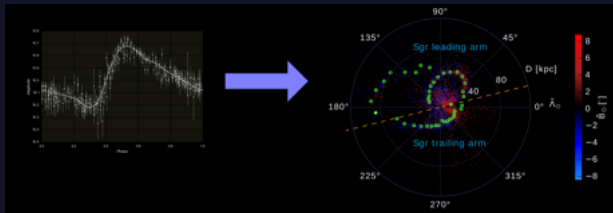
## user-created



# The Idea

adding value to two of the four science pillars as specified for LSST:

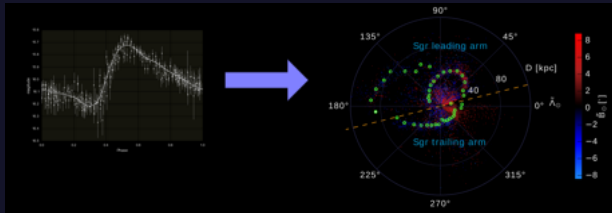
*Exploring the Transient Optical Sky and Mapping the Milky Way*



# The Idea

adding value to two of the four science pillars as specified for LSST:

*Exploring the Transient Optical Sky and Mapping the Milky Way*



- goal:** large and deep sets of precisely known variable stars  
⇒ understanding the nature of the stellar halo of our Milky Way  
⇒ constraining its history

# The Implementation

Point of Interest is a downstream broker of ANTARES



# The Implementation

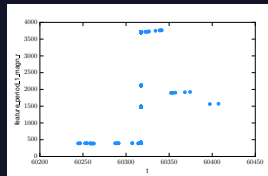
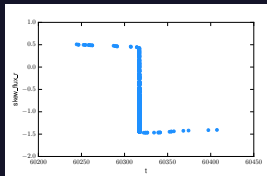
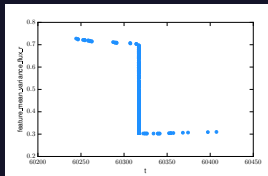
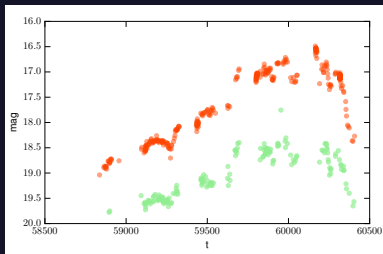
Point of Interest is a downstream broker of ANTARES



- alerts
- light-curves
- annotated: cross-match, features
- classification
  
- store feature history
- more specific classification: amplitude-period-phase modulation (Blazhko effect)
- watch for modulation
- specific "Points of Interest": from publications, user-created
- specific calculations for follow-up: visibility/finder charts, phase/time from model

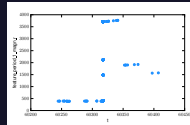
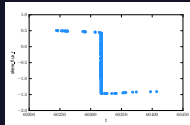
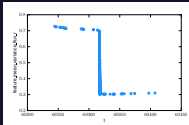
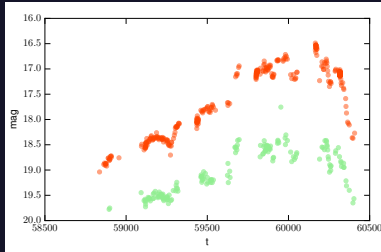
# Specifics

Point of Interest watches the feature history



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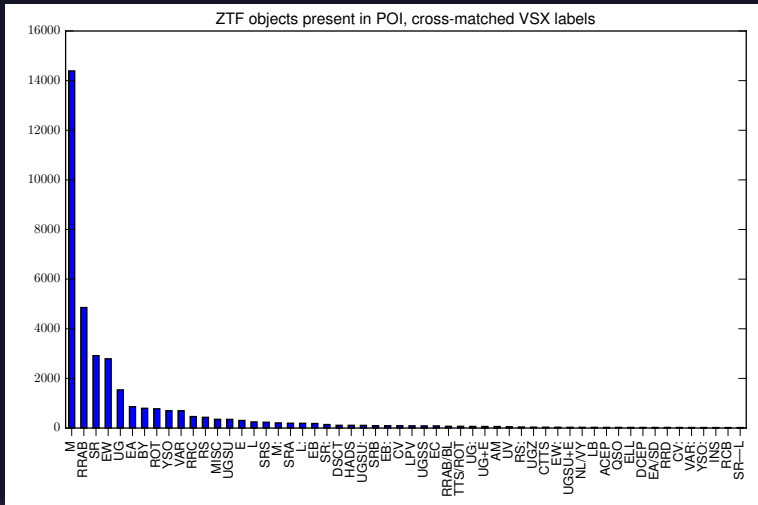
...



just some of the features from ANTARES and calculated on our own - to be processed with a neural network

# Data

Consuming `high_amplitude_variable_star_candidate_staging` from ANTARES, which objects do we get?





# Classifier

**Classifier strategy** is influenced by the pre-filtering due to the choice of stream topic

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## **Classification Pipeline:**

1st level: CV/Nova, E, LPV, Pulsating, Periodic (other), Quasar, SN, YSO

# Classifier

**Classifier strategy** is influenced by the pre-filtering due to the choice of stream topic

## **Classification Pipeline:**

1st level: CV/Nova, E, LPV, Pulsating, Periodic (other), Quasar, SN, YSO

interesting but optional so far:

2th and 3rd level: subtypes (RRab, RRC, Blazhko etc.)

# Technical Details

## Data:

- downstream broker from ANTARES
- currently: only ZTF (except for a few alerts)
- with LSST in  $\sim 1$  months (working with ANTARES)

## Backend:

- ingests stream
- annotates with additional features
- saves feature history
- classifier: xgboost
- SQLite database

# Technical Details

## Frontend:

- Flask website
- nginx web server
- plots with bokeh
- Aladin lite finder chart
- visual query builder with jQuery

## other tools:

- Watchlist digest
- user administration
- general test and admin tools

## On github:

[https://github.com/ninahernitschek/poi\\_broker\\_backend](https://github.com/ninahernitschek/poi_broker_backend)

[https://github.com/ninahernitschek/poi\\_broker\\_frontend](https://github.com/ninahernitschek/poi_broker_frontend)

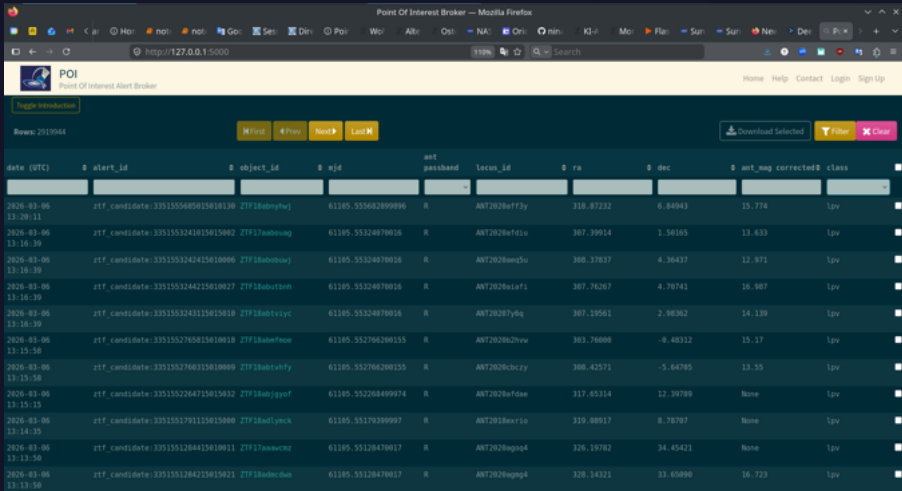
# Walkthrough

... of the broker website

`https://poibroker.uantof.cl/`

# Startpage

What you see when opening the website:

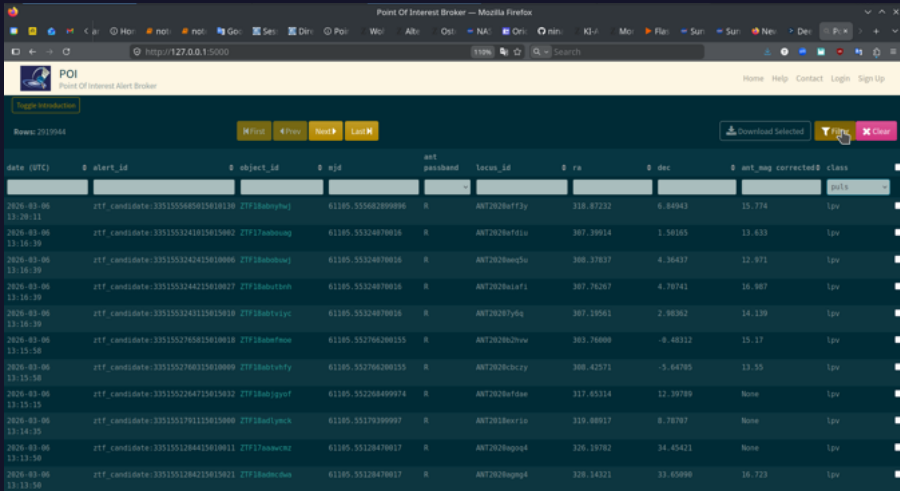


The screenshot shows a web browser displaying the "Point Of Interest Broker" website. The browser's address bar shows the URL "http://127.0.0.1:5000". The website has a dark theme and a navigation bar with links for "Home", "Help", "Contact", "Login", and "Sign Up". Below the navigation bar, there is a "Toggle introduction" button. The main content area displays a table with 11 columns: "date (UTC)", "alert\_id", "object\_id", "obj", "ant passband", "locus\_id", "ra", "dec", "ant\_magnitude", "corrected", and "class". The table contains 11 rows of data, each representing a different point of interest. The "date (UTC)" column shows dates from 2026-03-06 13:20:11 to 2026-03-06 13:13:50. The "ant passband" column shows values like "R", "R", "R", "R", "R", "R", "R", "R", "R", "R", "R". The "locus\_id" column shows values like "ANT2026aff23y", "ANT2026afdu", "ANT2026awq2u", "ANT2026aiaf1", "ANT20267ydg", "ANT20262hrvv", "ANT2026bcbrzy", "ANT2026afdae", "ANT2026axrio", "ANT2026agpq4", "ANT2026agpq4". The "ra" column shows values like "310.87232", "307.39914", "300.37837", "307.76267", "307.19561", "303.76009", "300.42571", "317.65314", "310.80917", "326.19782", "328.14321". The "dec" column shows values like "6.84943", "1.50165", "4.36437", "4.78741", "2.98362", "-8.48312", "-5.64785", "12.39789", "8.78797", "34.45421", "33.65990". The "ant\_magnitude" column shows values like "15.774", "13.633", "12.971", "16.907", "14.139", "15.17", "13.55", "None", "None", "None", "16.723". The "corrected" column shows values like "None", "None", "None", "None", "None", "None", "None", "None", "None", "None", "None", "None". The "class" column shows values like "lpv", "lpv", "lpv", "lpv", "lpv", "lpv", "lpv", "lpv", "lpv", "lpv", "lpv", "lpv".

date (UTC)	alert_id	object_id	obj	ant passband	locus_id	ra	dec	ant_magnitude	corrected	class
2026-03-06 13:20:11	ztf_candidate:3351555685015610130	ZTF18abnyfwj	61105.555682899996	R	ANT2026aff23y	310.87232	6.84943	15.774	None	lpv
2026-03-06 13:16:30	ztf_candidate:3351553241015615002	ZTF17aabwmg	61105.55324070016	R	ANT2026afdu	307.39914	1.50165	13.633	None	lpv
2026-03-06 13:16:30	ztf_candidate:3351553242415610096	ZTF18abnbwuj	61105.55324070016	R	ANT2026awq2u	300.37837	4.36437	12.971	None	lpv
2026-03-06 13:16:30	ztf_candidate:3351553244215610027	ZTF18abubtsh	61105.55324070016	R	ANT2026aiaf1	307.76267	4.78741	16.907	None	lpv
2026-03-06 13:16:30	ztf_candidate:3351553243115615010	ZTF18abvryzc	61105.55324070016	R	ANT20267ydg	307.19561	2.98362	14.139	None	lpv
2026-03-06 13:15:58	ztf_candidate:3351552765015610018	ZTF18abnface	61105.552766200155	R	ANT20262hrvv	303.76009	-8.48312	15.17	None	lpv
2026-03-06 13:15:58	ztf_candidate:3351552760315610009	ZTF18abvrfyf	61105.552766200155	R	ANT2026bcbrzy	300.42571	-5.64785	13.55	None	lpv
2026-03-06 13:15:15	ztf_candidate:3351552264715615032	ZTF18abjgyof	61105.552268499974	R	ANT2026afdae	317.65314	12.39789	None	None	lpv
2026-03-06 13:14:35	ztf_candidate:3351551791115615000	ZTF18abdjyack	61105.55179399997	R	ANT2026axrio	310.80917	8.78797	None	None	lpv
2026-03-06 13:13:50	ztf_candidate:3351551284415610011	ZTF17aaawcnz	61105.55128470017	R	ANT2026agpq4	326.19782	34.45421	None	None	lpv
2026-03-06 13:13:50	ztf_candidate:3351551284215615021	ZTF18abwcdwa	61105.55128470017	R	ANT2026agpq4	328.14321	33.65990	16.723	None	lpv

# Filter

Without the need to create an user account, you can filter the table:  
enter conditions and click the  button

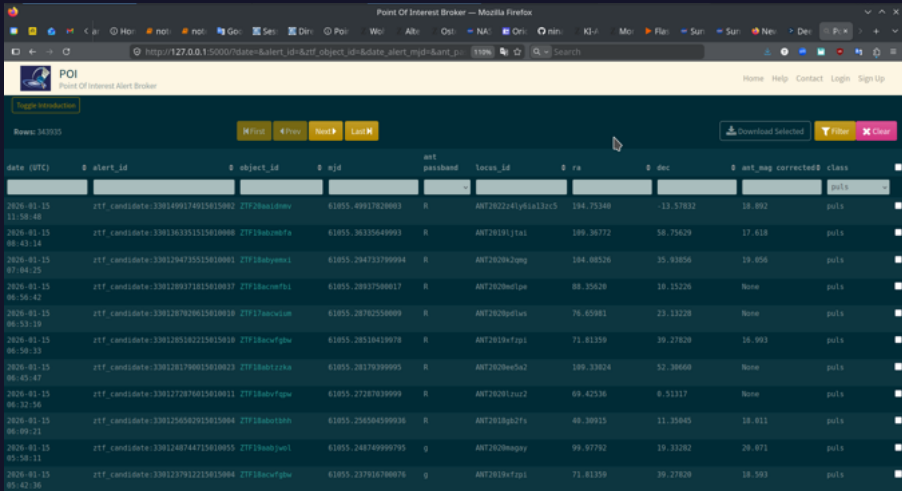


The screenshot shows the 'Point Of Interest Broker' web application interface. At the top, there is a navigation bar with links for Home, Help, Contact, Login, and Sign Up. Below the navigation bar, there is a search bar and a 'Filter' button highlighted with a mouse cursor. The main content area displays a table with 10 columns: date (UTC), alert\_id, object\_id, njid, ant\_passband, locus\_id, ra, dec, ant\_mpg corrected, and class. The table contains 10 rows of data, each representing a different point of interest. The 'Filter' button is located in the top right corner of the table area, next to a 'Download Selected' button and a 'Clear' button.

date (UTC)	alert_id	object_id	njid	ant_passband	locus_id	ra	dec	ant_mpg corrected	class
2026-03-06 13:20:11	ztf_candidate:335155685015610130	ZTF18abnyhwj	61105_555682899996	R	ANT2026bff23y	310.87232	6.84943	15.774	lvv
2026-03-06 13:16:30	ztf_candidate:3351553241015615002	ZTF17aabwmg	61105_55324070016	R	ANT2026afdu	307.39914	1.50165	13.633	lvv
2026-03-06 13:16:30	ztf_candidate:3351553242415610096	ZTF18abbnwvj	61105_55324070016	R	ANT2026bwq2su	308.37837	4.36437	12.971	lvv
2026-03-06 13:16:30	ztf_candidate:3351553244215610027	ZTF18abubtsh	61105_55324070016	R	ANT2026e1af1	307.76267	4.78741	16.907	lvv
2026-03-06 13:16:30	ztf_candidate:3351553243115615010	ZTF18abrvzyc	61105_55324070016	R	ANT20267ydg	307.19561	2.98362	14.139	lvv
2026-03-06 13:15:58	ztf_candidate:3351552765015610018	ZTF18abnface	61105_552766200155	R	ANT2026b2hrvv	303.76009	-8.48312	15.17	lvv
2026-03-06 13:15:58	ztf_candidate:3351552760315610009	ZTF18abrvhfy	61105_552766200155	R	ANT2026bcbrzy	308.42571	-5.64705	13.55	lvv
2026-03-06 13:15:15	ztf_candidate:3351552264715615032	ZTF18abjgyof	61105_552268499974	R	ANT2026bf0se	317.65314	12.39789	None	lvv
2026-03-06 13:14:35	ztf_candidate:3351551791115615000	ZTF18abdljyack	61105_55179399997	R	ANT2018exrio	310.88917	8.78707	None	lvv
2026-03-06 13:13:50	ztf_candidate:3351551284415610011	ZTF17aaawcnz	61105_55128470017	R	ANT2026bqpg4	326.19702	34.45421	None	lvv
2026-03-06 13:13:50	ztf_candidate:3351551284215615021	ZTF18abwcdwa	61105_55128470017	R	ANT2026bqpg4	328.14321	33.65090	16.723	lvv

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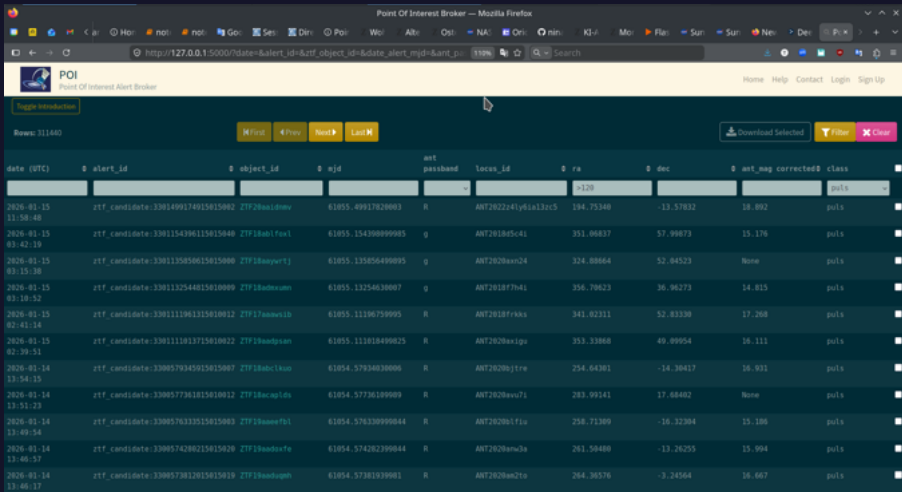
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date (UTC)	alert_id	object_id	mjd	ant passband	locus_id	ra	dec	ant_mag corrected	class
2020-01-15 11:58:48	ztf_candidate:3301499174915615082	ZTF18acwfmv	61055.49917820003	R	ANT2022z4ly6sa13zc5	194.75348	-13.57832	18.992	puls
2020-01-15 08:43:14	ztf_candidate:3301363351515610988	ZTF18abcmfa	61055.36335649993	R	ANT2019j1ai	189.36772	58.75629	17.618	puls
2020-01-15 07:04:25	ztf_candidate:3301294735515610081	ZTF18abywxi	61055.294733799994	R	ANT2020z4mg	184.08526	35.93856	19.056	puls
2020-01-15 06:56:42	ztf_candidate:33012893731815610837	ZTF18acnefb1	61055.28937588017	R	ANT2020bdlpe	88.35628	18.15226	None	puls
2020-01-15 06:53:39	ztf_candidate:3301287828615610818	ZTF17accvum	61055.28782530089	R	ANT2020pdlws	78.65981	23.13228	None	puls
2020-01-15 06:50:33	ztf_candidate:3301285182215615810	ZTF18acwfgbw	61055.28518419978	R	ANT2019xfzpi	71.81359	39.27820	18.993	puls
2020-01-15 06:45:47	ztf_candidate:3301281798015610823	ZTF18abtzcka	61055.28179399995	R	ANT2020bc5a2	189.33824	52.38660	None	puls
2020-01-15 06:32:36	ztf_candidate:330127287615610811	ZTF18abvfgw	61055.27287839999	R	ANT2020lzu2	69.42536	8.51317	None	puls
2020-01-15 06:09:21	ztf_candidate:3301256582915615084	ZTF18abotahh	61055.256584599936	R	ANT2018pbzfs	48.30915	11.35045	18.811	puls
2020-01-15 05:58:11	ztf_candidate:3301248744715610855	ZTF18abjwo1	61055.24874999995	g	ANT2020mgay	99.97792	19.33282	28.871	puls
2020-01-15 05:42:36	ztf_candidate:3301237912215615084	ZTF18acwfgbw	61055.237916790076	g	ANT2019xfzpi	71.81359	39.27820	18.993	puls

# Filter

two or more conditions:

(and if you want to bookmark it: just bookmark the URL)



The screenshot shows the Point Of Interest Broker web application interface. The browser address bar displays the URL: `http://127.0.0.1:5000/pdate=&alert_id=&rf_object_id=&date_alert_mjd=&ant_p...`. The application header includes the POI logo and navigation links: Home, Help, Contact, Login, Sign Up. Below the header, there are navigation buttons: First, Prev, Next, Last. On the right side, there are buttons for Download Selected, Filter, and Clear. The main content area displays a table of alerts with the following columns: date (UTC), alert\_id, object\_id, mjd, ant\_passband, locus\_id, ra, dec, ant\_mag\_corrected, and class. The table contains 10 rows of alert data.

date (UTC)	alert_id	object_id	mjd	ant_passband	locus_id	ra	dec	ant_mag_corrected	class
2020-01-15 11:58:48	ztf_candidate:3301499174915615082	ZTF18aadnsv	61055.49917820003	R	ANT2022z4ly6sa13zc5	194.75340	-13.57032	18.092	puls
2020-01-15 03:42:19	ztf_candidate:3301154396115615040	ZTF18ab1faw1	61055.1543000999985	g	ANT2018t5c4i	351.06837	57.96073	15.176	puls
2020-01-15 03:15:38	ztf_candidate:3301135850615615090	ZTF18aayvrtj	61055.135856499095	g	ANT2020axn24	324.80864	52.04523	None	puls
2020-01-15 03:10:52	ztf_candidate:3301132544015610009	ZTF18adecuan	61055.13254630007	g	ANT2018f7h4i	356.79623	36.96273	14.815	puls
2020-01-15 02:41:34	ztf_candidate:330111961315610012	ZTF17anows1b	61055.11196739995	R	ANT2018frkks	341.02311	52.83330	17.268	puls
2020-01-15 02:39:51	ztf_candidate:3301111013715610022	ZTF18aaplsan	61055.111018499025	R	ANT2020ax1qz	353.33868	49.09954	16.111	puls
2020-01-14 13:54:15	ztf_candidate:3300579345015615007	ZTF18abc1kuo	61054.57934030006	R	ANT2020bjtrr	254.64301	-14.30417	16.931	puls
2020-01-14 13:51:23	ztf_candidate:3300577361815610012	ZTF18acp1ds	61054.57736109909	R	ANT2020bvu7i	283.99341	17.68482	None	puls
2020-01-14 13:49:54	ztf_candidate:3300576333515615003	ZTF18aamfbl	61054.576330999044	R	ANT2020b1f1u	256.71309	-16.32304	15.108	puls
2020-01-14 13:46:57	ztf_candidate:3300574280215615020	ZTF18aadsxfs	61054.574282399044	R	ANT2020amw3a	261.50400	-13.26255	15.994	puls
2020-01-14 13:46:17	ztf_candidate:3300573812015615019	ZTF18aawggh	61054.57381039901	R	ANT2020am2to	264.30576	-3.24564	16.667	puls

# Object properties

click on an object (locus) to see its properties

The screenshot shows the Point Of Interest Broker web interface. A modal window is open for the object ZTF17aaawsib, displaying its lightcurve. The plot shows magnitude (mag) versus date (date\_alert\_mjd). The y-axis ranges from 17.2 to 18.8, and the x-axis ranges from 80000 to 81000. The data points are colored green and red, showing a clear dip in magnitude around MJD 80500. The modal window also displays the following information:

- Object ID: ANT2018fkks
- Locus RA: 341.02311440729816
- Locus Dec: 52.83329750420545
- Download Lightcurve as CSV

The background interface shows a table of objects with columns for date (UTC), alert\_id, and candidate information. The table is partially obscured by the modal window.

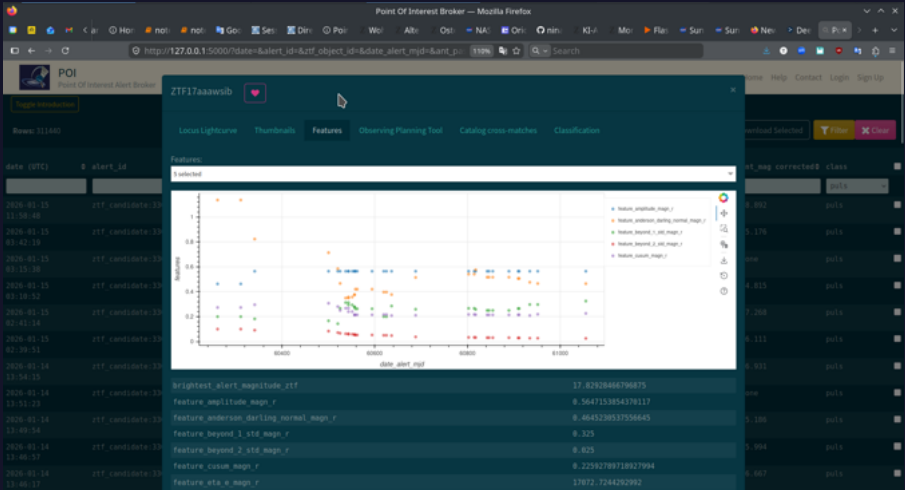
# Object properties

The screenshot shows the Point Of Interest Broker web interface. A modal window is open for the object ZTF17aaawsib. The modal has tabs for Locus Lightcurve, Thumbnails (selected), Features, Observing Planning Tool, Catalog cross-matches, and Classification. Below the tabs, it says "Alert Thumbnails from ZTF, vertically flipped." and displays three panels: Science, Template, and Difference. The background shows a table of object data with columns for date (UTC), alert\_id, and various object properties.

date (UTC)	alert_id	Science	Template	Difference					
2020-01-15 13:58:48	ZTF_candidate:33								
2020-01-15 03:42:39	ZTF_candidate:33								
2020-01-15 03:15:38	ZTF_candidate:33								
2020-01-15 03:18:52	ZTF_candidate:33								
2020-01-15 02:45:54	ZTF_candidate:33								
2020-01-15 02:39:51	ZTF_candidate:330111013715610022	ZTF17aaawsib	61055_112610499025	R	NT2020axjg	353_33868	49_09054	16_111	pulls
2020-01-14 13:54:15	ZTF_candidate:3300579345015010007	ZTF17aaawsib	61054_57934030006	R	NT2020k1yr	254_04301	14_30427	16_931	pulls
2020-01-14 13:51:23	ZTF_candidate:3300577361815010012	ZTF17aaawsib	61054_57736100999	R	NT2020revu7j	283_99341	17_08482	None	pulls
2020-01-14 13:49:54	ZTF_candidate:3300576323515010003	ZTF17aaawsib	61054_576320099044	R	NT2020b1fu	236_71309	16_32304	15_108	pulls
2020-01-14 13:46:57	ZTF_candidate:3300574280215015020	ZTF17aaawsib	61054_574282399044	R	NT2020am6a	261_50400	13_26295	15_994	pulls
2020-01-14 13:46:17	ZTF_candidate:3300579812015015019	ZTF17aaawsib	61054_57381039901	R	NT2020m62u	264_30576	13_24564	16_067	pulls

# Object properties

features are plotted over time to track changing features



# Object properties

observing planning tool shows a finder chart for the object (with Aladin Lite)  
you can zoom in and out

The screenshot shows the Point Of Interest Broker web interface. The main content area displays the observing planning tool for object ZTF17aaawsib. The tool includes a finder chart with a zoomed-in view of the object, RA: 341.02311445729816, Dec: 52.8329750425545. The interface includes a table of observations, a legend for filters, and an observing planning section with fields for Observatory (ALMA), Date (2026-04-04), and Time (UTC/Local), and a Retrieve button.

date (UTC)	alert_id
2026-01-15 11:58:48	ZTF_candidate-39
2026-01-15 01:42:39	ZTF_candidate-39
2026-01-15 03:15:38	ZTF_candidate-39
2026-01-15 03:18:52	ZTF_candidate-39
2026-01-15 05:45:54	ZTF_candidate-39
2026-01-15 02:39:51	ZTF_candidate-39
2026-01-14 13:54:15	ZTF_candidate-39
2026-01-14 13:51:23	ZTF_candidate-39
2026-01-14 13:49:54	ZTF_candidate-39
2026-01-14 13:48:57	ZTF_candidate-39
2026-01-14 13:46:17	ZTF_candidate-39

Observing Planning

Observatory: ALMA Date: 2026-04-04 Time: UTC Local

Retrieve

# Object properties

scrolling down allows for selection of observatory for plotting altitude/airmass of object and moon

The screenshot shows the 'Point Of Interest Broker' web application in a Mozilla Firefox browser. The main interface is titled 'Observing Planning' and includes a dropdown menu for the observatory (set to 'Cerro Paranal') and a date selector (set to '2026-04-04'). There are radio buttons for 'UTC' and 'Local' time zones, and a 'Retrieve' button. Below this, a plot displays 'Altitude (deg)' on the left y-axis and 'Airmass' on the right y-axis against 'Time starting 2026-04-03 [UTC]' on the x-axis. The plot shows two curves: a blue line for the 'object' and an orange line for the 'moon'. The object's altitude peaks at approximately 85 degrees around 06:00 UTC on April 4th. To the right of the plot is a circular image of the moon with a white crescent, and text indicating: 'Moon Phase at 2026-04-04 00:00:00 UTC', 'Phase: waning gibbous', 'Illumination: 96%', and 'separation from moon to object during night: 125.753 to 128.443 degree'. A 'Close' button is located at the bottom right of the plot area. On the left side of the browser window, a table lists rows of data with columns for 'date (UTC)' and 'alert\_id', showing a list of candidate observations.

# Object properties

next feature to implement: add your own observatory

Point Of Interest Broker — Mozilla Firefox

http://127.0.0.1:5000/?date=&alert\_id=&obj\_id=&date\_alert\_mjd=&ant\_p...

POI Point Of Interest Alert Broker

Rows: 311440

date (UTC) alert\_id

date (UTC)	alert_id
2026-01-15 13:38:48	217_candidate:30
2026-01-15 03:42:39	217_candidate:30
2026-01-15 03:15:38	217_candidate:30
2026-01-15 03:18:52	217_candidate:30
2026-01-15 07:45:54	217_candidate:30
2026-01-15 02:39:51	217_candidate:30
2026-01-14 13:54:15	217_candidate:30
2026-01-14 13:51:23	217_candidate:30
2026-01-14 13:49:54	217_candidate:30
2026-01-14 13:46:57	217_candidate:30
2026-01-14 13:46:17	217_candidate:30

Observing Planning

Observatory: Cerro Paranal Date: 2026-04-04 Time: UTC Local

Retrieve

Altitude (deg) vs Time starting 2026-04-03 [UTC]

Altitude (deg) vs Time starting 2026-04-03 [UTC]

Moon Phase at 2026-04-04 00:00:00 UTC  
Phase: waning gibbous  
Illumination: 96%  
separation from moon to object during night: 125.753 to 128.443 degree

Close

# Object properties

some catalog crossmatches, including broker crossmatches

The screenshot shows the Point Of Interest Broker web interface. A modal window is open for the object ZTF17aaaaw5ib. The modal has tabs for Locus, Lightcurve, Thumbnails, Features, Observing Planning Tool, Catalog cross-matches, and Classification. The 'Catalog cross-matches' tab is active, showing a table of crossmatches for Locus ID: ANT2018frkks.

catalog	object	ra_cat	dec_cat	separation(mas)
allwise	2224485_57+525600_3	341.8232428	52.8334312	6.638
zmass_psc	22448554+5249599	341.823089	52.833321	6.0915
galia_dr3_gaia_source	Gaia DR3 2982873823652688576	341.8231774286116	52.8332888834826	6.138
bright_guide_star_cat	N106837851	341.8231715124	52.8333524233	6.297

This object can also be found in:

Alert brokers:

- ALeRCE <https://alerce.net/en/object/ZTF17aaaaw5ib>
- ANTARES <https://antares.norlab.edu/foc/ANT2018frkks>

External Services:

- IPAC
- SIMBAD
- SNAD
- TNS
- VizieR

The background interface shows a table of rows with columns for date (UTC), alert\_id, and other data. The modal window has a 'Close' button in the bottom right corner.

# Classification

classification can change over time - we track that, too:  
you see the classification of this alert

The screenshot shows the Point Of Interest Broker interface in Mozilla Firefox. The main window displays a table of alerts with columns for 'date (UTC)' and 'alert\_id'. A modal window is open for alert 'ZTF17aaawsib', showing a 'Classification Probability Radar' chart. The chart is titled 'Classification Probability Radar' and 'Classified as PULS@.522050986741636'. The radar chart has eight axes representing different classifications: LPV, E, CVNOVA, YSO, SN, QUAS, PERIODIC(OTHER), and PULS. The PULS axis shows the highest probability, reaching approximately 0.5. The chart also includes a legend for 'pt\_candidates:330111981315010012' and various interactive icons.

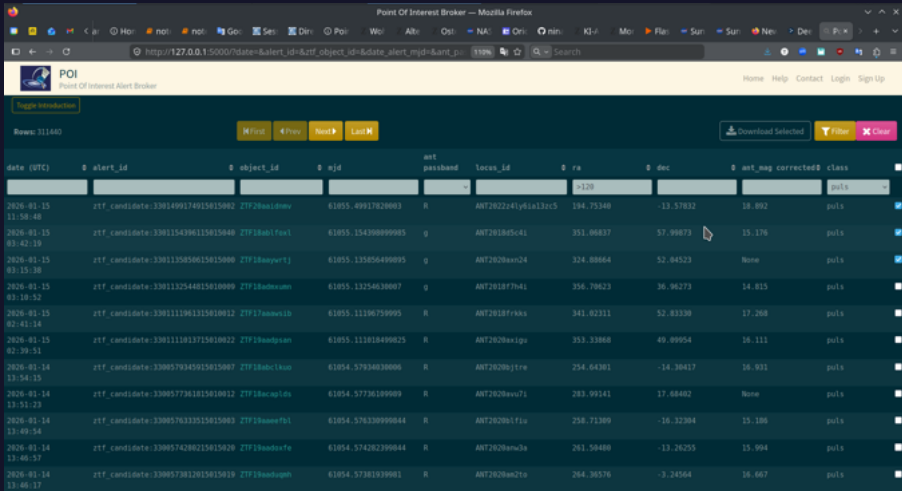
date (UTC)	alert_id
2020-01-15 11:58:46	ZTF_candidates:33
2020-01-15 01:42:59	ZTF_candidates:33
2020-01-15 03:15:38	ZTF_candidates:33
2020-01-15 03:18:52	ZTF_candidates:33
2020-01-15 07:45:54	ZTF_candidates:33
2020-01-15 02:39:51	ZTF_candidates:33
2020-01-14 13:54:15	ZTF_candidates:33
2020-01-14 13:51:23	ZTF_candidates:33
2020-01-14 13:49:54	ZTF_candidates:33
2020-01-14 13:46:57	ZTF_candidates:33
2020-01-14 13:46:17	ZTF_candidates:33

# Download rows

select rows and then click the



button to get a \*.csv



The screenshot shows the Point Of Interest Broker web application. At the top, there's a navigation bar with "Home", "Help", "Contact", "Login", and "Sign Up". Below that, a "Toggle introduction" button is visible. The main content area shows "Rows: 311440" and a set of navigation buttons: "First", "Prev", "Next", and "Last". To the right of these buttons are "Download Selected", "Filter", and "Clear" buttons. Below the navigation is a table with columns: "date (UTC)", "alert\_id", "object\_id", "mjd", "ant passband", "locus\_id", "ra", "dec", "ant\_mag corrected", and "class". The table contains 10 rows of data, each with a checkbox on the right side. The first row has a checked checkbox, while the others are unchecked.

date (UTC)	alert_id	object_id	mjd	ant passband	locus_id	ra	dec	ant_mag corrected	class	
2020-01-15 11:58:48	ztf_candidate:3301499174915615082	ZTF18aaadmv	61055.49917820003	R	ANT2022z4ly6sa13zc5	194.75340	-13.57032	18.092	puls	<input checked="" type="checkbox"/>
2020-01-15 03:42:19	ztf_candidate:3301154396115615040	ZTF18ab1faw1	61055.1543000999985	g	ANT2018d5c41	351.06837	57.98073	15.176	puls	<input checked="" type="checkbox"/>
2020-01-15 03:15:38	ztf_candidate:3301135850615615000	ZTF18aayvrt1	61055.135856499095	g	ANT2020axn24	324.80864	52.04523	None	puls	<input checked="" type="checkbox"/>
2020-01-15 03:10:52	ztf_candidate:3301132544015610009	ZTF18adecum	61055.13254630007	g	ANT2018f7h41	356.79623	36.96273	14.815	puls	<input type="checkbox"/>
2020-01-15 02:41:34	ztf_candidate:3301113961315610012	ZTF17awwv1b	61055.11196739995	R	ANT2018frkks	341.02311	52.83330	17.268	puls	<input type="checkbox"/>
2020-01-15 02:39:51	ztf_candidate:3301111013715610022	ZTF18aaplsan	61055.111018499025	R	ANT2020ax1qz	353.33868	49.09954	16.111	puls	<input type="checkbox"/>
2020-01-14 13:54:15	ztf_candidate:3300579345015615007	ZTF18abckkuo	61054.57934030006	R	ANT2020bjttr	254.64301	-14.30417	16.931	puls	<input type="checkbox"/>
2020-01-14 13:51:23	ztf_candidate:3300577361815610012	ZTF18acmplds	61054.57736109909	R	ANT2020bvv7i	283.99341	17.68482	None	puls	<input type="checkbox"/>
2020-01-14 13:49:54	ztf_candidate:3300576333515615003	ZTF18aawmfb1	61054.576330999044	R	ANT2020b1f1u	256.71309	-16.32304	15.108	puls	<input type="checkbox"/>
2020-01-14 13:46:57	ztf_candidate:3300574280215615020	ZTF18aadsxfs	61054.574282399044	R	ANT2020amw3a	261.50400	-13.26255	15.994	puls	<input type="checkbox"/>
2020-01-14 13:46:17	ztf_candidate:3300573812015615019	ZTF18aawmghn	61054.57381039901	R	ANT2020ben2to	264.30576	-3.24564	16.667	puls	<input type="checkbox"/>

# Download rows

alerts\_3.csv — LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

Liberation Sans 10 pt

A1 date\_log

	A	B	C	D	E	F	G	H	I	J	K	L
1	date_log	site_alert_type	site_id	pt_offset_id	num_alerts	num_mag_values	brightest_alert_of_pt	brightest_alert_magnitude_of	brightest_alert_observation_time_of	sitec_id	sitec_ra	sitec_dec
2	2020-05-25 12:42:08.620594	63955_4981762_of_candidate	3301499174815003002	ZTF20abwvne	86	20	37_of_candidate:2049396204815003008	14.8555551754742	63955_3952083002	AAT20222-Hydra13arc5	194.753386148252	-13.5782239338899
3	2020-05-25 01:48:11.739574	63955_1543981_of_candidate	3301154396115003040	ZTF20abwvne	436	37	37_of_candidate:132491316115003088	15.6451625823075	59078_3813183999	AAT2020wvne4	351.086373510699	57.9987268943064
4	2020-05-25 01:00:25.749054	63955_1398544999_of_candidate	3301139850815003000	ZTF20abwvne	1444	1241	37_of_candidate:1364448850815003001	17.3705577890342	58718_4488542001	AAT2020wvne24	324.888643208796	52.0452332938064
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Sheet 1 of 1 | alerts\_3 | Default | English (USA) | Average: Sum: 0 | 100%

# Your account

creating an account opens more advanced functionality

The screenshot shows a web browser window with the address bar displaying `http://127.0.0.1:5000/profile`. The page title is "Point Of Interest Broker" and the browser's address bar shows "132%". The page content is as follows:

- Header:** "POI Point Of Interest Alert Broker" on the left, and "Home Help Contact Profile" on the right.
- Profile Section:** A dark teal box with a "Profile" tab and a "Security" button. It says "Welcome, Nina!" and "Manage your favorites and watchlists below." Below this is a summary table:

Favorites	Groups	Watchlists
0	0	0
- Your Favorites:** A section with a "New Group" button and a sub-section for "Ungrouped" items. It contains the text "No favorites yet."
- Your POI Watchlists:** A section with a "New Watchlist" button and the text "No watchlists yet."

At the bottom of the page, a footer reads: "Copyright © 2025 Nina Herritschek and development team. All rights reserved. Fork me on GitHub. App Version: 3.0.0"

# Bookmark

Save your filtered search as a bookmark

The screenshot shows the Point Of Interest Broker web application in a Mozilla Firefox browser. The browser address bar shows the URL: `http://127.0.0.1:5000/pdate=&alert_id=&rtf_object_id=&date_alert_mjd=&ant_pos=`. The page title is "Point Of Interest Broker". The navigation menu includes "Home", "Help", "Contact", and "Profile".

At the top of the main content area, there is a "Toggle introduction" button. Below it, the text "Rows: 21097" is displayed. To the right of this text are four navigation buttons: "First", "Prev", "Next", and "Last". Further right are three action buttons: "Download Selected", "Filter", and "Clear".

The main content is a table with the following columns: "date (UTC)", "alert\_id", "object\_id", "mjd", "ant\_posband", "locus\_id", "ra", "dec", "ant\_mag corrected", and "class". The table contains 10 rows of data, each representing a different astronomical object. Each row has a small square icon to its right, likely for selection or deletion.

date (UTC)	alert_id	object_id	mjd	ant_posband	locus_id	ra	dec	ant_mag corrected	class
2026-03-06 13:13:07	rtf_candidate:3351550772215010033	ZTF18abdcdf1	61105.530775500014	R	ANT2020basecc	311.20604	17.51406	20.991	lvv
2026-03-06 13:00:01	rtf_candidate:3351547232215010030	ZTF18abdeeah	61105.54723379994	R	ANT2020basecc	311.20604	17.51406	20.820	lvv
2026-03-06 13:02:53	rtf_candidate:3351543662215010034	ZTF18abdeeah	61105.54366099908	R	ANT2020basecc	311.20604	17.51406	19.8	lvv
2026-03-06 13:02:04	rtf_candidate:3351543112215010006	ZTF18abdeeah	61105.54311340023	R	ANT2020basecc	293.11351	-7.60399	19.22	lvv
2026-03-06 12:57:15	rtf_candidate:3351539764715010014	ZTF18abdeeah	61105.53976049979	R	ANT2018colins	200.65170	1.52309	19.025	lvv
2026-03-06 12:57:15	rtf_candidate:3351539764715010022	ZTF18abdeeah	61105.53976049979	R	ANT2020basecc	200.62873	1.36014	19.741	lvv
2026-03-06 12:57:15	rtf_candidate:3351539764215010019	ZTF18abdeeah	61105.53976049979	R	ANT2020basecc	201.78937	1.40835	20.050	lvv
2026-03-06 12:57:15	rtf_candidate:3351539765615010019	ZTF18abdeeah	61105.53976049979	R	ANT2020basecc	201.90073	3.95463	20.522	lvv
2026-03-06 12:57:15	rtf_candidate:3351539764015010007	ZTF18abdeeah	61105.53976049979	R	ANT2020basecc	201.87007	2.50100	19.719	lvv
2026-03-06 12:57:15	rtf_candidate:3351539765015010011	ZTF18abdeeah	61105.53976049979	R	ANT2020basecc	201.00496	3.25070	20.703	lvv
2026-03-06 12:56:35	rtf_candidate:3351539295615010000	ZTF18abdeeah	61105.539293999784	R	ANT2018basecc	278.71378	-3.34565	21.436	lvv

# Bookmark

Save your filtered search as a bookmark

The screenshot shows the Point Of Interest Broker web application in a Mozilla Firefox browser. The browser's address bar displays the URL: `http://127.0.0.1:5000/?date=&alert_id=&zrf_object_id=&date_alert_mjd=&ant_p...`. The application header includes the logo, name, and navigation links (Home, Help, Contact, Profile). Below the header, there are navigation buttons: "Home", "Help", "Contact", and "Profile".

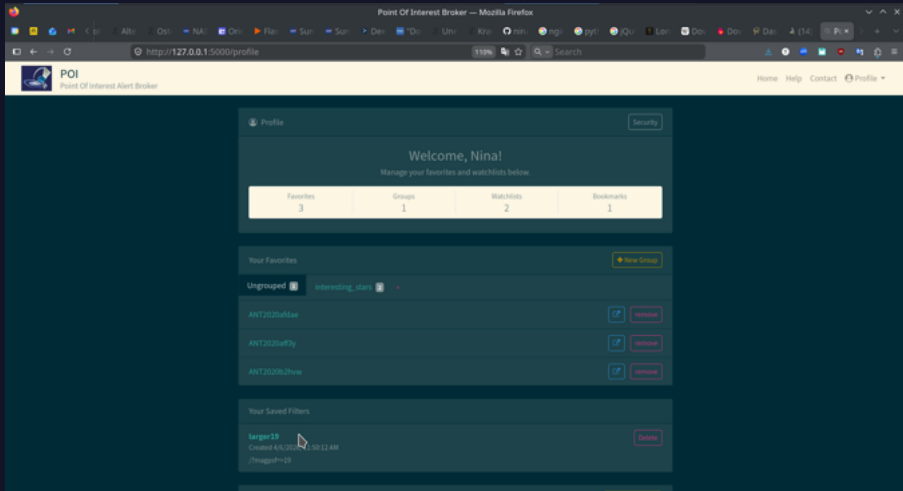
The main content area displays a table of search results. The table has columns: `date (UTC)`, `alert_id`, `object_id`, `mjd`, `ant_posband`, `locus_id`, `ra`, `dec`, `ant_mag corrected`, and `class`. The table shows several rows of data, including columns for `date (UTC)`, `alert_id`, `object_id`, `mjd`, `ant_posband`, `locus_id`, `ra`, `dec`, `ant_mag corrected`, and `class`.

A dialog box is overlaid on the table, titled "127.0.0.1:5000". It contains the text "Name this filter bookmark:" and a text input field with the value "larger19". The dialog has "Cancel" and "OK" buttons.

date (UTC)	alert_id	object_id	mjd	ant_posband	locus_id	ra	dec	ant_mag corrected	class
2026-03-06 13:13:07	217_canddate:325155677223610033	ZTF18abwzq1	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	26.991	1sv
2026-03-06 13:06:01	217_canddate:325154723223610030	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	26.828	1sv
2026-03-06 13:02:53	217_canddate:325154366223610034	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	19.0	1sv
2026-03-06 13:02:04	217_canddate:325154311223610006	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	19.22	1sv
2026-03-06 12:57:35	217_canddate:325153976423610014	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	19.025	1sv
2026-03-06 12:57:15	217_canddate:325153976423610022	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	19.741	1sv
2026-03-06 12:57:15	217_canddate:325153976423610019	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	26.856	1sv
2026-03-06 12:57:15	217_canddate:325153976423610019	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	26.522	1sv
2026-03-06 12:57:15	217_canddate:325153976423610007	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	19.719	1sv
2026-03-06 12:57:15	217_canddate:325153976423610011	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	26.703	1sv
2026-03-06 12:56:05	217_canddate:3251539299623610000	ZTF18abwzq	61105.536775366014	R	ANT2020bawng	311.20694	17.51406	21.426	1sv

# Bookmark

Save your filtered search as a bookmark



The screenshot shows a web browser window displaying the 'Point Of Interest Broker' website. The browser's address bar shows the URL 'http://127.0.0.1:5000/profile'. The website header includes the logo 'POI Point Of Interest Alert Broker' and navigation links for 'Home', 'Help', 'Contact', and 'Profile'. The main content area is titled 'Profile' and features a 'Security' button. A welcome message 'Welcome, Nina!' is displayed, followed by the instruction 'Manage your favorites and watchlists below.' Below this, a summary table shows the user's statistics:

Favorites	Groups	Watchlists	Bookmarks
3	1	2	1

The 'Your Favorites' section includes a '+ New Group' button and a list of ungrouped items under the 'interesting\_stars' group. The items are:

- ANT2020a5ae (with 'IF' and 'remove' buttons)
- ANT2020a#3y (with 'IF' and 'remove' buttons)
- ANT2020b2hsw (with 'IF' and 'remove' buttons)

The 'Your Saved Filters' section shows a filter named 'larger19' with the details 'Created 4/5/2022 11:58:12 AM' and the URL '/?tagset=19'. A 'remove' button is visible next to the filter name.

# Favorites

Add an object (locus) to your favorites

The screenshot shows the Point Of Interest Broker web application in Mozilla Firefox. The browser address bar displays `http://127.0.0.1:5000`. The main content area features a modal window for the locus `ZTF18abryhwj`. The modal has a pink heart icon in the top right corner, indicating it is a favorite. Below the title, there are tabs for `Locus Lightcurve` (selected), `Thumbnails`, `Features`, `Observing Planning Tool`, `Catalog cross-matches`, and `Classification`. The lightcurve plot shows `AB - IAB (mag)` on the y-axis (ranging from 14.0 to 18.0) and `date_averaged` on the x-axis (ranging from 60000 to 80000). The plot contains two data series: green dots and red dots. A `Download Lightcurve as CSV` link is visible in the top right of the plot area. A `Close` button is located in the bottom right of the modal. In the background, a table of data is visible with columns for `date (UTC)`, `alert_id`, and `candidate`. The table contains several rows of data, including entries for `ZTF18abryhwj` with associated IDs and magnitudes.

# Favorites

all favorites show up (also) as "Ungrouped"

The screenshot shows a web browser window displaying the 'Point Of Interest Broker' application. The user is logged in as 'Nina'. The main content area shows a summary of favorites and watchlists:

Favorites	Groups	Watchlists
3	0	0

Below this summary, the 'Your Favorites' section is visible. It includes a 'New Group' button and a list of three ungrouped items:

- Ungrouped
- ANT2020a6tae
- ANT2020a93y
- ANT2020b2hew

Each item has a checkbox and a 'Remove' button. The 'Your POI Watchlists' section at the bottom shows 'No watchlists yet.' and a 'New Watchlist' button.

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# Favorites

... from which you can add them to a group

The screenshot shows a web browser window displaying the POI application. The browser's address bar shows the URL `http://127.0.0.1:5000/profile`. The application header includes the POI logo and navigation links for Home, Help, Contact, and Profile. The main content area is titled "Profile" and features a "Security" button in the top right corner. A welcome message "Welcome, Nina!" is displayed, followed by the instruction "Manage your favorites and watchlists below." Below this, a summary table shows the user's current counts:

Favorites	Groups	Watchlists
3	0	0

The "Your Favorites" section is currently empty, with a "New Group" button in the top right corner. Below this, the "Ungrouped" section lists three items:

- ANT2020a8dx
- ANT2020a93y
- ANT2020b2hew

Each item has a checkbox and a "Remove" button. The "Your POI Watchlists" section is also empty, with a "New Watchlist" button in the top right corner. The footer of the application contains the copyright notice: "Copyright © 2025 Nina Hemsitsek and development team. All rights reserved. Fork me on GitHub. App Version: 3.0.0".

# Favorites

... from which you can add them to a group

The screenshot shows a web browser window with the URL `http://127.0.0.1:5000/profile`. The page title is "Point Of Interest Broker". The user is logged in as "Nina".

The main content area displays a "Profile" section with a "Security" button. Below this, a welcome message says "Welcome, Nina!" and "Manage your favorites and watchlists below." A summary table shows:

Favorites	Groups	Watchlists
3	1	0

Below the summary, the "Your Favorites" section is visible. It includes a "New Group" button and a list of favorites under the "Ungrouped" category. The first favorite is "interesting\_start", which is highlighted with a mouse cursor. Below it are three other favorites: "ANT2020a4ax", "ANT2020a93y", and "ANT2020b2hew". Each favorite has a "Remove" button.

The "Your POI Watchlists" section is empty, showing "No watchlists yet." and a "New Watchlist" button.

At the bottom of the page, the footer contains the text: "Copyright © 2025 Nina Herritschek and development team. All rights reserved. Fork me on GitHub. App Version: 3.0.0".

# Favorites

... from which you can add them to a group  
and you could also add them to multiple groups

The screenshot shows a web browser window displaying the 'Point Of Interest Broker' application. A modal dialog box titled 'Move to Group' is open, prompting the user to move the item 'ANT2020a8ae' to a specific group. The 'Select Group' dropdown menu is currently set to 'interesting\_stars'. The background interface includes a profile section with 'Favorites: 3' and 'Watchlists: 0', a 'Your Favorites' section with a '+ New Favorite' button, a list of items under the 'interesting\_stars' group (ANT2020a8ae, ANT2020a93y, ANT2020b29we), and a 'Your POI Watchlists' section with a '+ New Watchlist' button. The footer contains the text: 'Copyright © 2020 Nina Herritschek and development team. All rights reserved. Fork me on GitHub. App Version: 3.0.0'.

# Favorites

our newly created group `interesting_stars`

The screenshot shows a web browser window displaying the 'Point Of Interest Broker' application. The browser's address bar shows the URL `http://127.0.0.1:5000/profile`. The application header includes the POI logo and navigation links for Home, Help, Contact, and Profile. The main content area is titled 'Profile' and features a 'Security' button. A welcome message 'Welcome, Nina!' is displayed, followed by the instruction 'Manage your favorites and watchlists below.' Below this, a summary table shows the user's statistics:

Favorites	Groups	Watchlists
3	1	0

The 'Your Favorites' section includes a '+ New Group' button and a list of favorites. The first favorite is 'interesting\_stars', which is highlighted. Below it are two other favorites, 'ANT2020a@a' and 'ANT2020a#fy', each with 'UF' and 'REMOVE' buttons. The 'Your POI Watchlists' section has a '+ New Watchlist' button and a message 'No watchlists yet.'

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# Watchlists

Favorites are exact objects. Watchlists allow for more flexibility watching for future alerts matching certain patterns:

The screenshot shows a web browser window displaying the 'Point of Interest Broker' application. The page title is 'Point of Interest Broker' and the URL is 'http://127.0.0.1:5000/profile'. The user is logged in as 'Nina'. The main content area is titled 'Profile' and includes a 'Security' button. A welcome message 'Welcome, Nina!' is displayed, followed by the instruction 'Manage your favorites and watchlists below.' Below this, a summary table shows the user has 3 Favorites, 1 Group, and 0 Watchlists. The 'Your Favorites' section lists 'interesting\_stars' under the 'Ungrouped' category, along with two specific items: 'ANT2020aIaaw' and 'ANT2020aIaFy', each with 'IF' and 'REMOVE' buttons. The 'Your POI Watchlists' section is currently empty, with a 'No watchlists yet.' message and a '+ New Watchlist' button.

Favorites	Groups	Watchlists
3	1	0

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# Watchlists

Configure your watchlist with the visual query builder tool:

The screenshot shows a web browser window with the URL `http://127.0.0.1:5000/profile`. The page title is "Point Of Interest Broker". A modal window titled "Create Watchlist" is open, displaying a visual query builder interface. The modal has a dark teal background and contains the following elements:

- Logic operators: "AND" (selected) and "OR".
- Buttons: "Add rule" and "Add group".
- Rule 1: Field "Mean Magnitude (R)" with operator "greater" and value "19.5". A "Delete" button is on the right.
- Rule 2: Field "Probability Class" with operator "equal" and value "puls". A "Delete" button is on the right.
- Buttons: "Generate SQL" and "Open Full Page".
- Text input: "Watchlist name" with a "Save Query" button.

Below the modal, a list of existing watchlists is visible, including "AWT 2020a15a" and "AWT 2020a17a", each with a "Delete" button. A "New Watchlist" button is also present. At the bottom of the page, a footer reads: "Copyright © 2020 Nina Herritschek and development team. All rights reserved. Fork me on GitHub. App Version: 3.0.0".

# Watchlists

click the **Generate SQL** button to generate the query

The screenshot shows a web browser window with the URL `http://127.0.0.1:5000/profile`. The page title is "Point Of Interest Broker". The main content is a "Create Watchlist" modal form. The form has a header with "AND" and "OR" operators and "Add rule" and "Add group" buttons. It contains two rows of conditions: "Mean Magnitude (R)" with the operator "greater" and value "19.5", and "Probability Class" with the operator "equal" and value "puls". Below these is a yellow "Generate SQL" button. A text area below the button displays the generated SQL query: `Feature_mean_magn_r > 19.5 AND prob_class = 'puls'`. There is also a "Save Query" button and a "Watchlist name" input field. At the bottom of the modal, it says "Query is valid. Filter: featuretable.feature\_mean\_magn\_r = 19.5 AND classification.prob\_class = 'puls'". Below the modal, there is a section for "Your POI Watchlists" with a "New Watchlist" button and the text "No watchlists yet."

# Watchlists

... and

Save Query

The screenshot shows a web browser window with the URL `http://127.0.0.1:5000/profile`. The page title is "Point Of Interest Broker". A modal dialog titled "Create Watchlist" is open, displaying a query builder interface. The dialog has a dark teal background with a light gray border. At the top, it shows "AND" and "OR" options, with "AND" selected. There are two "Add rule" and "Add group" buttons. The main area contains two rows of query conditions:

- Row 1: "Mean Magnitude (R)" field with a value of "19.5" and a "greater" operator. A "Cancel" button is on the right.
- Row 2: "Probability Class" field with a value of "puls" and an "equal" operator. A "Cancel" button is on the right.

Below the conditions is a "Generate SQL" button and an "Open Full Page" button. The generated SQL query is displayed in a light yellow box: `Feature_mean_magn_r > 19.5 AND prob_class = 'puls'`. A "Save Query" button is visible at the bottom right of the dialog. Below the dialog, the main page content is dimmed, showing a "New Watchlist" button and the text "No watchlists yet".

Query is valid. Filter: `featuretable.feature_mean_magn_r > 19.5 AND classification.prob_class = 'puls'`

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# Watchlists

you can have multiple watch lists

The screenshot shows a web browser window displaying the 'Point of Interest Broker' application. The browser's address bar shows the URL `http://127.0.0.1:5000/profile`. The application header includes the logo 'POI Point Of Interest Alert Broker' and navigation links for 'Home', 'Help', 'Contact', and 'Profile'.

The main content area is titled 'Profile' and includes a 'Security' button. A welcome message reads 'Welcome, Nina!' with the subtext 'Manage your favorites and watchlists below.' Below this is a summary table:

Favorites	Groups	Watchlists
3	1	1

The 'Your Favorites' section features a '+ New Group' button and a list of items:

- An 'Ungrouped' category containing a sub-group named 'interesting\_stars'.
- An item 'ANT2020aIaaw' with 'IP' and 'Remove' buttons.
- An item 'ANT2020aIaFty' with 'IP' and 'Remove' buttons.

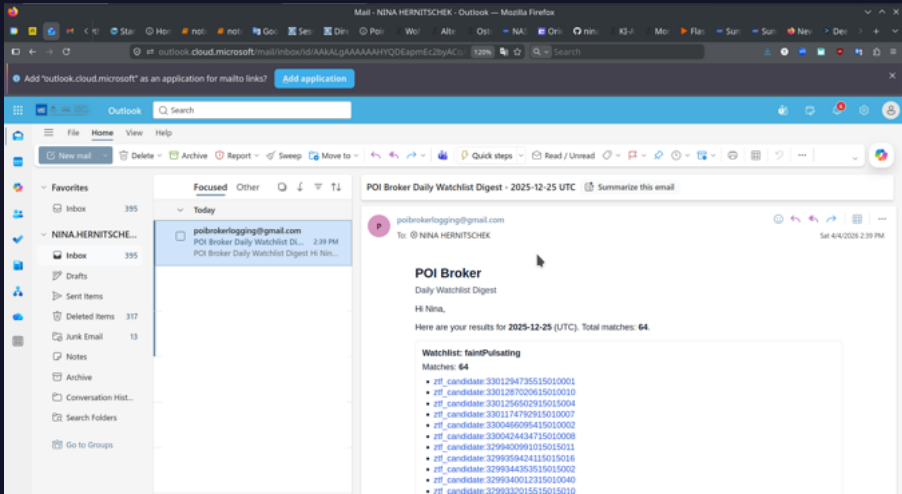
The 'Your POI Watchlists' section includes a '+ New Watchlist' button and a single watchlist entry:

- 'PulsPulsating' (Created 4/4/2020, 2:04:26 PM) with a 'Delete' button. The associated feature table is `featuretable.feature_mean_magn_r > 19.5 AND classification_prob_class = 'puls'`.

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# Watchlists

after the end of each night, you get an e-mail digest that includes updates for all your watch lists



The screenshot shows a Mozilla Firefox browser window displaying an Outlook web interface. The browser's address bar shows the URL `outlook.cloud.microsoft/mail/inbox/nd/AAALgAAAAAHYQDEapmEG2byACo`. The Outlook interface includes a navigation pane on the left with folders like 'Inbox' (395) and 'Drafts'. The main content area shows an email titled 'POI Broker Daily Watchlist Digest - 2025-12-25 UTC' from 'poibrokerlogging@gmail.com' to 'NINA.HERNITSCHER', dated 'Sat 4/4/2025 2:39 PM'. The email body contains the following text:

**POI Broker**  
Daily Watchlist Digest  
Hi Nina,  
Here are your results for 2025-12-25 (UTC). Total matches: **64**.

**Watchlist: faintPulsating**  
Matches: **64**

- zfi\_candidate:3301294735515010001
- zfi\_candidate:3301287020615010010
- zfi\_candidate:3301256502915015004
- zfi\_candidate:3301174792915010007
- zfi\_candidate:3300466095415010002
- zfi\_candidate:3300424434715010008
- zfi\_candidate:3299400991015015011
- zfi\_candidate:3299309424115015016
- zfi\_candidate:3299344353515015002
- zfi\_candidate:3299340012315010040
- zfi\_candidate:3299332015515015010

## try it out

you can find us at:

<https://poibroker.uantof.cl/>

(we had some recent interruptions, but we are back online!)

# Questions



please send me an e-mail if you find bugs or have suggestions  
for something to be implemented