

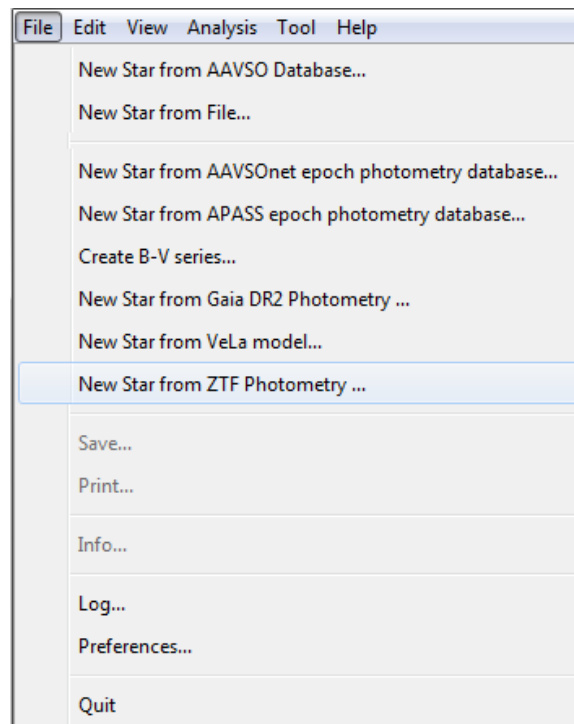
# ZTF Plug-in for VStar

This plugin allows you to retrieve light curve data from the online ZTF database. The details of the ZTF project can be found here: <https://www.ztf.caltech.edu/>.

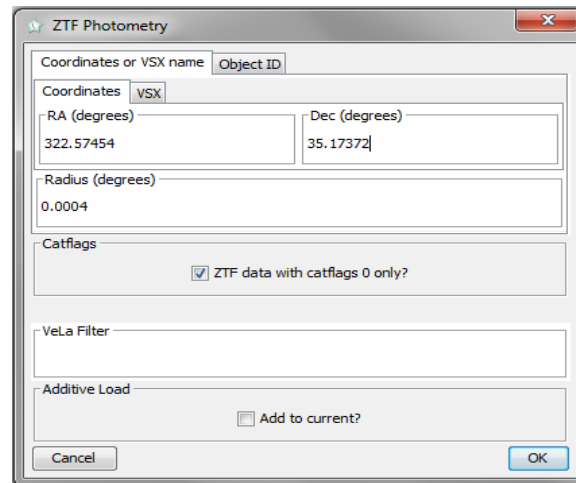
The plugin can retrieve data by star coordinates or by the unique ZTF object ID. Several ZTF object IDs can belong to one star; to get all available data, you usually have to combine data series from several different object IDs. Retrieving data by star coordinates lets us get all data points at once; however, you have to limit the search area by a small circle.

## Retrieving data by the star's coordinates or by the VSX name

Select “New star from ZTF Photometry” on the VStar file menu:



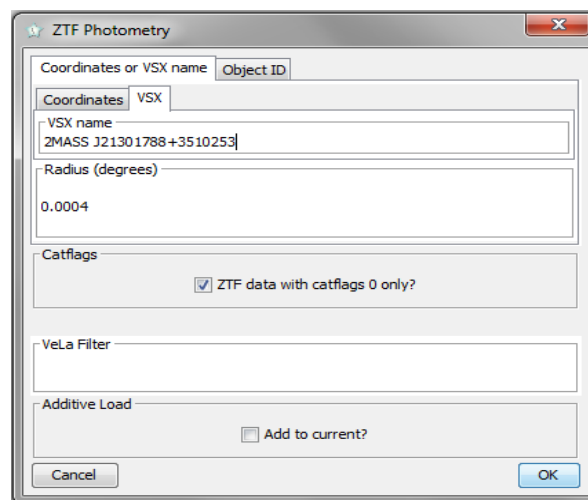
A dialog box will appear with the input fields for star coordinates. Enter the coordinates in degrees (epoch J2000):



The image shows a Windows-style dialog box titled "ZTF Photometry". It has two tabs: "Coordinates or VSX name" and "Object ID". The "Coordinates" tab is selected. Inside this tab, there are two sub-sections: "Coordinates" and "Radius (degrees)". The "Coordinates" section has two input fields: "RA (degrees)" with the value "322.57454" and "Dec (degrees)" with the value "35.17372". The "Radius (degrees)" section has a single input field with the value "0.0004". Below these is a "Catflags" section with a checked checkbox labeled "ZTF data with catflags 0 only?". At the bottom, there are two more sections: "VeLa Filter" and "Additive Load", both with empty input fields. The "Additive Load" section also has an unchecked checkbox labeled "Add to current?". At the very bottom are "Cancel" and "OK" buttons.

You can find the coordinates of the star of interest on the VSX website <https://www.aavso.org/vsx>. The "Radius" field defines the search radius; in most cases, the default value is ok.

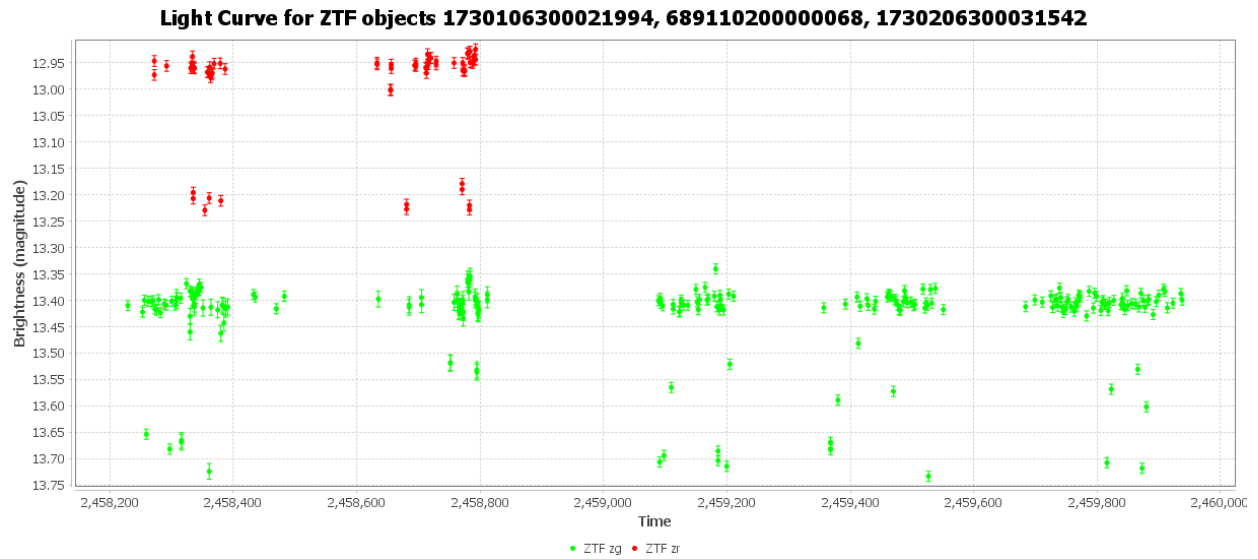
Another option is to use the VSX name. Besides the primary name, the VSX usually recognizes several assigned names from existing catalogs. So, instead of the coordinates, you can switch to the "VSX" tab and enter the star's name:



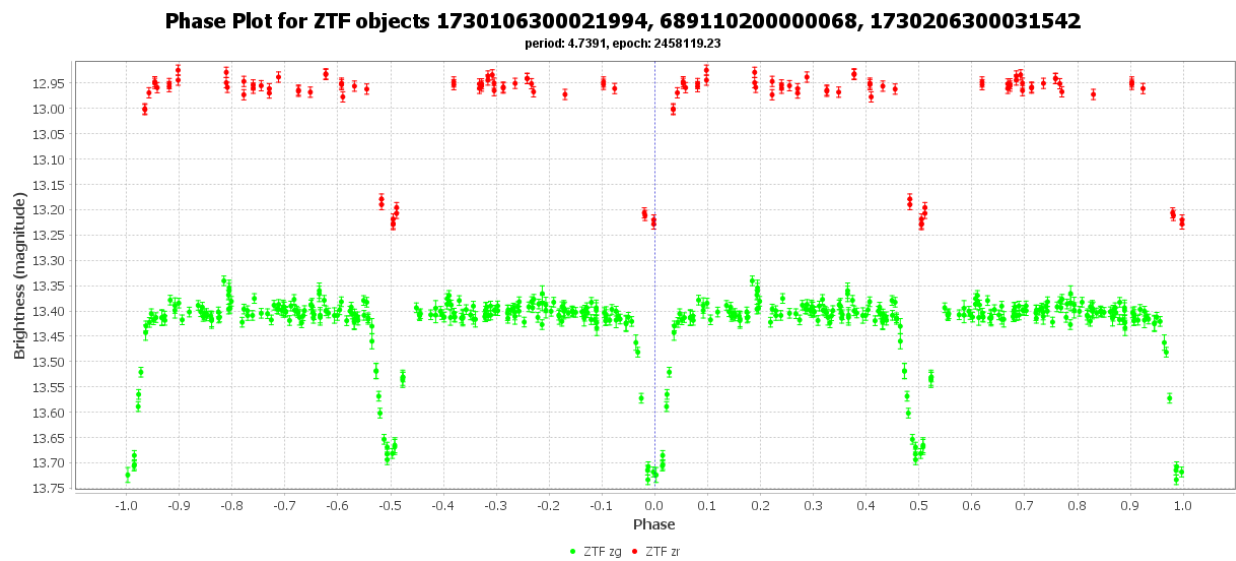
The image shows the same "ZTF Photometry" dialog box, but with the "VSX" tab selected. The "Coordinates" section is now empty, and a new "VSX name" input field has appeared, containing the text "2MASS J21301788+3510253". The "Radius (degrees)" section remains the same with the value "0.0004". The "Catflags" section and the bottom buttons are also the same as in the previous image.

If the checkbox "ZTF data with catflags 0 only" is checked (this is by default), only the data with no "bad flags" will be retrieved. This is recommended by the VSX.

After entering the coordinates or the VSX name, press the [OK] button. When a VSX name is entered, the plug-in first refers to the VSX website, trying to obtain the coordinates. Then it calls the ZTF web service to get the data for the ZTF objects inside the circle with the specified radius centered on the coordinates you set (or obtained from the VSX by the object name). The process of retrieving the data sometimes may take dozens of seconds. As a result, the light curve(s) should appear in the plot pane:



In our example, we used the EA star PMAK V5 (=2MASS J21301788+3510253) with a period of 4.7391 days. Here is the phase plot:



## Retrieving data via ZTF object ID

Also, you can retrieve the data via ZTF object ID. To determine the ID of the star of interest, go to <https://irsa.ipac.caltech.edu/cgi-bin/Gator/nph-scan?submit=Select&projshort=ZTF>, select a catalog, and press the [SELECT] button:

The screenshot shows the NASA/IPAC Infrared Science Archive (IRSA) General Catalog Query Engine. The header includes the IRSA logo and the text "NASA/IPAC INFRARED SCIENCE ARCHIVE". Below the header are navigation links: "IRSA", "DATA SETS", "SEARCH", "TOOLS", "HELP", and a "Login" link. The main content area is titled "General Catalog Query Engine" and "powered by Gator". It features a navigation bar with buttons for "Quick Guide", "Tutorial", "Catalog List", "Process Monitor", and "Program Interface". Below this is a "CATALOG SELECTION:" dropdown menu set to "ZTF". A table titled "ZTF Archive" is displayed, with a "Select" button in the top right corner. The table has five columns: "Selection", "Descriptions", "# Columns", "# Rows", and "Information". It lists five ZTF DR catalogs, with ZTF DR15 Objects selected by default.

| ZTF Archive <b>Select</b>        |                  |           |            |                   |
|----------------------------------|------------------|-----------|------------|-------------------|
| Selection                        | Descriptions     | # Columns | # Rows     | Information       |
| <input checked="" type="radio"/> | ZTF DR15 Objects | 65        | 7315592173 | <a href="#">i</a> |
| <input type="radio"/>            | ZTF DR14 Objects | 65        | 7203292309 | <a href="#">i</a> |
| <input type="radio"/>            | ZTF DR13 Objects | 65        | 6985554017 | <a href="#">i</a> |
| <input type="radio"/>            | ZTF DR12 Objects | 65        | 6915002025 | <a href="#">i</a> |
| <input type="radio"/>            | ZTF DR11 Objects | 65        | 6860341302 | <a href="#">i</a> |

On the next page, enter the object's coordinates (or object name), then click [Run Query]:



## ZTF DR15 Objects

powered by Gator

[Quick Guide](#) [Tutorial](#) [Catalog List](#) [Process Monitor](#) [Program Interface](#)

[Run Query](#) [Restore Last Query Selection](#) [Reset](#)

☒ [Single Object Search](#) ☐ [Multi-Object Search](#) ☐ [All Sky Search](#)

### SPATIAL CONSTRAINTS

Coordinate or  
Object Name:

21 30 17.88 +35 10 25.4

*Examples:*

[298.0 29.87](#) | [269.84158 45.35492](#)

Search Method (choose one):

☒ [Cone:](#)

Radius   PA  Axial Ratio   
(0<Radius≤600 arcsec)

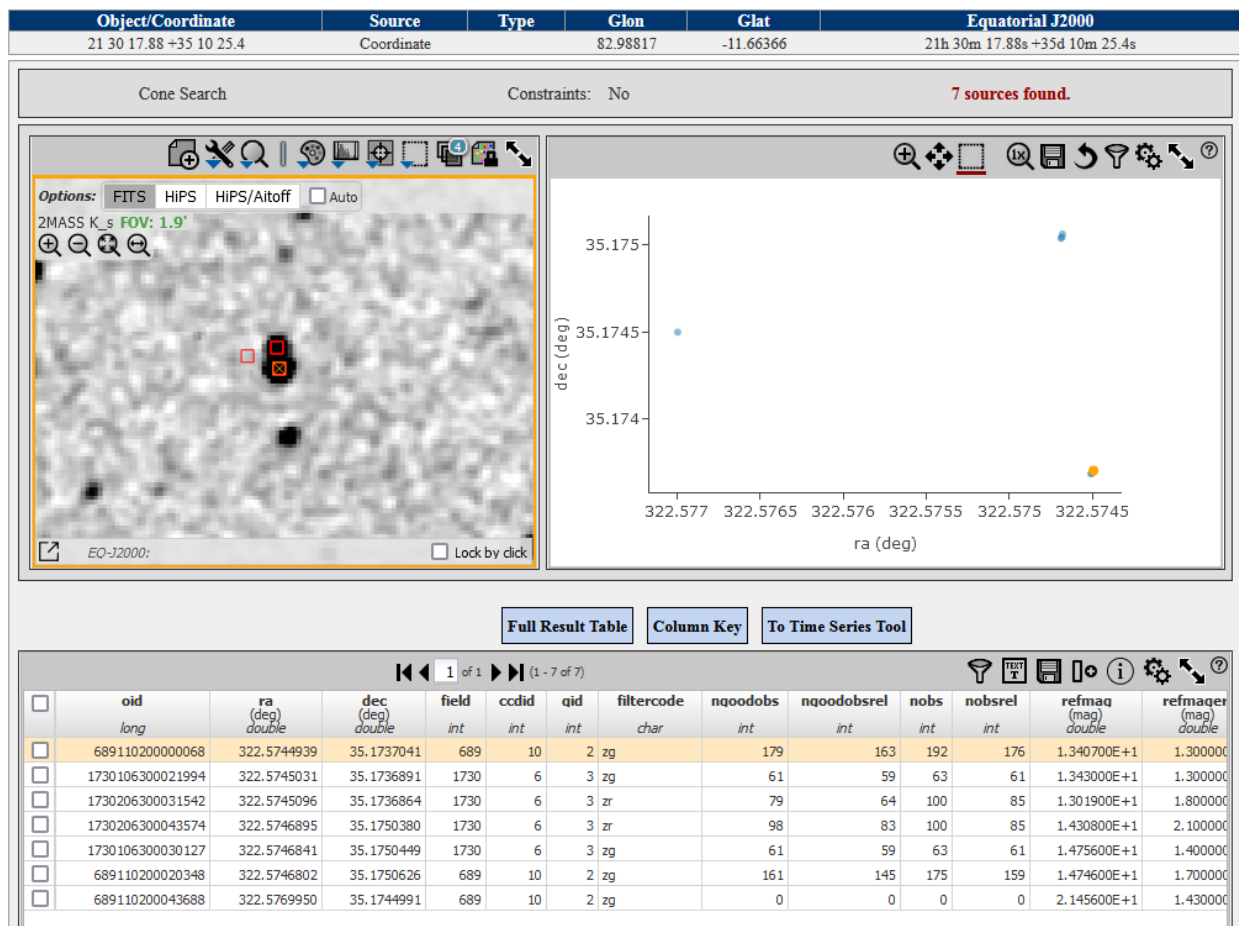
☐ [Box:](#)

Size:  arcsec  
(0<Size≤1200)

☐ [Polygon:](#)

Vertices:

You will see a sky image of the vicinity of the object (it can be zoomed in with the mouse or by clicking on the appropriate toolbar icon).



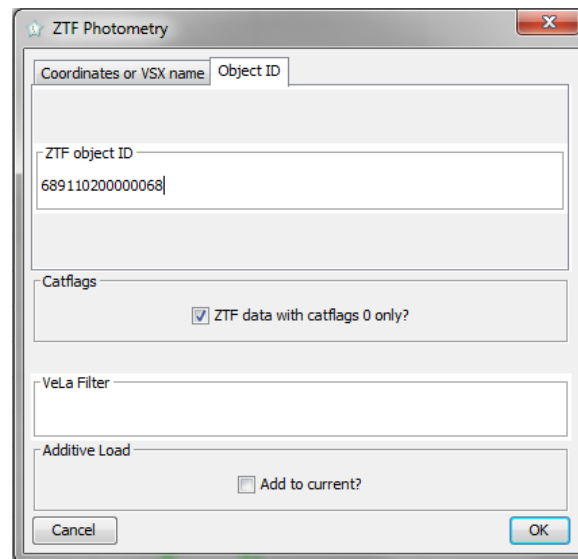
Full Result Table

Column Key

To Time Series Tool

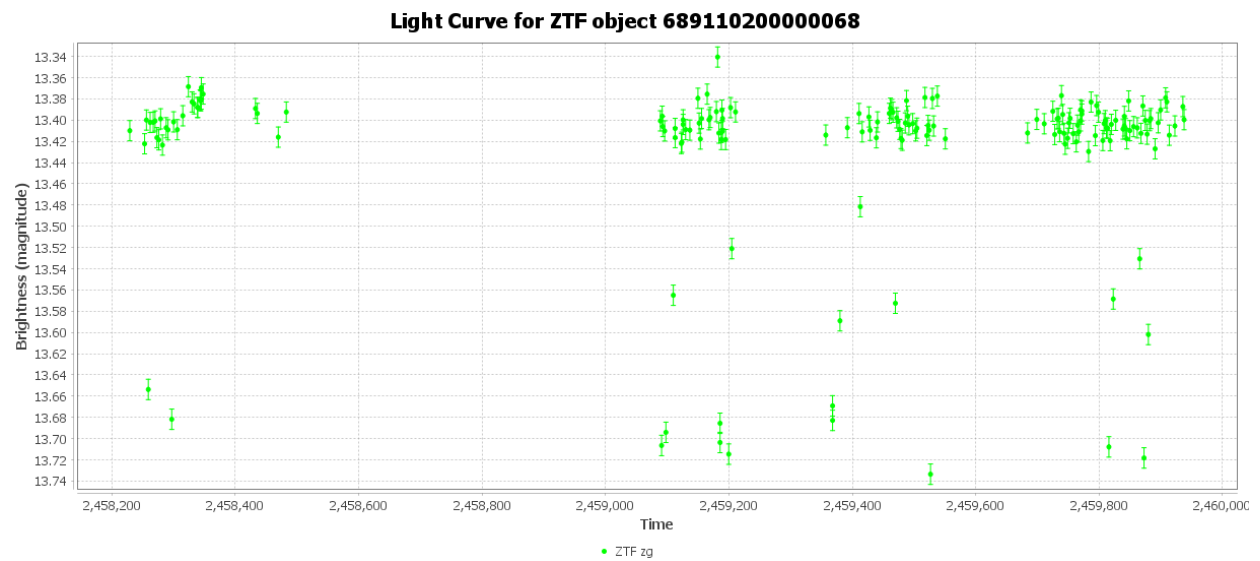
In the table below the image, you can see object identifiers (oid). Take one that corresponds to your object [There can be several IDs that belong to the object. Using “additive load” (see below) you can utilize them all]

Put a ZTF ID in the “ZTF object ID” on the “Object ID” tab:



The image shows a software dialog box titled "ZTF Photometry". It has two tabs: "Coordinates or VSX name" and "Object ID". The "Object ID" tab is selected. Inside the dialog, there is a text field labeled "ZTF object ID" containing the value "689110200000068". Below this is a section labeled "Catflags" with a checked checkbox "ZTF data with catflags 0 only?". There is also a "VeLa Filter" text field and an "Additive Load" section with an unchecked checkbox "Add to current?". At the bottom are "Cancel" and "OK" buttons.

Then press the [OK] button. The light curve should appear in the plot pane:



### Revision History

| Rev | Date        | Description     | Author                    |
|-----|-------------|-----------------|---------------------------|
| A   | 12 Mar 2023 | Initial release | Maksym Pyatnytskyy (PMAK) |