Appendix Report Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST) Internship

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Contents

1 Introduction

This report regards the first access and use of the Rubin Science Platform to plot simulated data imported from the pipeline or other means.
It describes the process needed to make light curves, color–color and color-magnitude diagrams using the Portal aspect of RSP, and shows how to edit these plots as preferred, depending on the user's interests.

2 Import the Data

The Portal aspect of RSP gives the user various choices to pick data from.
First of all there are TAP services (in "RSP TAP Search"), which include RSP and GAIA, as two examples.
The other possible data source is the external import ("Upload" in the platform); in particular this is the one I used.

There are plenty of articles publicly accessible in https://ui.adsabs.harvard.edu/ it is possible to take data from.

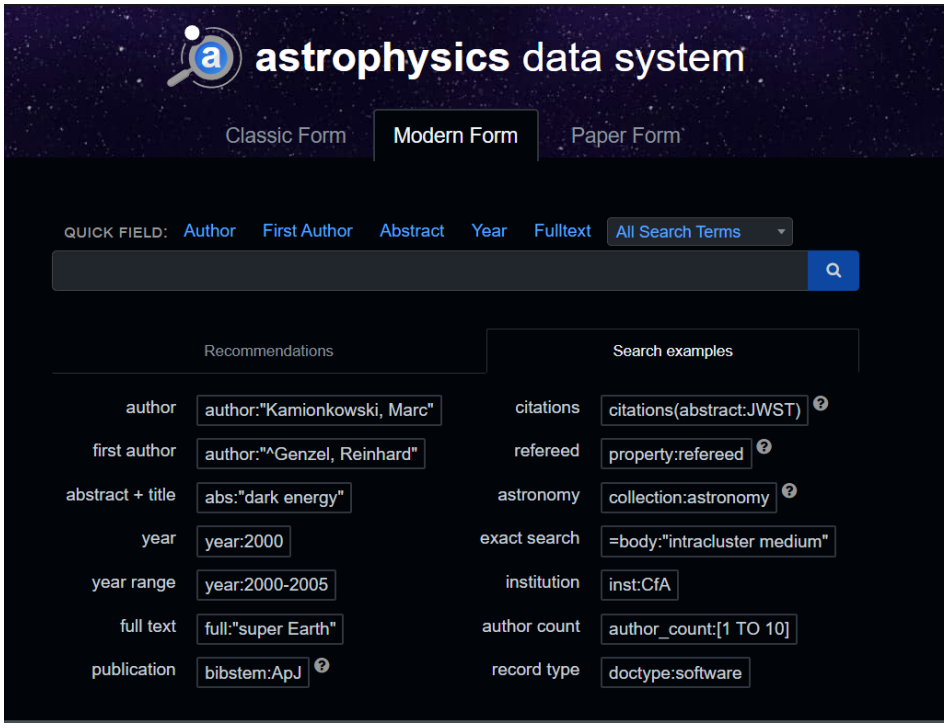


Figure 1: Screenshot from the opening page of the URL in section 2.

We have to get this article:
https://ui.adsabs.harvard.edu/abs/2014A%26A...570A..82V/abstract

in this case you could insert in the search bar:
$author$: "^$venuti$" $year$: 2014 $property$: $refereed$
and get this result:

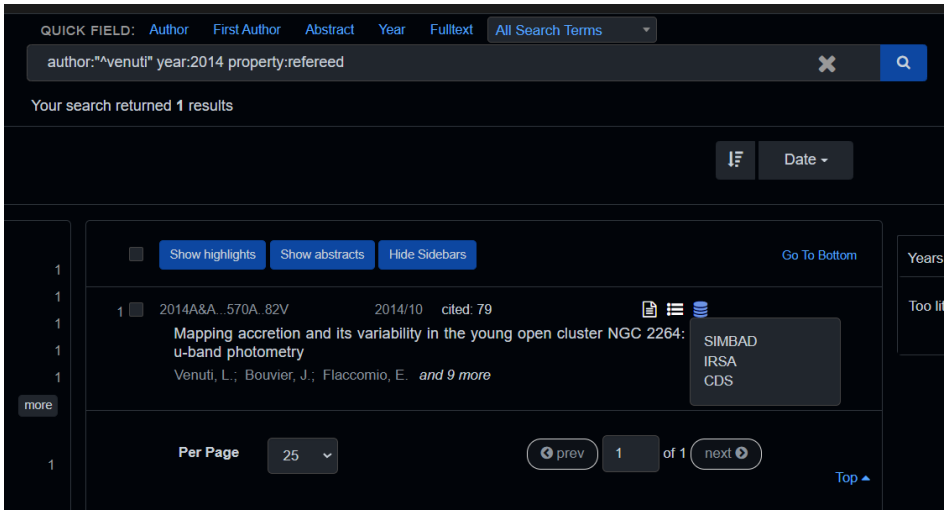


Figure 2: Search result.

By clicking "SIMBAD", it opens a new window where you have to click on the link in:

VizieR on-line data: <Available at CDS (J/A+A/570/A82): table2.dat table3.dat table4.dat>
and then click the link: /A+A/570/A82/stars in that page. At this point it is possible to choose which columns are useful for the research.

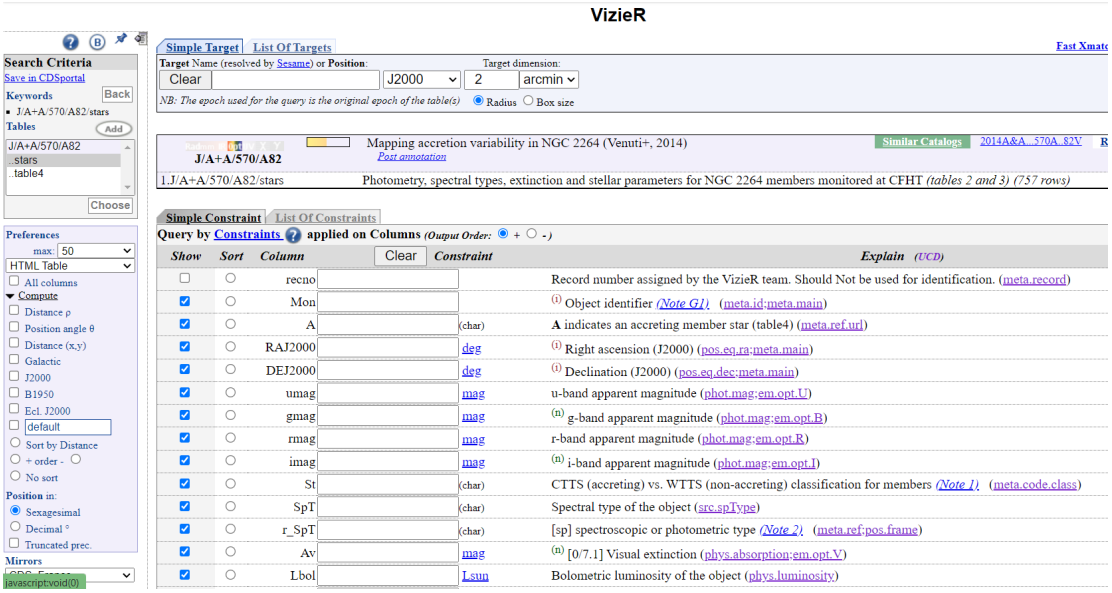


Figure 3

Select them and then click Save in CDSportal. It is useful to save the data file with the *.fits* format. At this point, using the Portal in RSP, it is possible to upload this file to work with it.

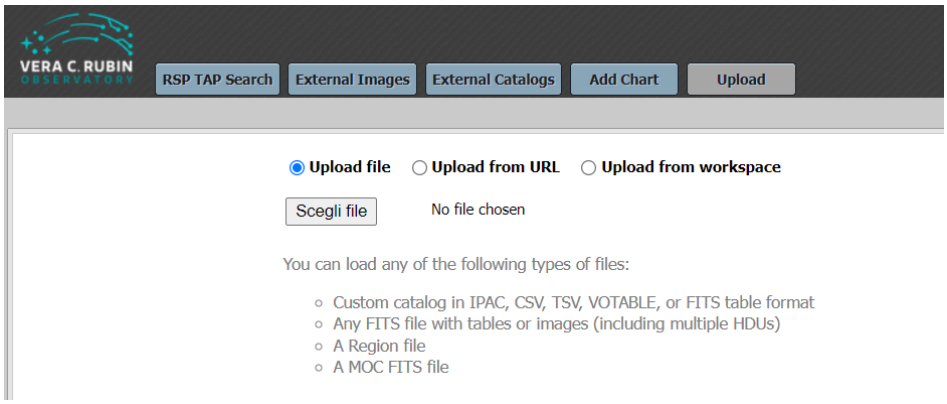


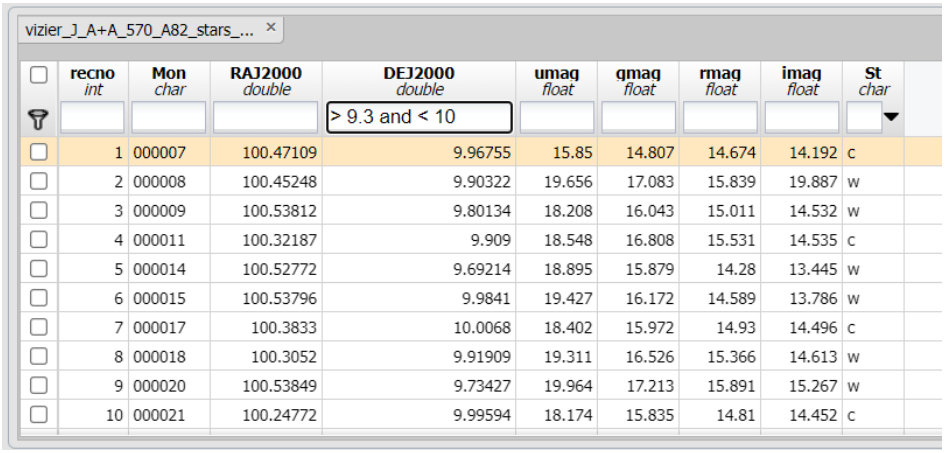
Figure 4: Upload section in RSP.

3 Work with the Rubin Science Platform

3.1 Use the Filter panel to select group of data

It is useful for various reasons to be able to select quickly a part of our data with given characteristics. In order to pursue this purpose, we can use the **Filter panel**.

Once this panel is selected, search bar appear for each column, letting us decide which data point the program will select.


vizier_J_A+A_570_A82_stars_...

recno int	Mon char	RAJ2000 double	DEJ2000 double	umag float	gmag float	rmag float	imag float	St char
			> 9.3 and < 10					
1	000007	100.47109	9.96755	15.85	14.807	14.674	14.192	c
2	000008	100.45248	9.90322	19.656	17.083	15.839	19.887	w
3	000009	100.53812	9.80134	18.208	16.043	15.011	14.532	w
4	000011	100.32187	9.909	18.548	16.808	15.531	14.535	c
5	000014	100.52772	9.69214	18.895	15.879	14.28	13.445	w
6	000015	100.53796	9.9841	19.427	16.172	14.589	13.786	w
7	000017	100.3833	10.0068	18.402	15.972	14.93	14.496	c
8	000018	100.3052	9.91909	19.311	16.526	15.366	14.613	w
9	000020	100.53849	9.73427	19.964	17.213	15.891	15.267	w
10	000021	100.24772	9.99594	18.174	15.835	14.81	14.452	c

Figure 5

In this example (Figure 5), a filter is applied to the DEC column, picking the points with $(9.3 < DEC < 10)\,deg$, so that every graph is open during this process will remove all the other points outside the filter range.

Now the table will contain only the values we want, so select all the points (white square on the up left corner of Figure 5) and select the option "remove all filters".
You should be left with all the data, with all the previous points still selected.
This means that each graph on the page will mark the selected points (by default giving them a different color).

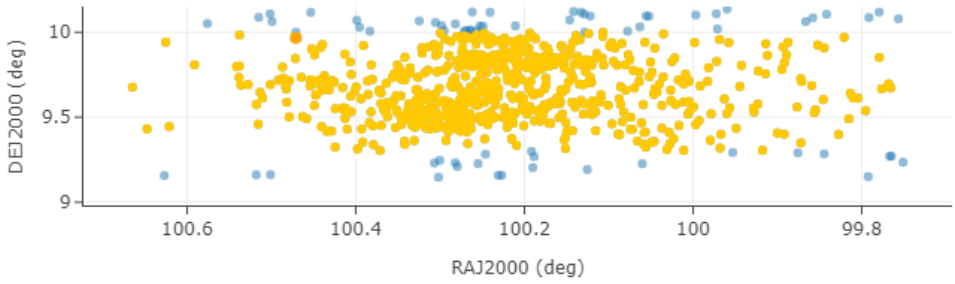


Figure 6: Spatial distribution of the points. The points with $(9.3 < DEC < 10)\,deg$ are in yellow, whereas the other are in blue.

3.2 Create graphs in the RSP

To create new plots or modify the existing ones it is possible to use the "Add Chart" button on the Portal aspect. It will open a window you can use to create and personalize every kind of plot with the columns of data imported.

Let's show as an example a Color-Magnitude Diagram, giving also some constraints.

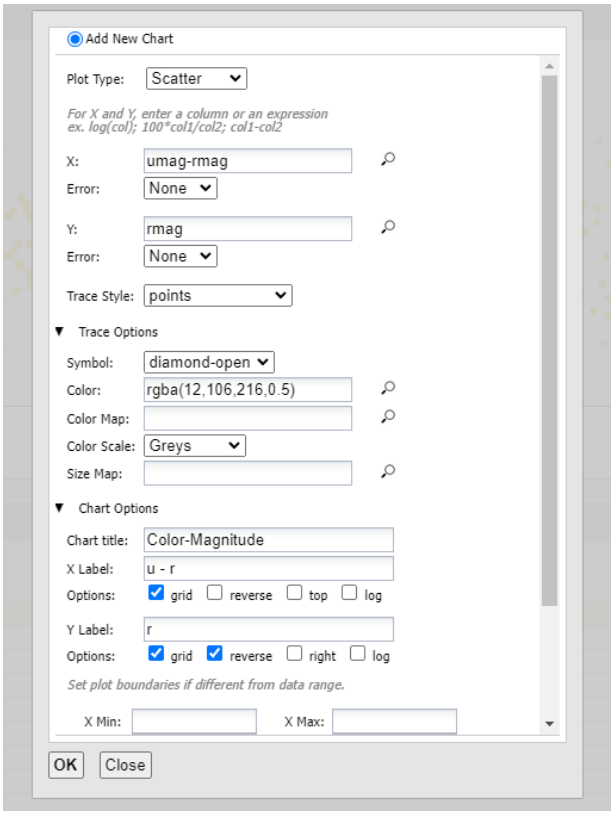


Figure 7

These configuration produces the following graph:

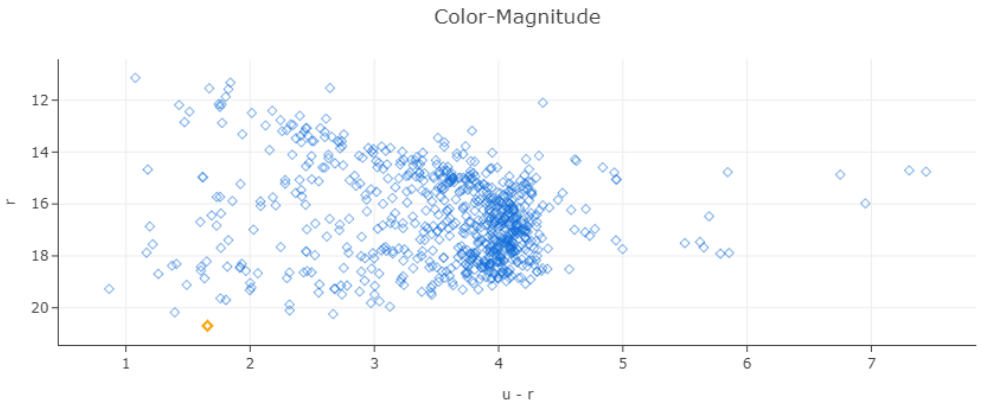


Figure 8: $(u-r, r)$ Color-Magnitude diagram.

Using similar steps to those described in subsection 3.1, we can use a filter to select only the weak-line T-Tauri stars and highlight them. Furthermore, by clicking "Chart options and tools" it is possible to modify *max* and *min* values of both X and Y axes. By doing so we obtain:

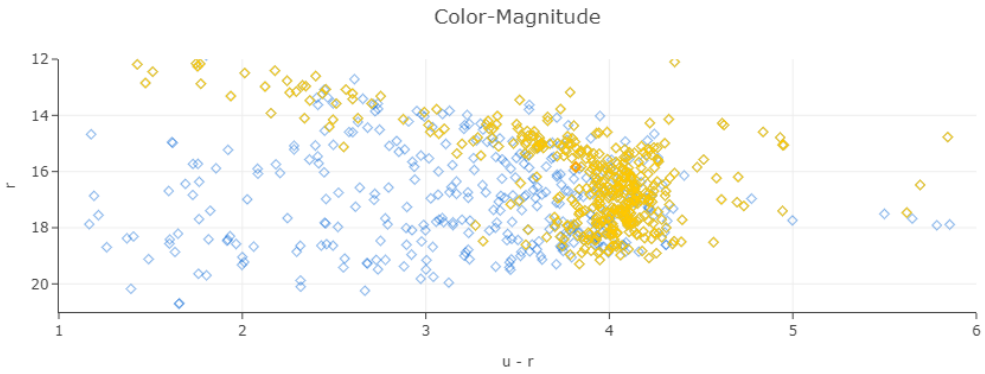


Figure 9: $(u-r, r)$ Color-Magnitude diagram (modified). The yellow points are the weak-line T-Tauri stars, all the others are in blue.