

How Do I...

Find cataclysmic variable candidates?

Many interesting objects are hidden among the SDSS data. One such object is a cataclysmic variable, a binary star pair in which the two stars are close together, and one star is a white dwarf. This guide comes from a modified form of a query by Dr. Paula Szkody at the University of Washington, an expert in Cataclysmic Variables.

1. From the astronomers' main page, click on the SQL Search link – the second link in the first column. The page looks like this:

SkyServer DRS Search - Mozilla Firefox

http://www.sdss.org/astro/en/tools/search/sql.asp

Sloan Digital Sky Survey / SkyServer

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DRS Tools

SQL Search

Please note: To be fair to other users, queries run from SkyServer search tools are restricted in how long they can run and how much output they return, by timeouts and row limits. Please see the Query Limits help page. To run a query that is not restricted by a timeout or number of rows returned, please use the CasJobs batch query service.

```
-- Please read the note above regarding query limits and spatial queries
select top 10 objid,ra,dec,u,g,r,i,z
from PhotoObj
where
  u between 0 and 19.6
  and g between 0 and 20
```

Submit Check Syntax Only? Output Format HTML XML CSV Reset

To find out more about the database schema use the Schema Browser.

For an introduction to the Structured Query Language (SQL), please see the SQL Intro help page. In particular, please read the Optimizing Queries section. If your query is timing out or running much slower than you think it should, please see also the the Bookmark Lookup bug section of the SQL Intro.

Find: best Find Next Find Previous Highlights Match case Phrase not found Done

2. In the main window, type the following query:

```
SELECT objID, ra, dec      -- get object ID, ra, dec of binary star
FROM PhotoPrimary         -- From all primary objects (best detections)
WHERE u - g < 0.4         -- Color cut
      AND g - r < 0.7
      AND r - i > 0.4
      AND i - z > 0.4
```

The query returns the object ID, RA, and dec of each binary star.

3. To view the actual binary stars, use the Image List tool. From the astronomers' main page, click on **Image List**. You will see a screen like this:

SDSS DR5 Image List Tool - Mozilla Firefox
File Edit View Go Bookmarks Tools Help deljcio.us
http://cas.sdss.org/astro/en/tools/chart/list.asp
SDSS DR5
Home | Help | Chart | Nav | Expl |
Use query to fill form

name	ra
274-51913-230	159.81
275-51910-275	161.0E
275-51910-525	161.7E
276-51909-19	164.0E

Cut and paste ra/dec list
Parameters
scale: 0.40 "/>SDSS DR5 Image List Tool
This page is to generate image cutouts of SDSS images based upon a user defined list of object positions. In order to avoid congestion on the server, the list is currently limited to 1000 objects. If this is a problem, please submit your list in pieces.
If you're new to the Image List tool, please see the [Visual Tools main page](#) and [Getting Started with Image List](#).
For the description of the other options see the Help section of the [Finding Chart](#). The format of the list can be from the following choices:

- List of (ra,dec) pairs**
Always ra comes first, followed by dec. Both ra and dec can be in degrees or hh:mm:ss.s dd:mm:ss.s format. The separator can be any white space or a comma.
- List of (name,ra,dec) triplets**
The fields must always be in this order. The name can be any single alphanumeric string containing at most an underscore and a dot (like ABC_1234.32). Both ra and dec can be in degrees or hh:mm:ss.s dd:mm:ss.s format. The separator can be any white space or a comma.
- Same as above, with a single header line**
The formats (1) and (2) can also contain a single header line, containing the column names. The header must use the same separator as the data. The names ra and dec are mandatory.
- Lists in the IRSA Gator format**
For details see the IRSA website.

Authors: Jim Gray, Alex Szalay, Maria Nieto-Santisteban, Tamas Budavari, February 2004.

4. Click on the small blue **Use query to fill form** link in the top left of the tool. Paste the following query into the main textbox.

```
SELECT top 100 objID as name, ra, dec
-- get object ID, ra, dec of binary star

FROM PhotoPrimary -- From all primary objects (best detections)

WHERE u - g < 0.4 -- Color cut
AND g - r < 0.7
AND r - i > 0.4
AND i - z > 0.4
```

This query is identical to the one from step 2, except that it is limited to return 100 objects.

5. Click **Submit**, then **Send to List**. The results will look like this:

SDSS DR5 Image List Tool - Mozilla Firefox

File Edit View Go Bookmarks Tools Help deljcio.us

http://cas.sdss.org/astro/en/tools/chart/list.asp

Customize Links SDSS SkyServer DR4

obj list page 1 page 2 page 3 page 4

587722983381338565
J163956.44+000931.5

587722952773010084
J163956.16+000625.6

587722983381338560
J163955.86+000651

587722983918207760
J163955.68+002602.4

587722983381337759
J163953.87+000107.9

587722983918209308
J163954.97+002932.8

587722953309882548
J163954.34+002234.7

587722952773011892
J163953.13+000121.2

587722983381338720
J163955.19+001110.2

587722952773011888
J163952.95+000402.3

587722983381338536
J163952.71+000155

587722983381337741
J163952.57+000234.3

587722982844467510
J163953.15+002104.5

587722952773010826
J163952.5+000735.6

587722982844466716
J163952.96+002412.3

587722953309882794
J163952.36+001609.4

587722983844467508
J163952.62+002119.7

587722952773011946
J163951.92+000812.6

587722983918209292
J163953.07+002947.5

587722983918209293
J163953.2+003128.5

587722983381338719
J163951.26+000915.4

587722953309881624
J163951.25+001428.8

587722983381336213
J163950.76+001041.2

587722953309882821
J163951.42+002502.8

587722952773010473
J163950.37+000904.8

Find: catady Find Next Find Previous Highlight Match case

Done

The results are thumbnail images of each candidate binary star that the query matched. Click on the image to go to the Navigate tool to see where the object is in the sky. Click on the name, above the image, to go to the Explore tool to learn more about the object.

- Remember that these are only candidate objects selected by color; you will have to make further observations to determine if they really are cataclysmic variables.
- Note that when you run this query in the SQL search tool (as you did in step 2), the query may sometimes time out. To get all results you will probably need to

use **CasJobs** (<http://casjobs.sdss.org/casjobs>). See the **CasJobs help page** for more information.