

## 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 DR5 Search - Mozilla Firefox

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

Sloan Digital Sky Survey / SkyServer

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DR5 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 | Navi | 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 "/p></div></div>

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:

The screenshot shows the SDSS DR5 Image List Tool interface. On the left, there is a search form with a 'Get Image' button and a 'Parameters' section with a 'scale' of 0.40 "/math>"/math>pix. Below the search form are 'Drawing options' including Grid, Label, PhotoObjs, SpecObjs, Targets, Outline, BoundingBox, Fields, Masks, Plates, and InvertImage. The main area displays a grid of 20 thumbnail images of star fields, each with a label containing two lines of coordinates: 'ra,dec' and 'J163952.71+000931.5'. The browser window title is 'SDSS DR5 Image List Tool - Mozilla Firefox' and the address bar shows 'http://cas.sdss.org/astro/en/tools/chart/list.asp'.

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.

6. 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.

7. 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.