

How Do I...

Find closely paired objects?

One common task is to find objects that are near to each other on the sky. Such close pairs might indicate objects that are interacting in some way, or might help identify clusters of objects. You can search for closely paired objects with an SQL search.

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://cas.sdss.org/astro/en/tools/search/sql.asp

Sloan Digital Sky Survey / SkyServer

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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.

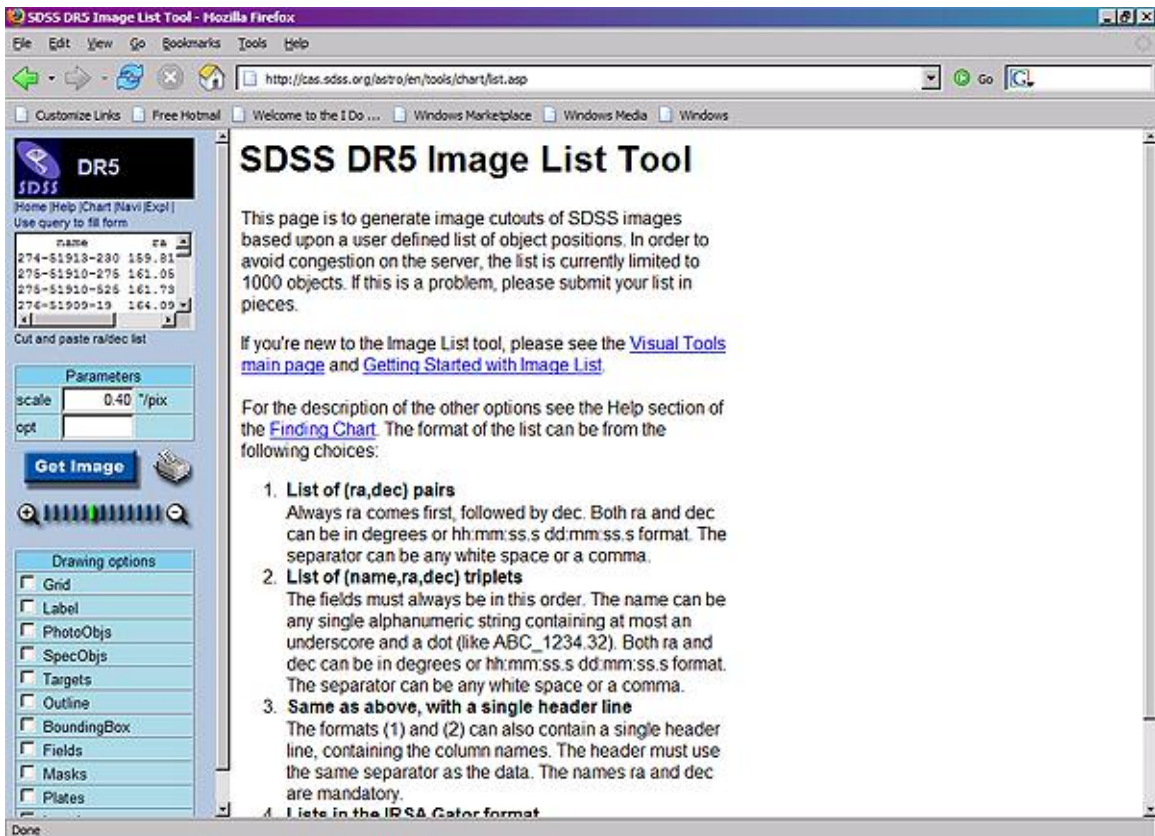
For an introduction to the Structured Query Language (SQL), please see the SQL Intro help page. In particular, please read the Optimizing Queries section. If your query is timing out or running much slower than you think it should, please see also the the BookMark Lookup bug section of the SQL Intro.

Find: bes Find Next Find Previous Highlight all Match case Phrase not found

2. In the large textbox, type the following query:

```
SELECT P1.objID as P1_ID, P1.ra as first_ra, P1.dec as first_dec,
       P2.objID as second_ID, P2.ra as second_ra, P2.dec as second_dec
       -- return object IDs and positions for
       -- both objects
FROM   PhotoTag P1,
       Neighbors N,
       PhotoTag P2
       -- P1 is the first object
       -- N is the pre-computed neighbor objects
       -- P2 is the second object
WHERE  P1.objID = N.objID
       -- P1 and P2 are neighbors:
       -- within 30 arcsec
       AND P2.objID = N.NeighborObjID
       -- objects are within 3 arcseconds
       AND N.Distance < .05
```

3. The query will return the object ID, ra, and dec of each of the two objects in the pair.
4. If you would like to see thumbnail images of each of the objects that matches the query, go to the Image List tool. From the astronomers' main page, click **Image List**. The tool looks like this:



5. Click on the **Use query to fill form** link, near the top left of the tool. You will see a textbox appear in the main panel of the window.

6. Queries in the Image List tool must take a slightly different form than queries in the SQL Search tool. All Image List queries must have the following for their SELECT blocks:

```
SELECT name, ra, dec
```

So you must rewrite your query as:

```
SELECT top 100 P1.objID as name, P1.ra as ra, P1.dec as dec
FROM   PhotoTag P1,           -- P1 is the first object
       Neighbors N,         -- N is the pre-computed neighbor objects
       PhotoTag P2          -- P2 is the second object
WHERE  P1.objID = N.objID    -- P1 and P2 are neighbors:
      -- within 30 arcsec
      AND P2.objID = N.NeighborObjID
      AND N.Distance < .05  -- objects are within 3 arcseconds
```

Note that this will return only the name and position of the first object in the pair (although you should be able to see both objects in the thumbnail image). Also note that the “top 100” means that the query will be limited to 100 objects.

- Click **Submit**, then **Send to List**. You will see thumbnail images for each of the objects that match your search criteria. The object at the center of the image will be only one of the objects, but both should be visible in the frame. You may find it helpful to turn on the *Grid* and *PhotoObjs* checkbox options. Results will look like this:

The screenshot shows the SDSS DR5 Image List Tool interface in Mozilla Firefox. The browser address bar displays <http://cas.sdss.org/astro/en/tools/chart/list.asp>. The page title is "SDSS DR5 Image List Tool - Mozilla Firefox".

On the left side, there is a search and query interface. It includes a "name,ra,dec" input field with a list of coordinates:

- 587722951693303810, 2
- 587722951693303810, 2
- 587722951693304096, 2
- 587722951693304096, 2

 Below this is a "Parameters" section with "scale" set to "0.40" and "opt" set to "GP". A "Get Image" button is present. At the bottom of the left panel, there are "Drawing options" checkboxes:

- Grid
- Label
- PhotoObjs
- SpecObjs
- Targets
- Outline
- BoundingBox
- Fields
- Masks
- Plates
- InvertImage

The main content area displays a grid of 20 thumbnail images, arranged in 4 rows and 5 columns. Each thumbnail shows a field of stars with a central object highlighted. The thumbnails are labeled with object IDs and coordinates, such as "587722951693303810 J154452.99-010322.2". The interface also includes navigation links at the top: "obj list page 1 page 2 page 3 page 4".

- Note that if you run this query without the "top 100," the query will return many results. To get all results you will probably need to use **CasJobs** (<http://casjobs.sdss.org/casjobs/>). See the **CasJobs help pages** for more information.