

How Do I...

Find images and spectra for objects in a given RA / Dec / Magnitude / Absolute Magnitude Range?

You can use the SDSS search tools to find all objects that meet certain criteria, such as position, magnitude, color, or absolute magnitude. The guide *How do I find data for all objects in a given RA/Dec/Magnitude/Absolute Magnitude range?* shows how to use SkyServer's search tools to find data.

But in addition to searching for catalog data, you can also search for images and spectra using any constraints you want, including position, magnitude, and absolute magnitude. To search for images and spectra, you will use the Image List tool along with SQL (links open in separate new windows).

This is an extremely powerful way to access SDSS data, because it allows you to search based on any criteria, and then to quickly view all objects that meet your criteria.

To get thumbnail images for a search with the Image List tool:

1. Go to the **Image List** tool. From the astronomers' main page, look under *Advanced Tools*. From the public main page, look under *SkyServer Tools*. You will see a screen like this:

SDSS DR5 Image List Tool - Mozilla Firefox

File Edit View Go Bookmarks Tools Help del.jco.us

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

Customize Links SDSS SkyServer DR4

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.

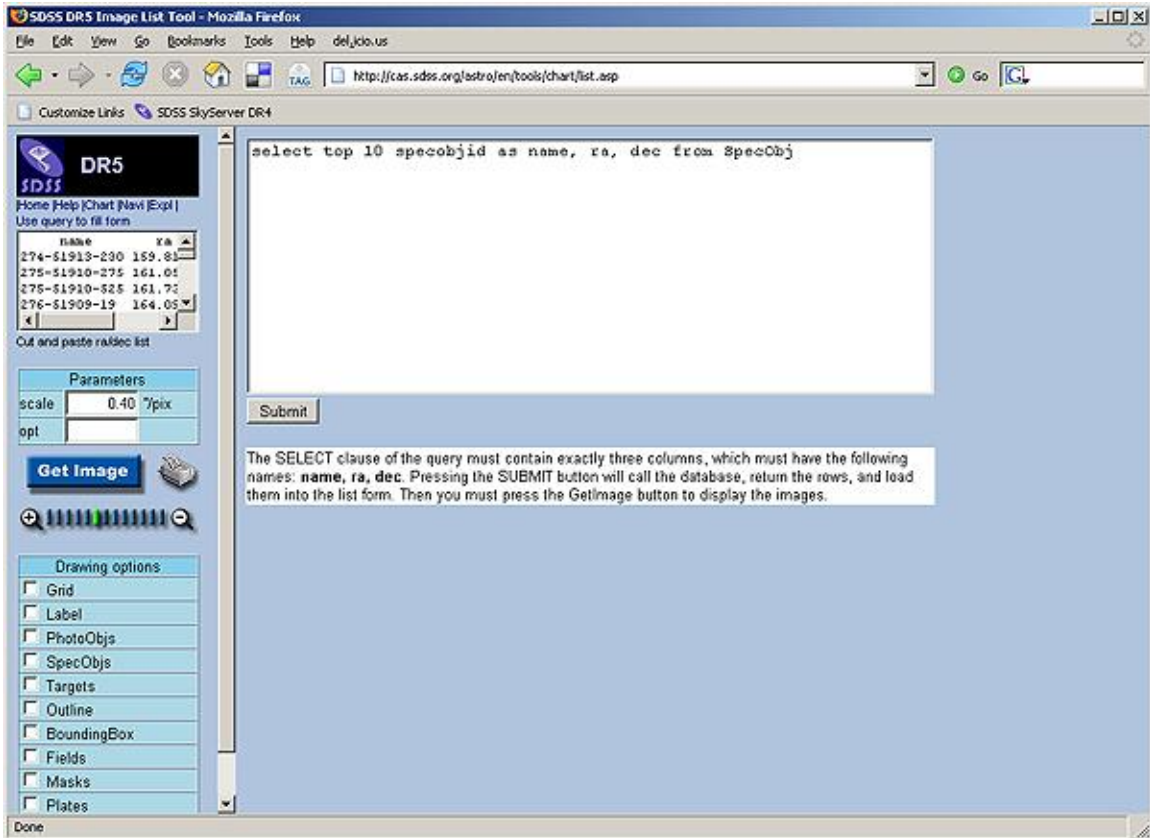
If you're new to the Image List tool, please see the [Visual Tools main page](#) and [Getting Started with Image List](#).

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.

Done

2. You can use the textbox in the upper left of the form, just above **Cut and Paste ra/dec list**, to get thumbnail images of a list of objects. Paste the list into the textbox in the upper left corner, in this format: *name ra dec* (with spaces between). *name* can be anything you want; *ra* and *dec* must be in decimal degrees.
3. However, you can also fill in the Image List with results from a query, allowing you to see thumbnails of matching objects. To send query results to the Image List tool, click the small **Use query to fill form** link above the textbox. The screen will change to look like this:



4. Replace the default query in the textbox with your own query. **IMPORTANT:** the **SELECT** block of the query must take the form

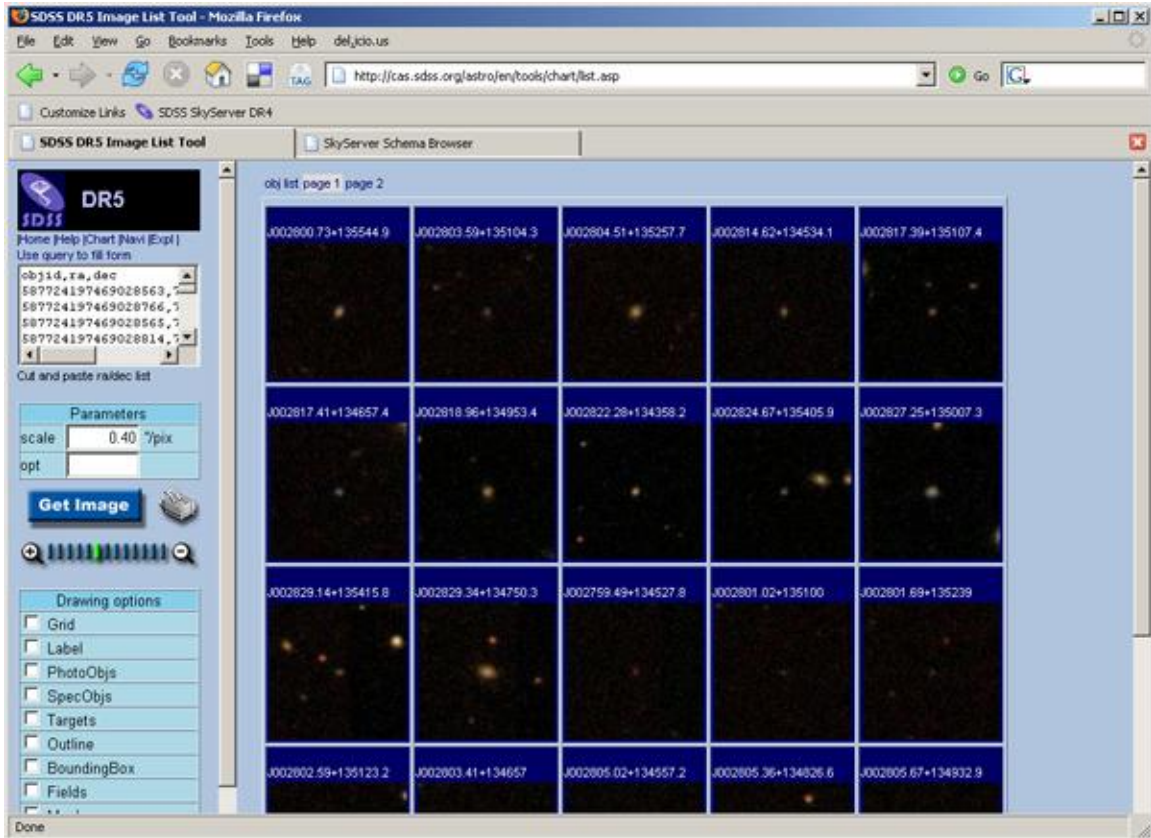
```
SELECT name, ra, dec
```

The name can be any piece of data you want, but the RA and Dec must be the RA and Dec from the database. Otherwise, you will get an error. For example, this query returns object IDs and positions of galaxies:

```
SELECT top 40 objid, ra, dec
FROM photoObj
WHERE type = 3
```

The Image List tool is limited to returning 1,000 objects from search results. If you request more than 1,000 objects, the list will only display the first 1,000.

5. Click **Submit** to send the query to the database. A list of results will come up in a new frame in the same window.
6. Click **Send to List** to send the results to the Image List tool. The page will now look like this:



- Each thumbnail image is an object that matched your query. Click on the thumbnail to go to the **Navigate** tool for that object, which will allow you to see the object's position in the sky.

- Click on the object's name (the J2000 name above the thumbnail image) to go to the **Explore** tool entry for that object. The Explore tool shows complete data for the object, including a spectrum if one was observed by the SDSS. The Explore tool will open in a new window, and will look like this:

The screenshot shows the SkyServer Object Explorer interface for the object SDSS J000007.81-000226.0. The main content area displays the following information:

SDSS J000007.81-000226.0
GALAXY ra=0.03258, dec=-0.040575, ObjId = 587731186203951236

mode	PRIMARY
status	TARGET PRIMARY OK_STRIPE OK_SCANLINE PSEGMENT RESOLVED OK_RUN GOOD SET
flags	BINNED1 INTERP COSMIC_RAY CHILD
PrimTarget	TARGET_GALAXY
SecTarget	

Below the metadata is a thumbnail image of the object with a coordinate grid. To the right of the image is a table of photometric data:

run	rerun	camcol	field	obj	rowc	colc
2662	40	3	283	132	242.4	1607.9
u	g	r	i	z		
16.97	15.67	15.13	14.87	14.60		
fiberMag_r	petroMag_r	devMag_r	expMag_r	psfMag_r	modelMag_r	
17.41	15.06	14.79	15.13	17.97	15.13	
extinction_r	petroRad_r	parentId	nChild			
0.09	8.768	587731186203951235	0			

Below the photometric data is a spectrum plot showing flux versus wavelength. The plot includes a table of spectral data:

plate	mjd	fiberId	z	zErr	zConf	specClass	ra	dec	fiberMag_r	objId
387	51791	192	0.024	0.00019	0.994	GALAXY	0.03260	-0.04057	17.37	587731186203951236

Additional spectral data is shown in a table below the plot:

zStatus	XCORR_EMLINE
zWarning	
PrimTarget	TARGET_GALAXY
SecTarget	
zPlace	0.039

- Click on the spectrum to show a larger view. Spectral lines are marked in pink and green. The redshift and redshift error are also marked on the spectrum.
- To download FITS images of the object, click on the **FITS** link below the *PhotoObj* heading in the left-hand menu. *Corrected Frames* are the final step of processing for SDSS images. There is one image for each filter. *Right-click* on the label for the filter you want to download the image.
- To see the spectrum as a FITS file, click on the **FITS** link below the *SpecObj* heading in the left-hand menu. *Right-click* on the **Download** link to download the spectrum. It will be a fits file with 4 rows and about 4,000 columns. See the guide to reading individual spectrum files (http://www.sdss.org/dr5/products/spectra/read_spSpec.html) for more information.

12. You can view and analyze the spectrum using the **SpecView** applet developed by the Space Telescope Science Institute. The applet is available at http://www.stsci.edu/resources/software_hardware/specview/ .