How Do I…
Find moving objects consistent with asteroids?

The SDSS is mostly (but not entirely!) a one-epoch sky survey. This makes it difficult to do solar system science with the catalog data as it appears in SkyServer. However, the SDSS has looked at the sky long enough that it has obviously found hundreds of thousands of moving objects. These moving objects can be found from the database to create a moving object sample.

You can also view and query the SDSS Moving Object Catalog (MOC) through the CasJobs interface. To find out how, ask me at this meeting, or E-mail the SDSS Helpdesk (sdss-helpdesk@fnal.gov).

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

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

```
SELECT top 100 objID, sqrt( power(rowv,2) + power(colv, 2) ) as velocity
FROM PhotoObj WHERE
        (power(rowv,2) + power(colv, 2)) > 50
        and rowv >= 0 and colv >=0
```

The query returns the object ID and velocity for each of 100 objects seen to be moving. It selects only those objects whose velocity is high enough to be consistent with an asteroid. You can save the query as a CSV (comma-separated value) file by selecting *CSV* from the **Output Format** menu of the SQL Search tool. CSV files can be opened by most graphing programs.

3. You now have a sample of 100 objects, by SDSS object ID, that are consistent with asteroids. You can examine them with the Explore tool. From the astronomers' main page, click **Explore** under *Advanced Tools*. Then click *Click here to Explore*.

4. Click **Objid** under *Search*. A new window will pop up. Enter the object ID and click OK. A new page will load with the Explore tool entry for that object.

5. To view the actual moving object candidates, use the Image List tool. From the astronomers' main page, click on **Image List**. You will see a screen like this:


6. 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
FROM PhotoObj WHERE
       (power(rowv,2) + power(colv, 2)) > 50
       and rowv >= 0 and colv >=0
```

This query returns only the object ID and position of each object, as required by the Image List tool. Notice that it looks the same as the previous query, except for the SELECT clause.

7. Click **Submit**, then **Send to List**. The results will look like this:
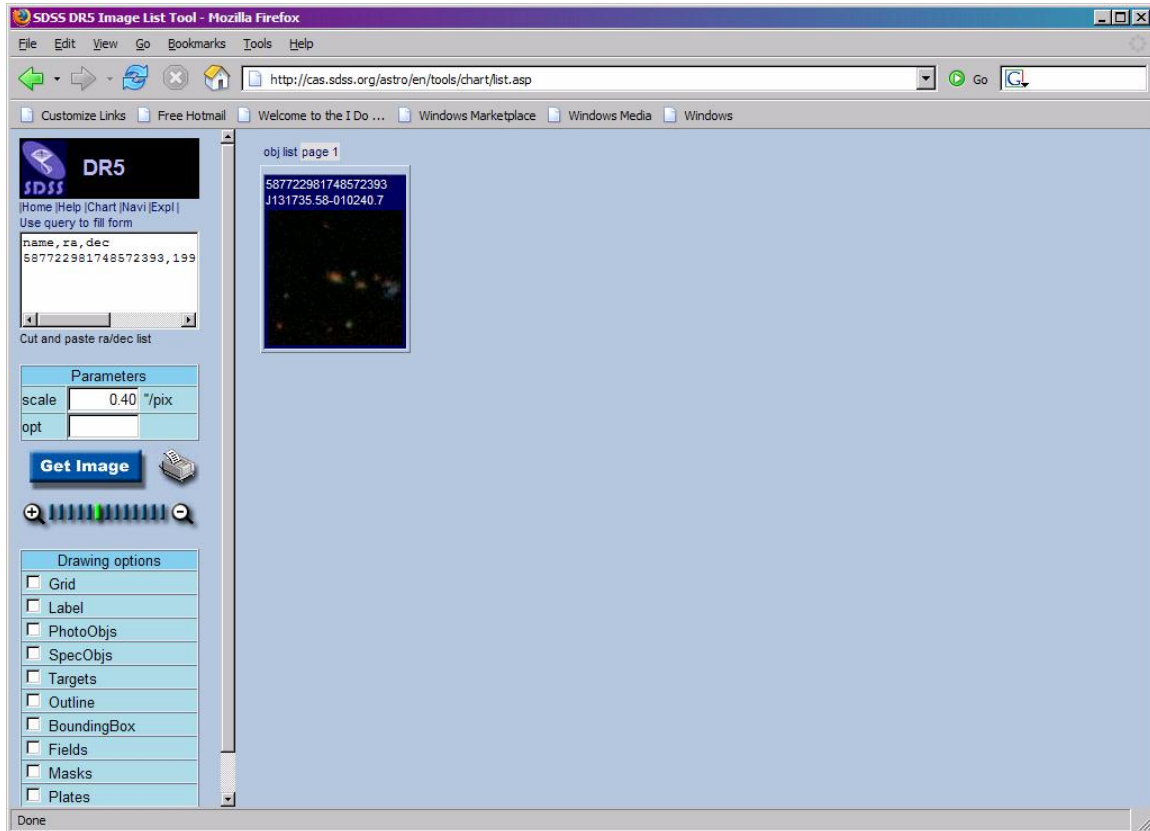
The results are thumbnail images of each object that the query matched. Click on the image to go to the **Navigate** tool to see where the object is in the sky. Click on the name, above the image, to go to the **Explore** tool to learn more about the object.

8. Note that when you have run these queries, you have always included "top 100" in the SELECT block. This limits the query to returning only the first 100 results. If you ran the query without the top 100, the query would probably exceed the 10 minute time limit for queries to the SkyServer SQL Search tool. However, you can run queries that last up to 8 hours by using **CasJobs**. See the **Guide to Running Long Queries with CasJobs** for more information.