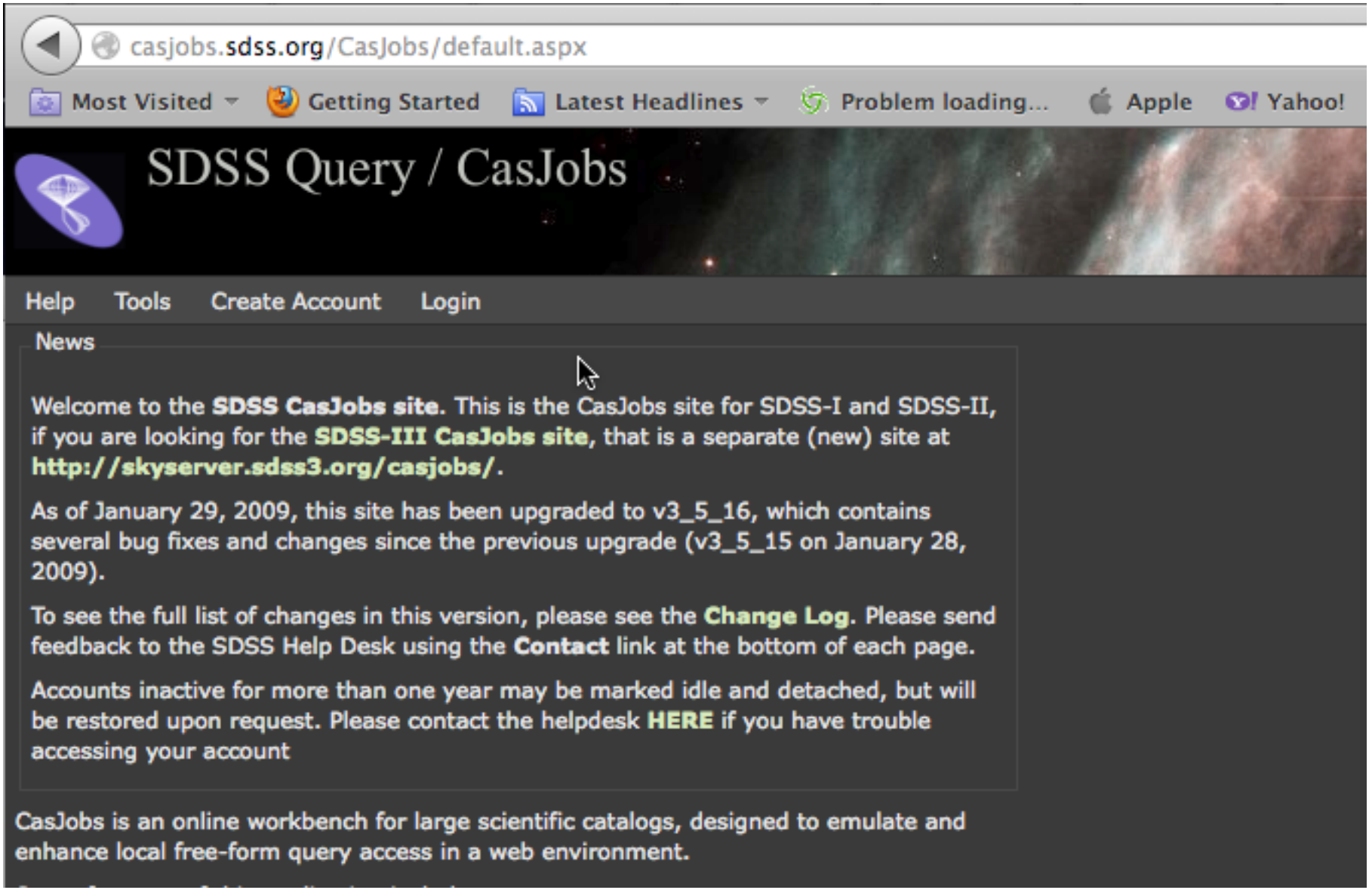
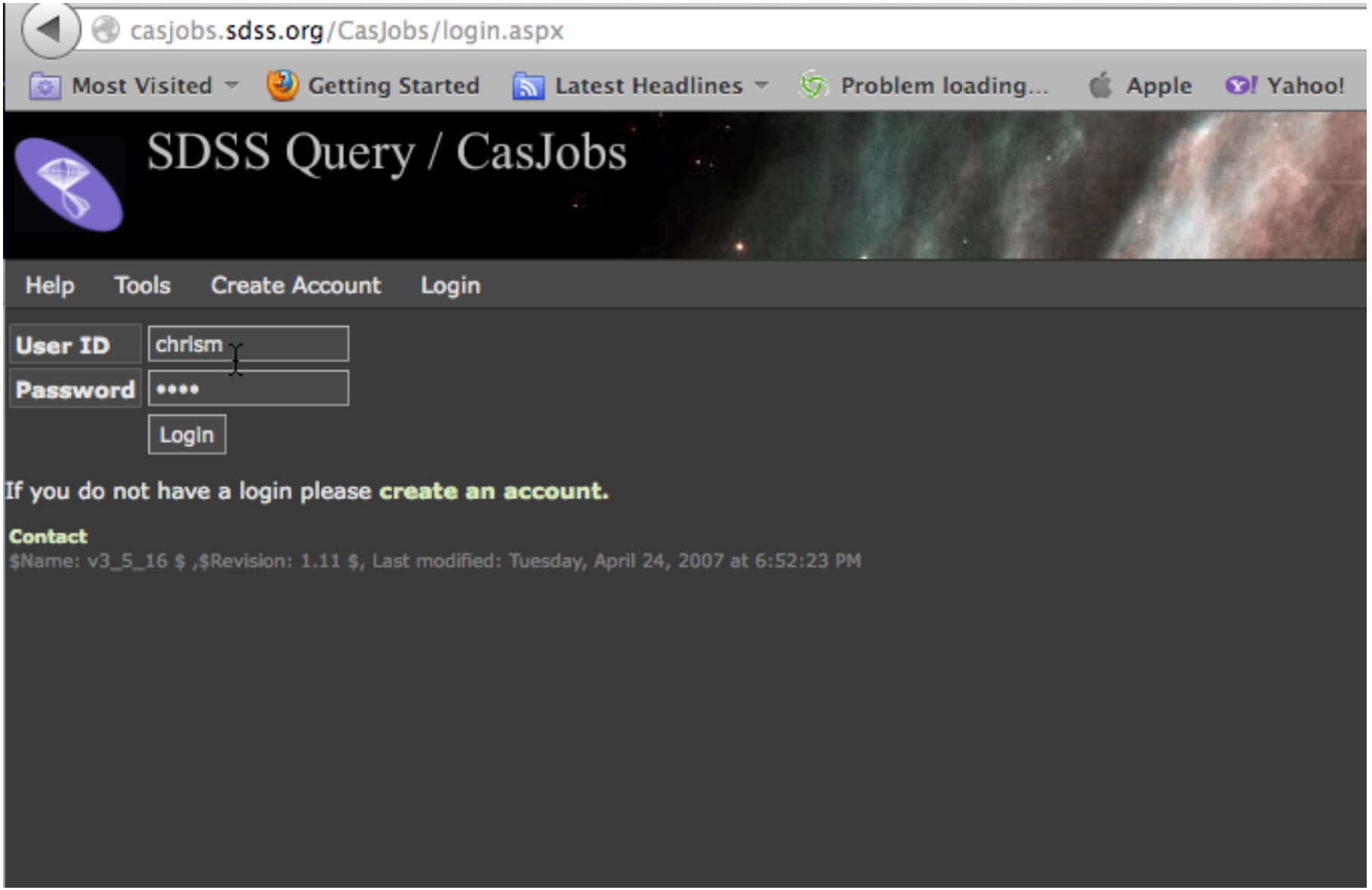
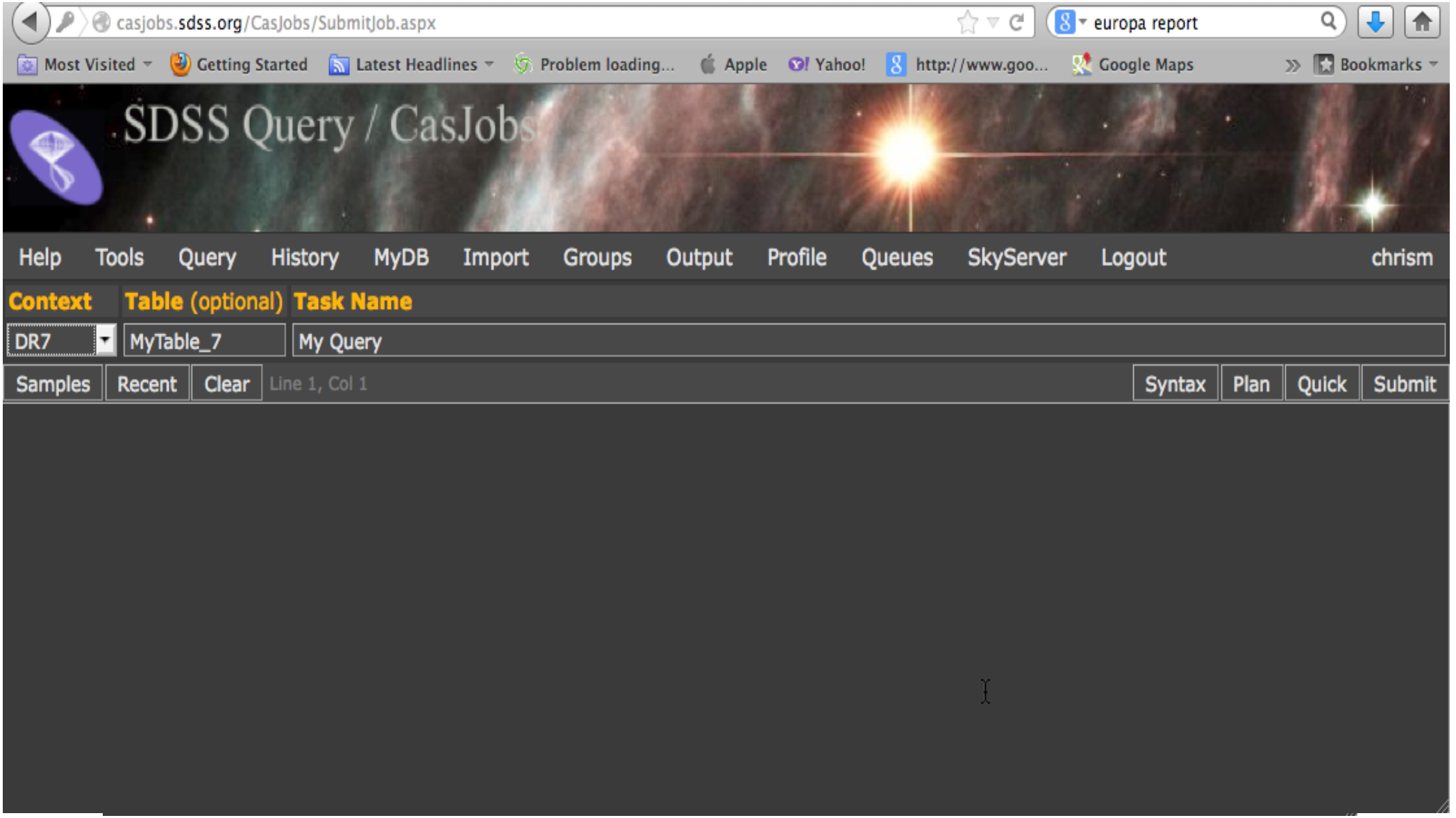
CasJobs Step-by-Step Demo



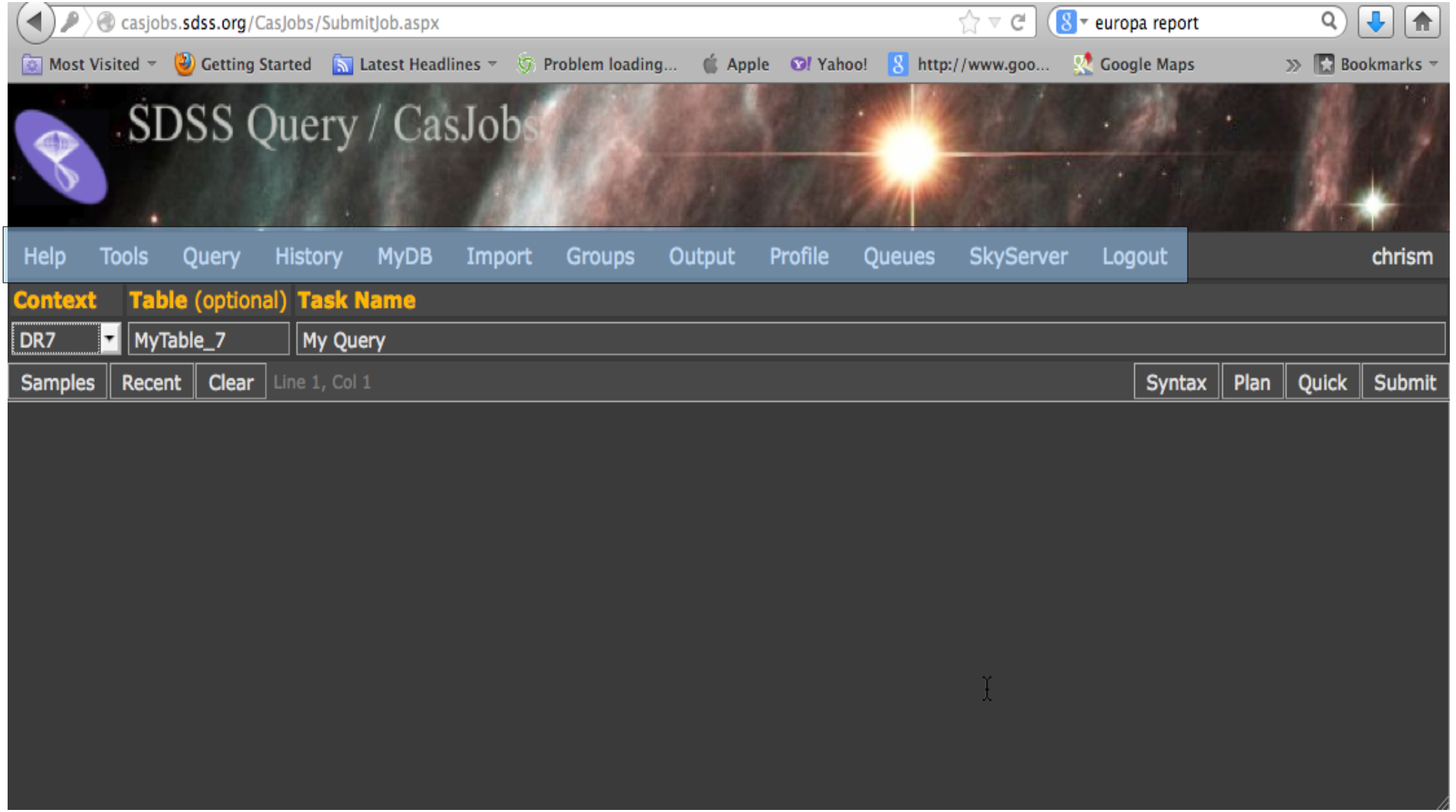
Log in (get an account)



The “Front-End”



Tabs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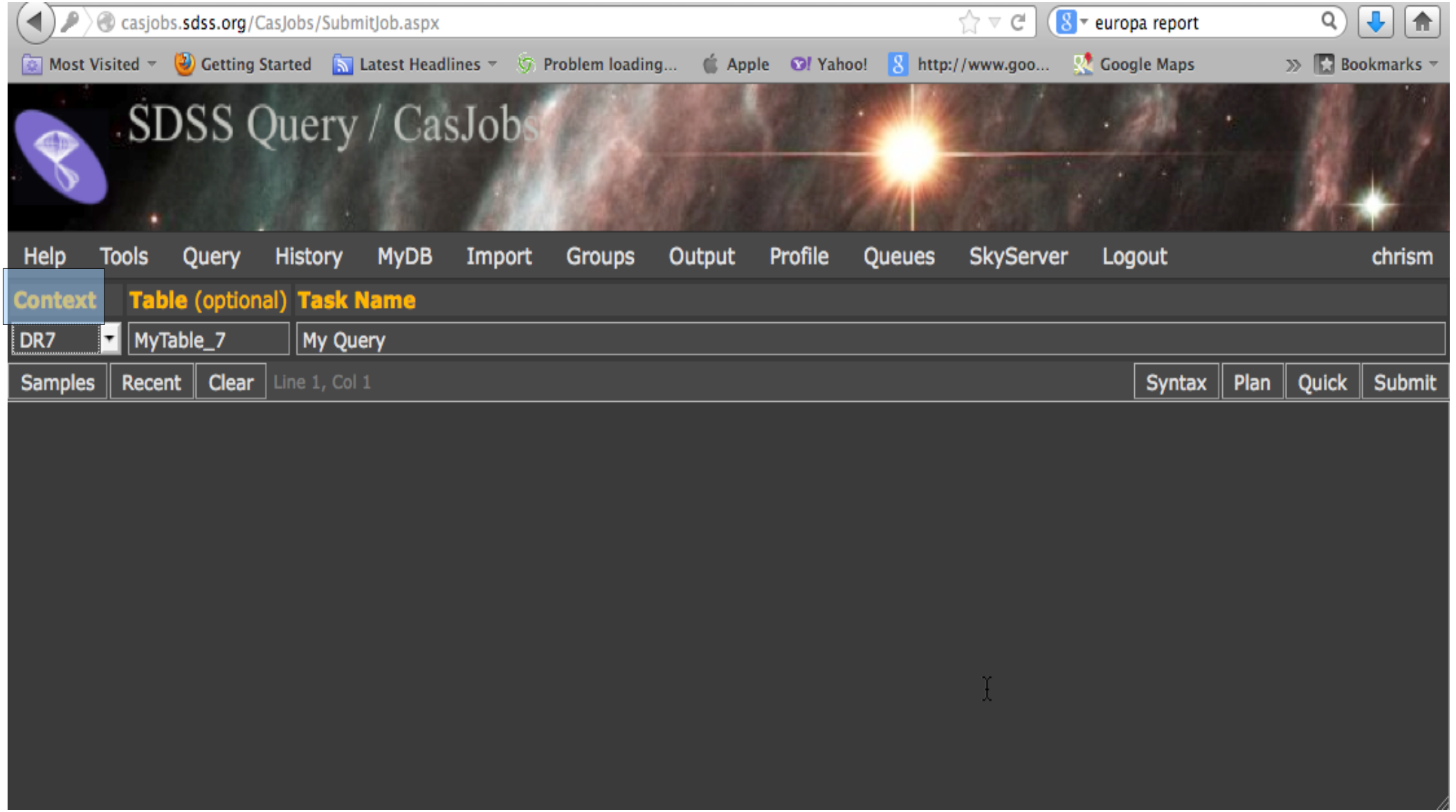
Quick
Submit

Context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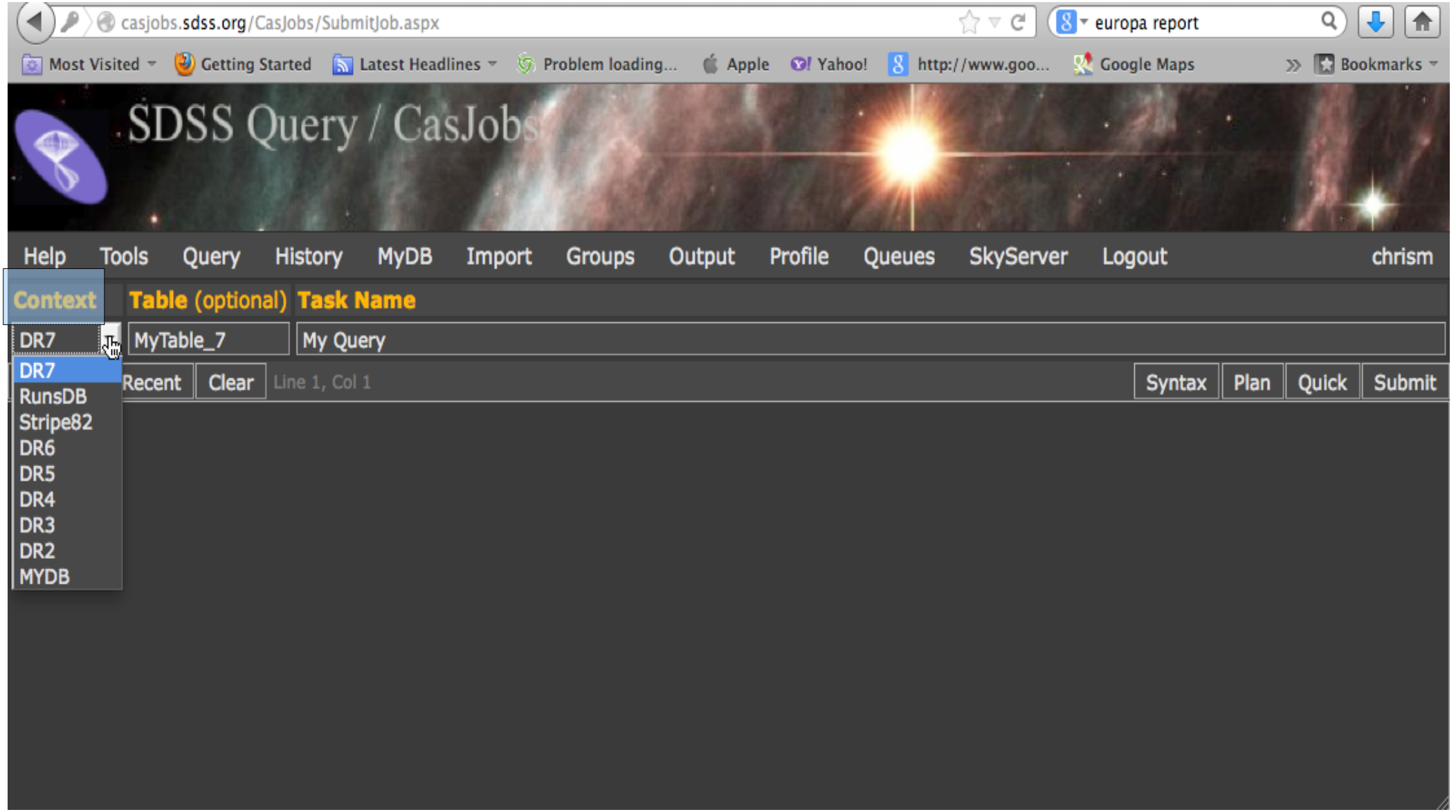
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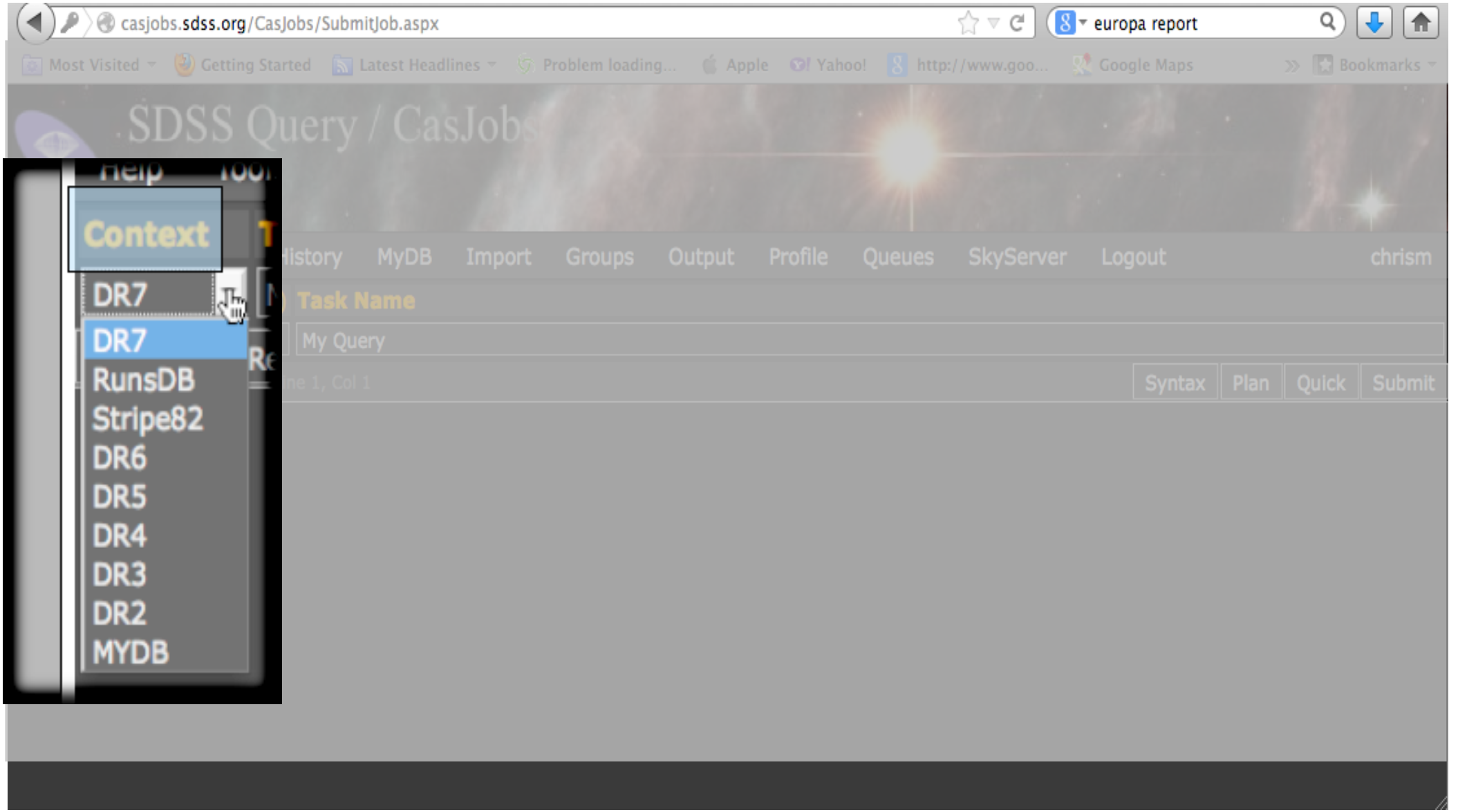
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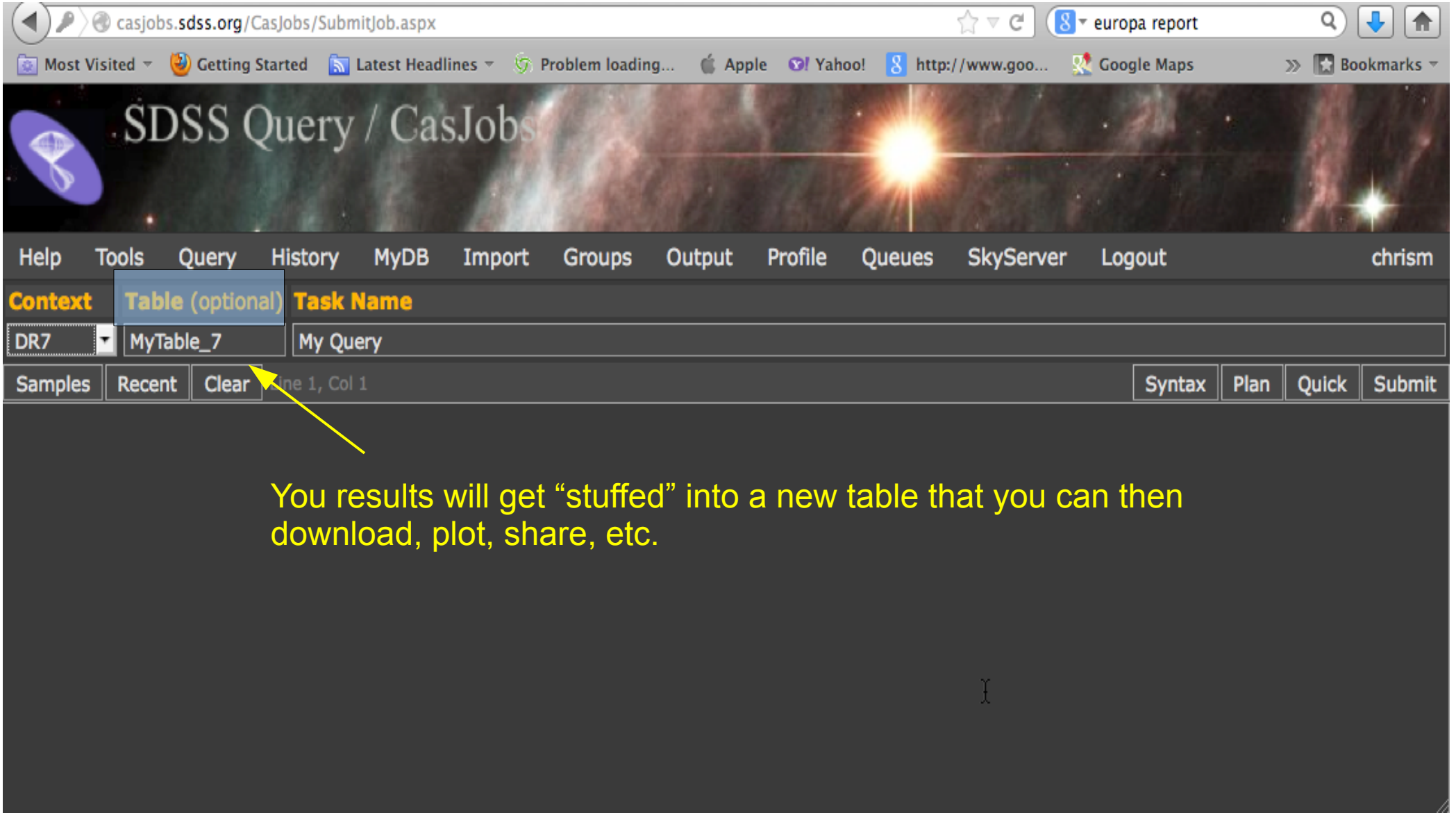
YOUR Tables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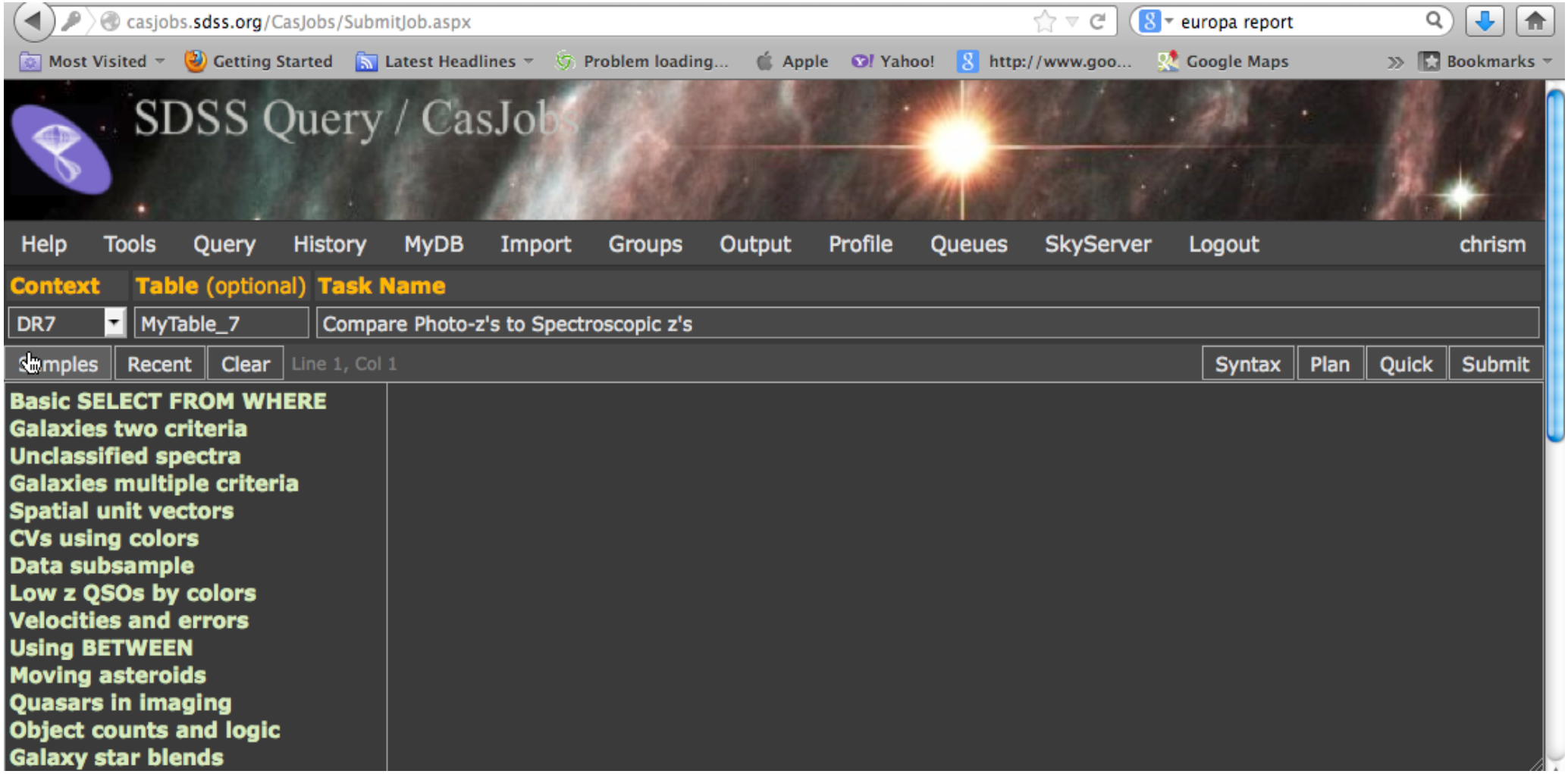
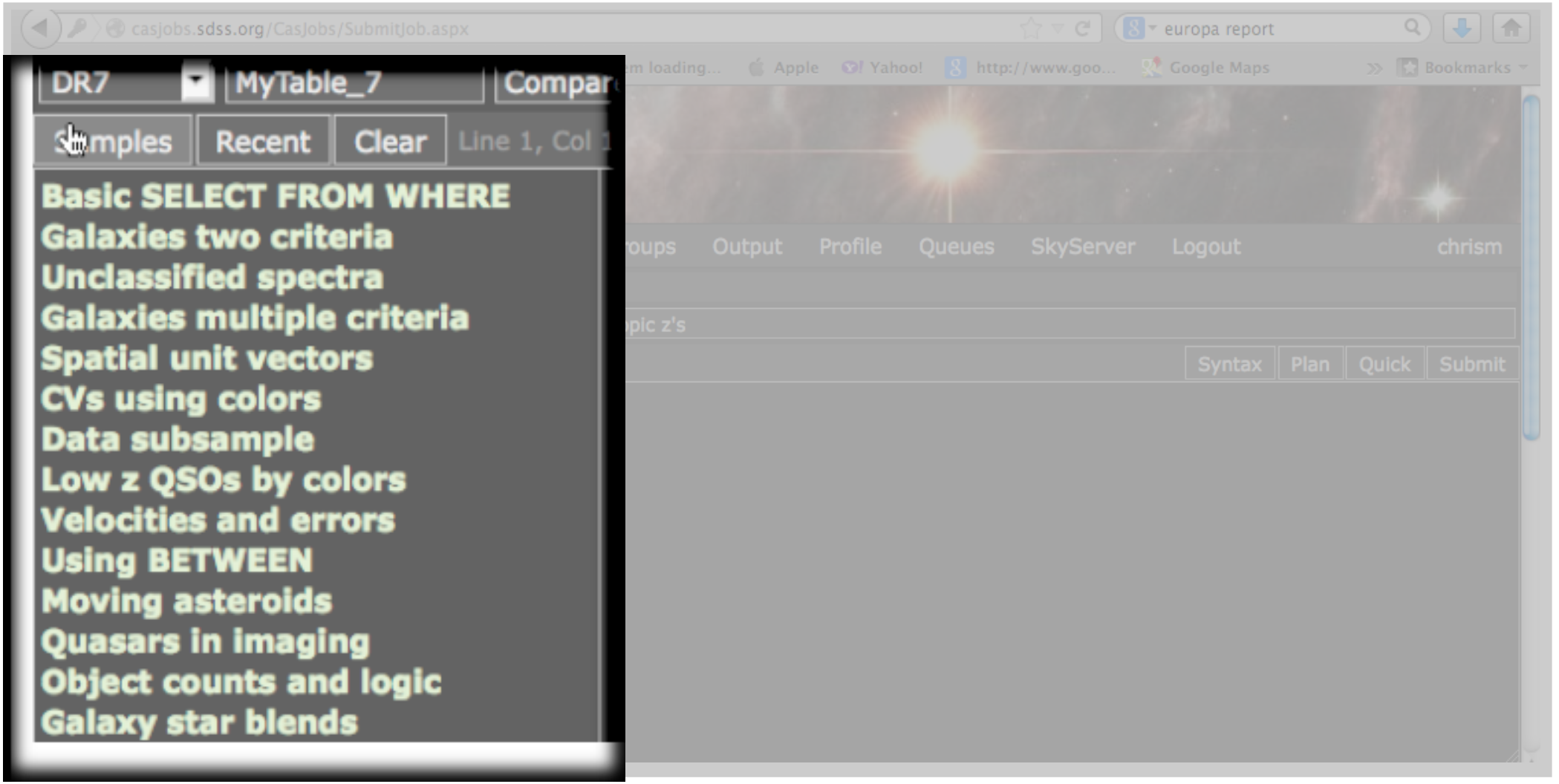
You results will get “stuffed” into a new table that you can then download, plot, share, etc.

Example Queries



Actually, the example queries are really for “experts”

Example Queries



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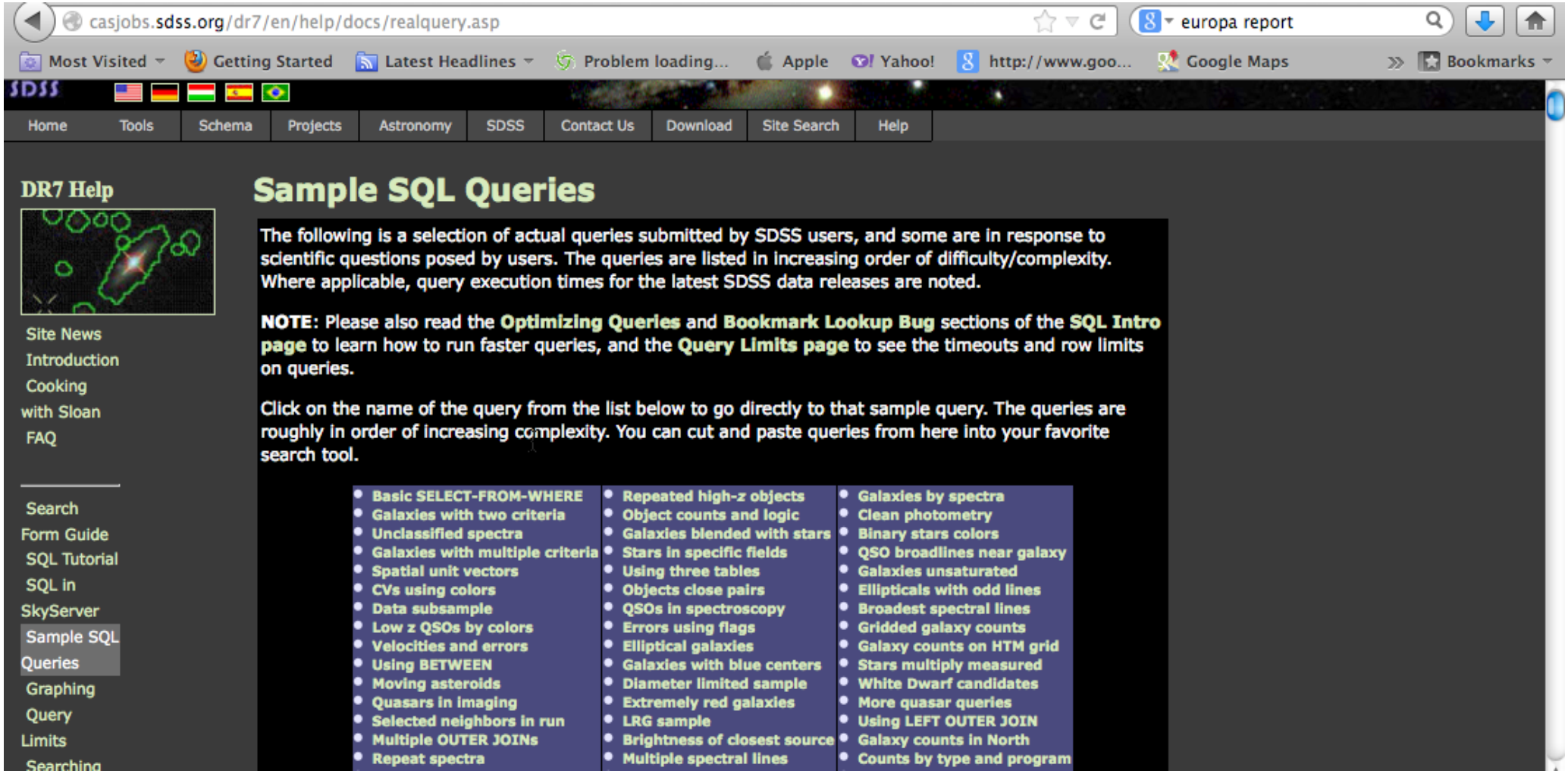
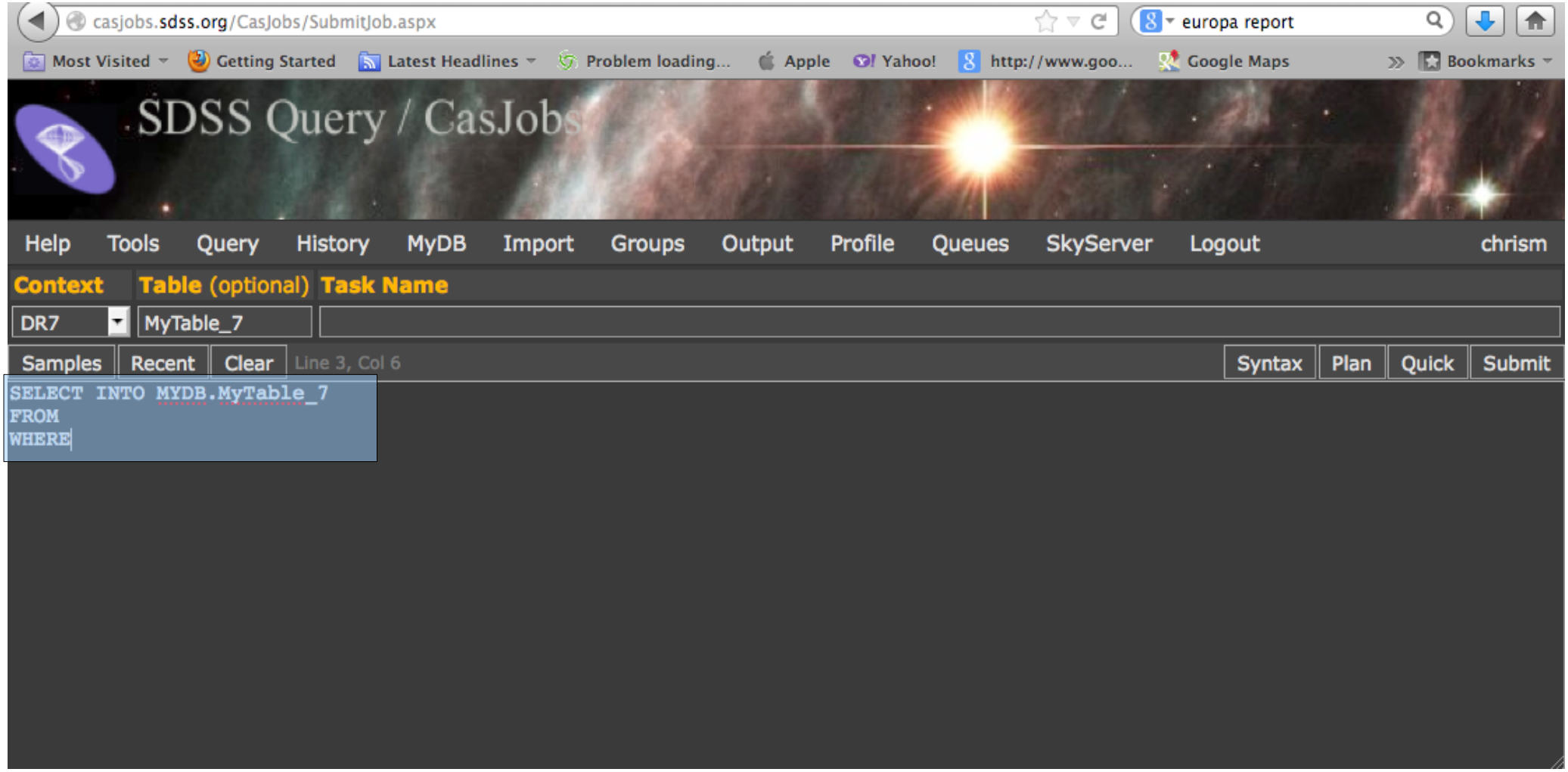
Example Queries (in SQL created by the SDSS team)



Look here BEFORE you start building queries

Building Your Query (you type it)



The first step is decide FROM what tables you are going to query

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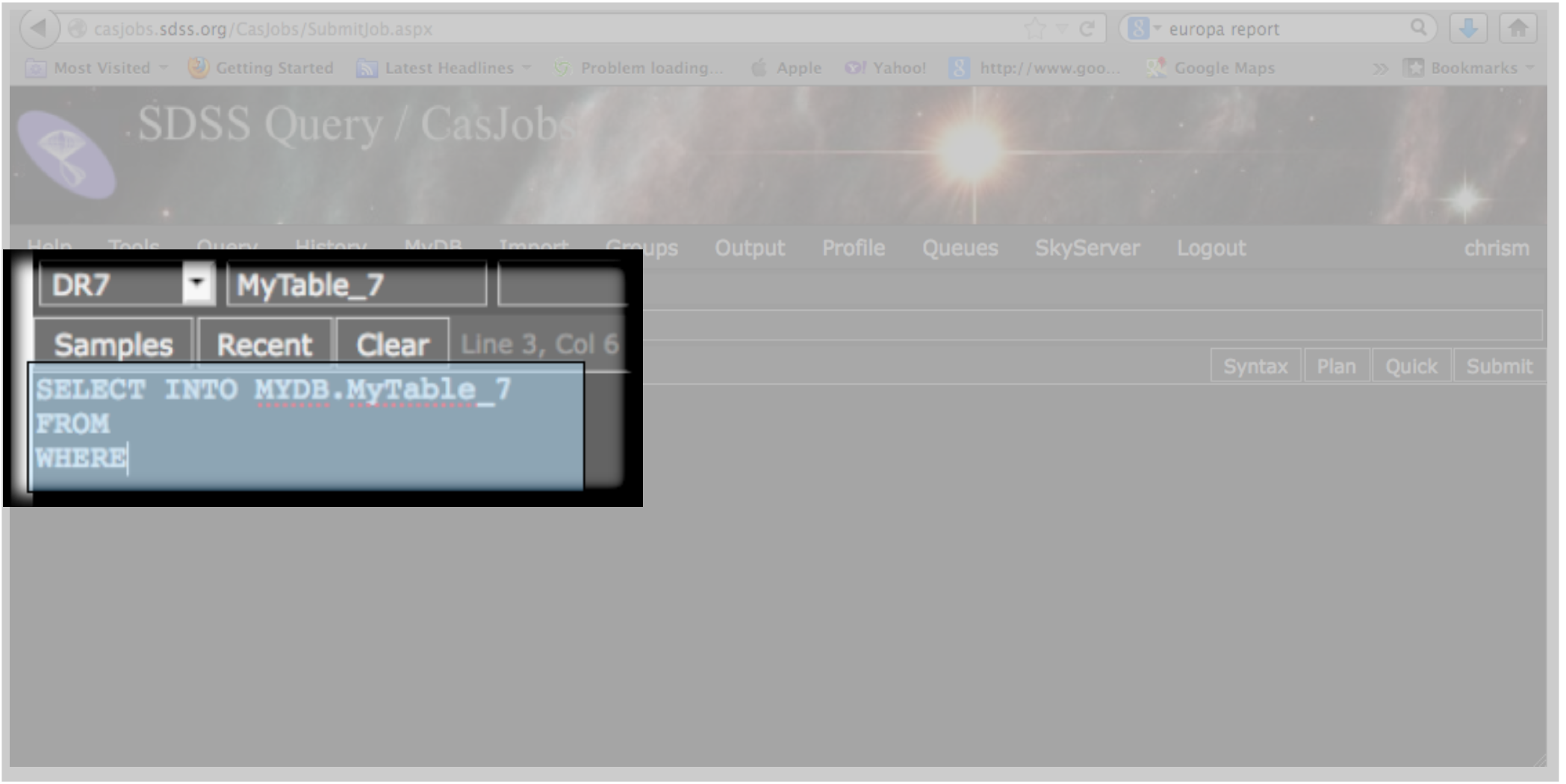

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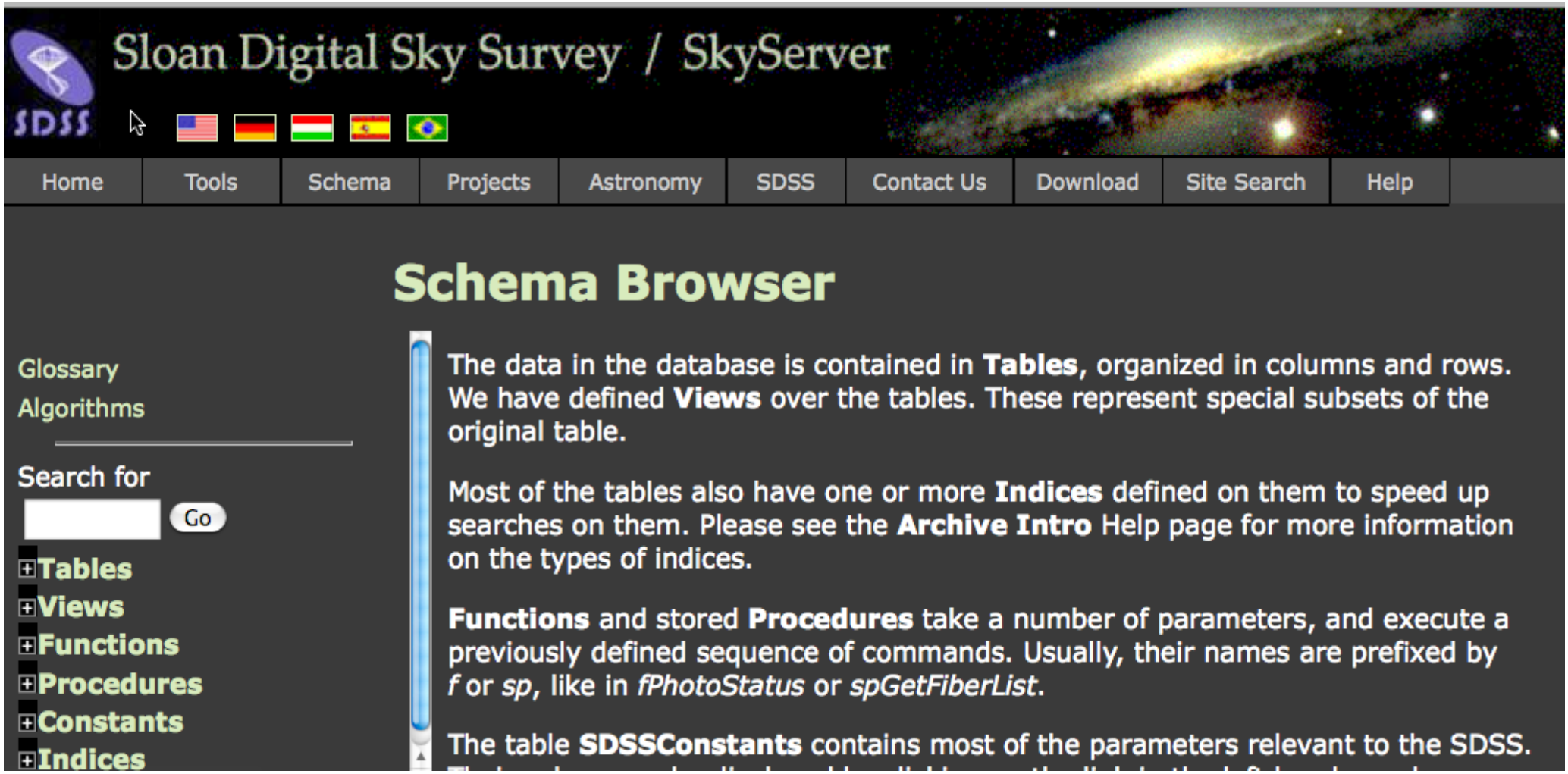
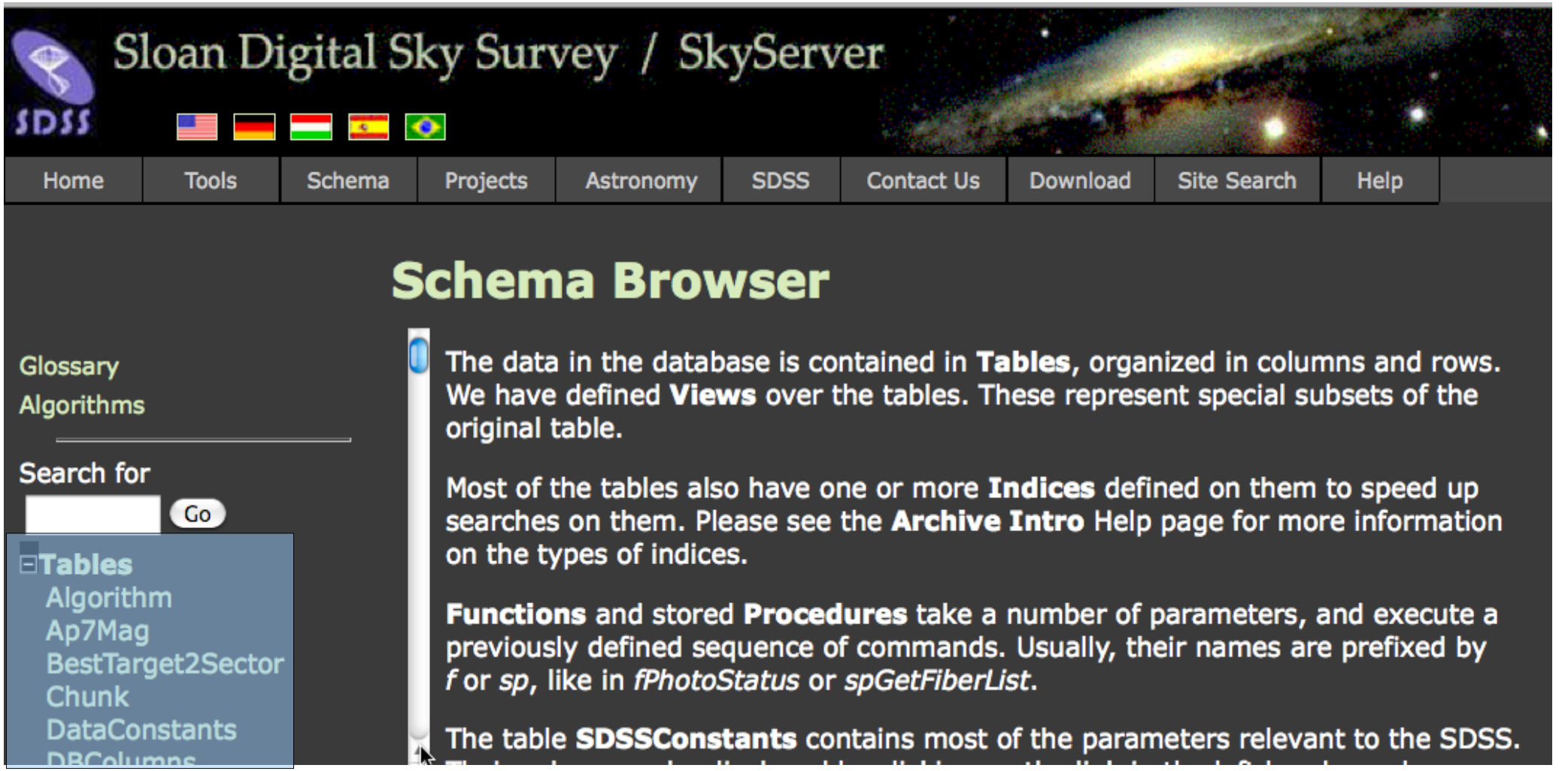
Learn Your Schema



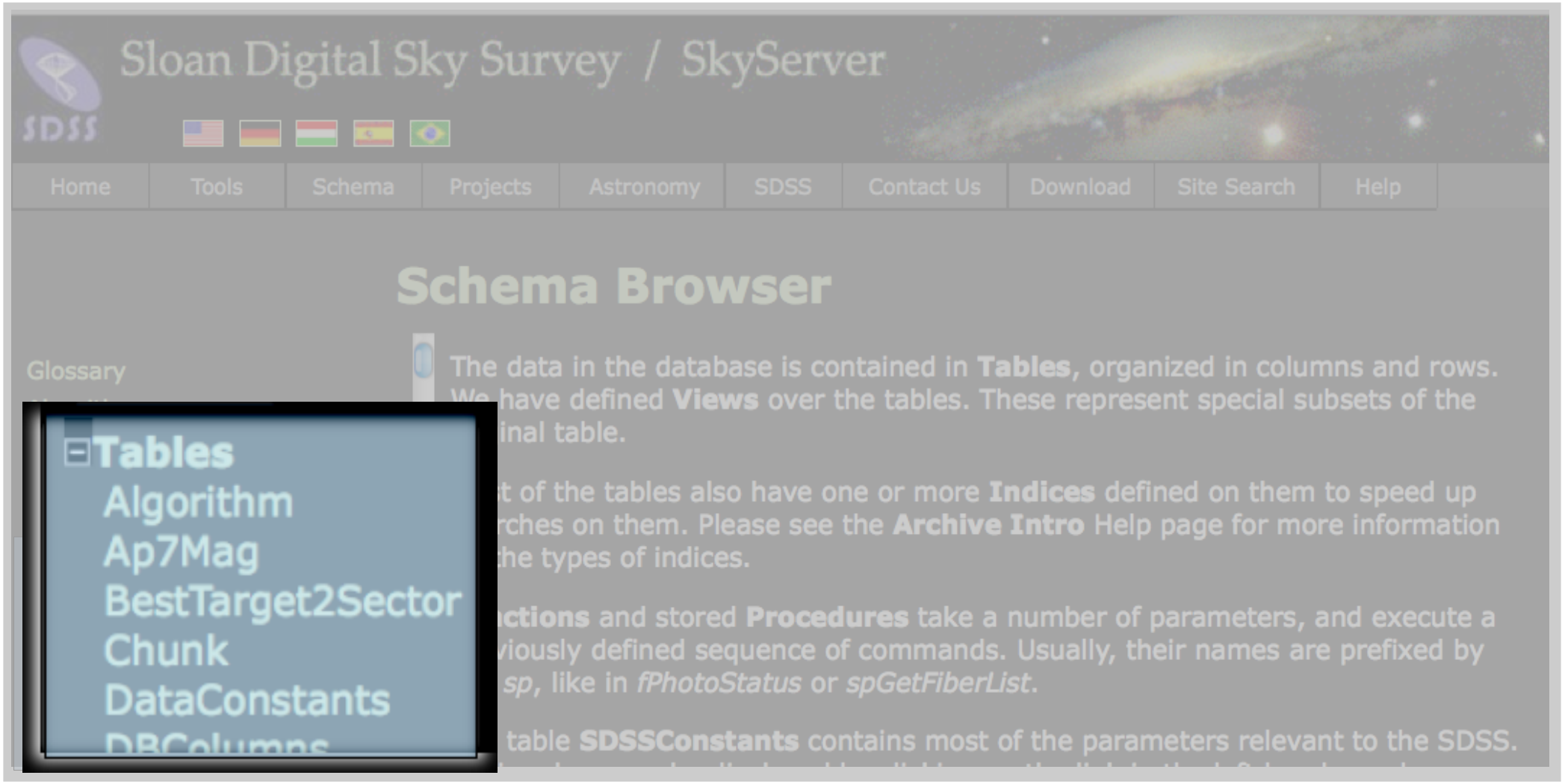
The schema defines how the database is organized.

Learn Your Schema



The tables contain the data.

Learn Your Schema



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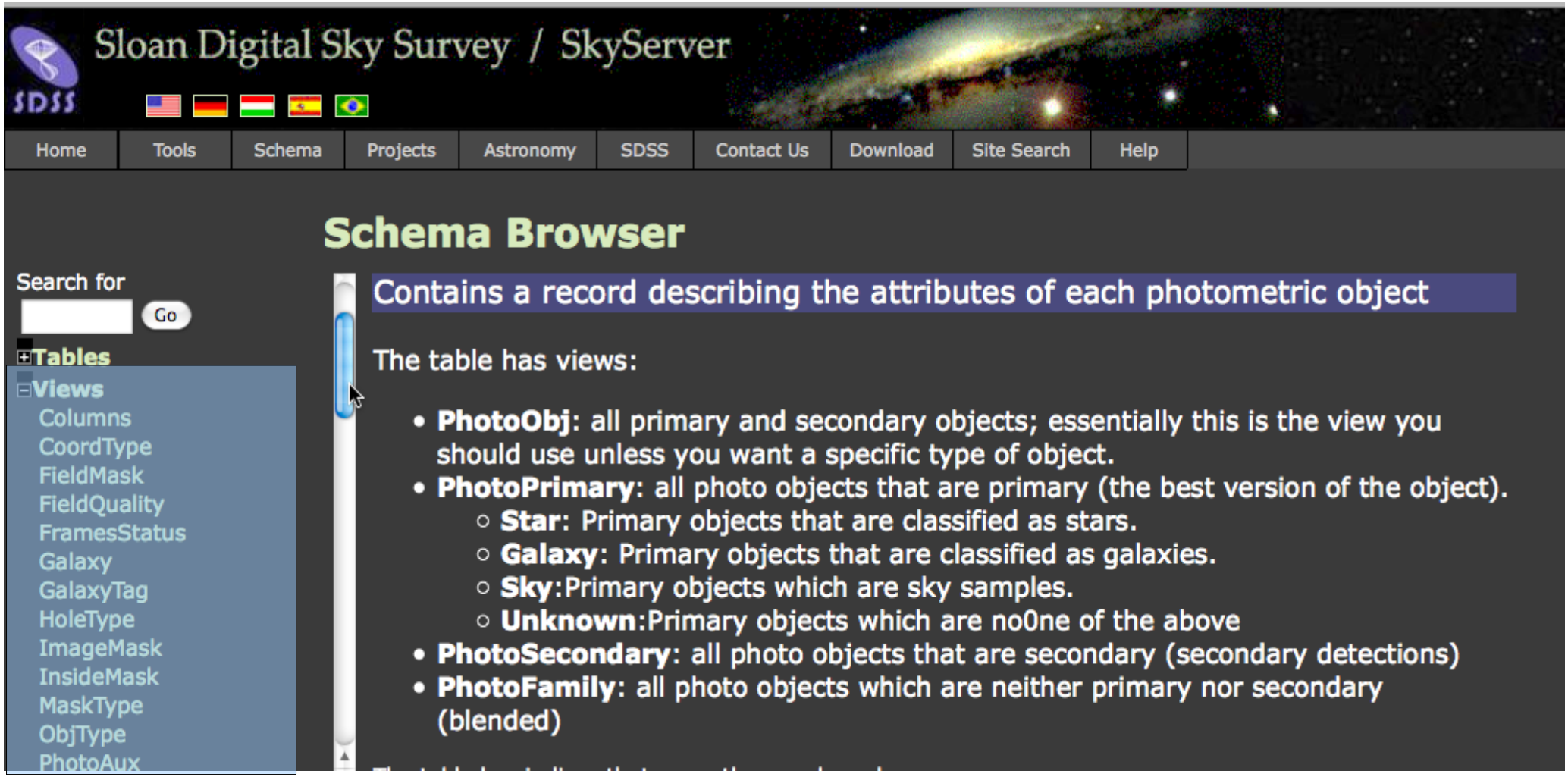
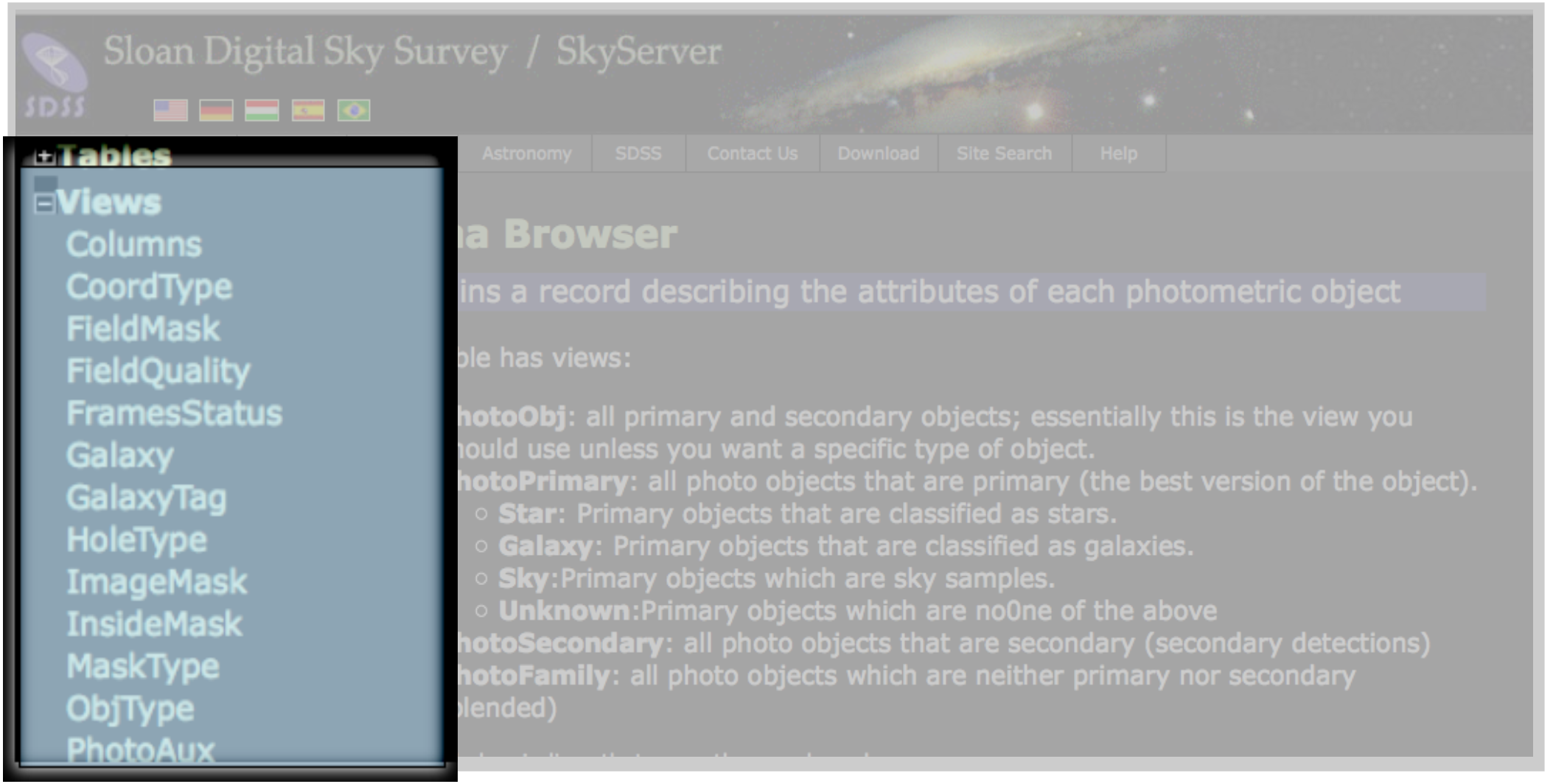


The tables contain the data. But in SQL, there are also VIEWS and FUNCTIONS

Learn Your Schema



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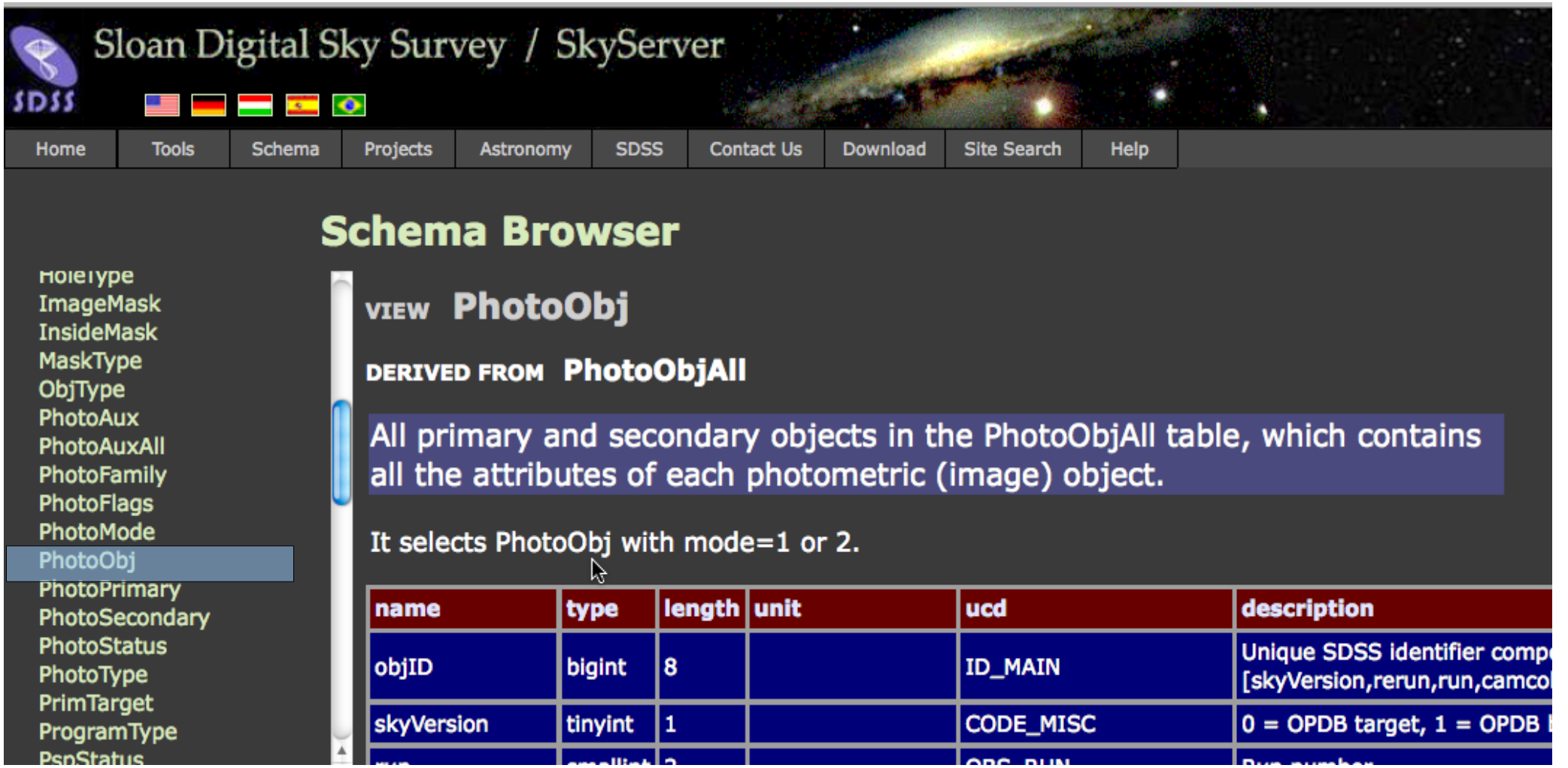
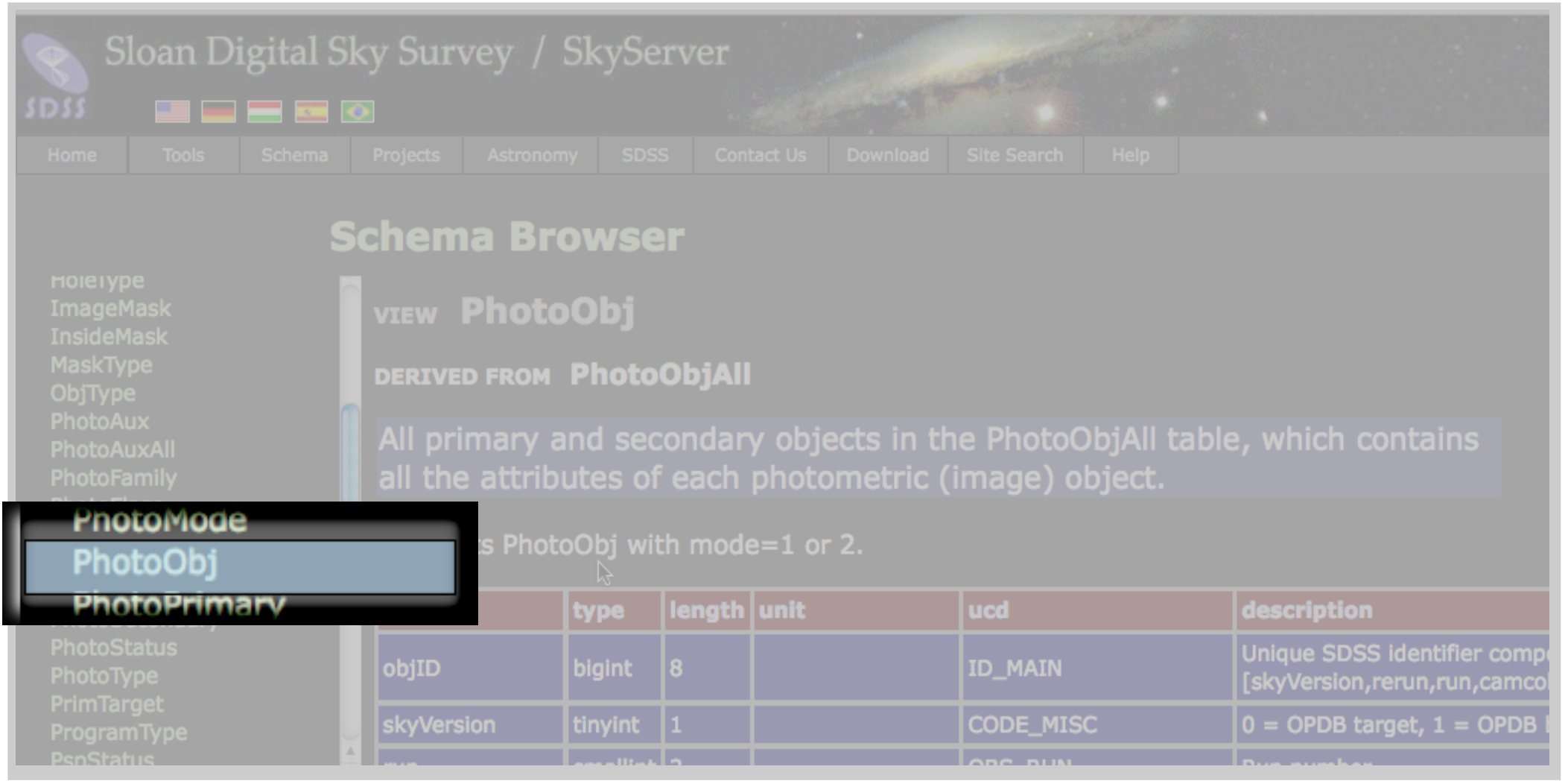


You will need to know the names of the attributes (columns) in the VIEW/TABLE

Learn Your Schema



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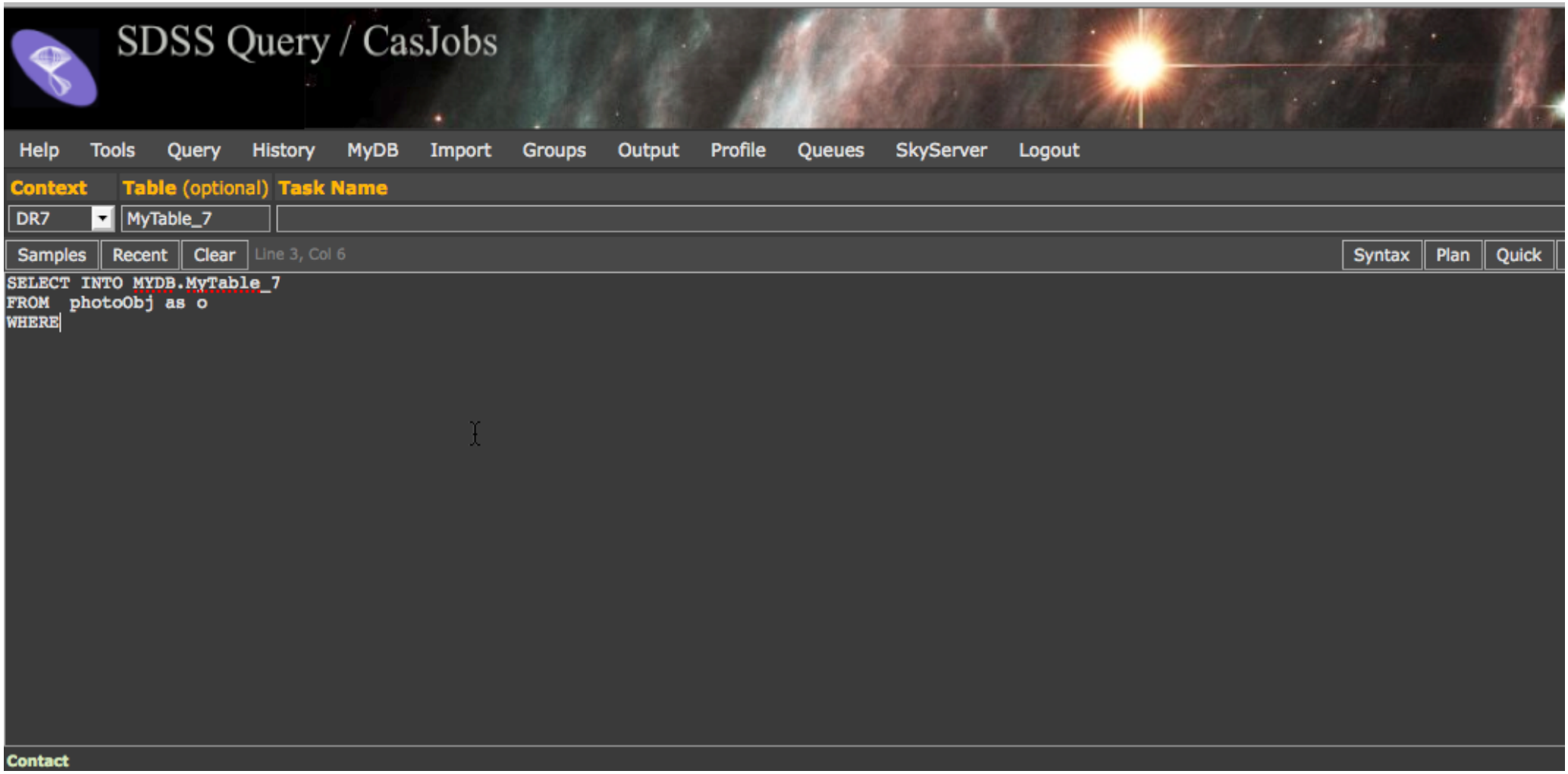
Now I can tell CasJobs where to search for data: FROM



Names can be long and cumbersome, so use an alias (like “o”)

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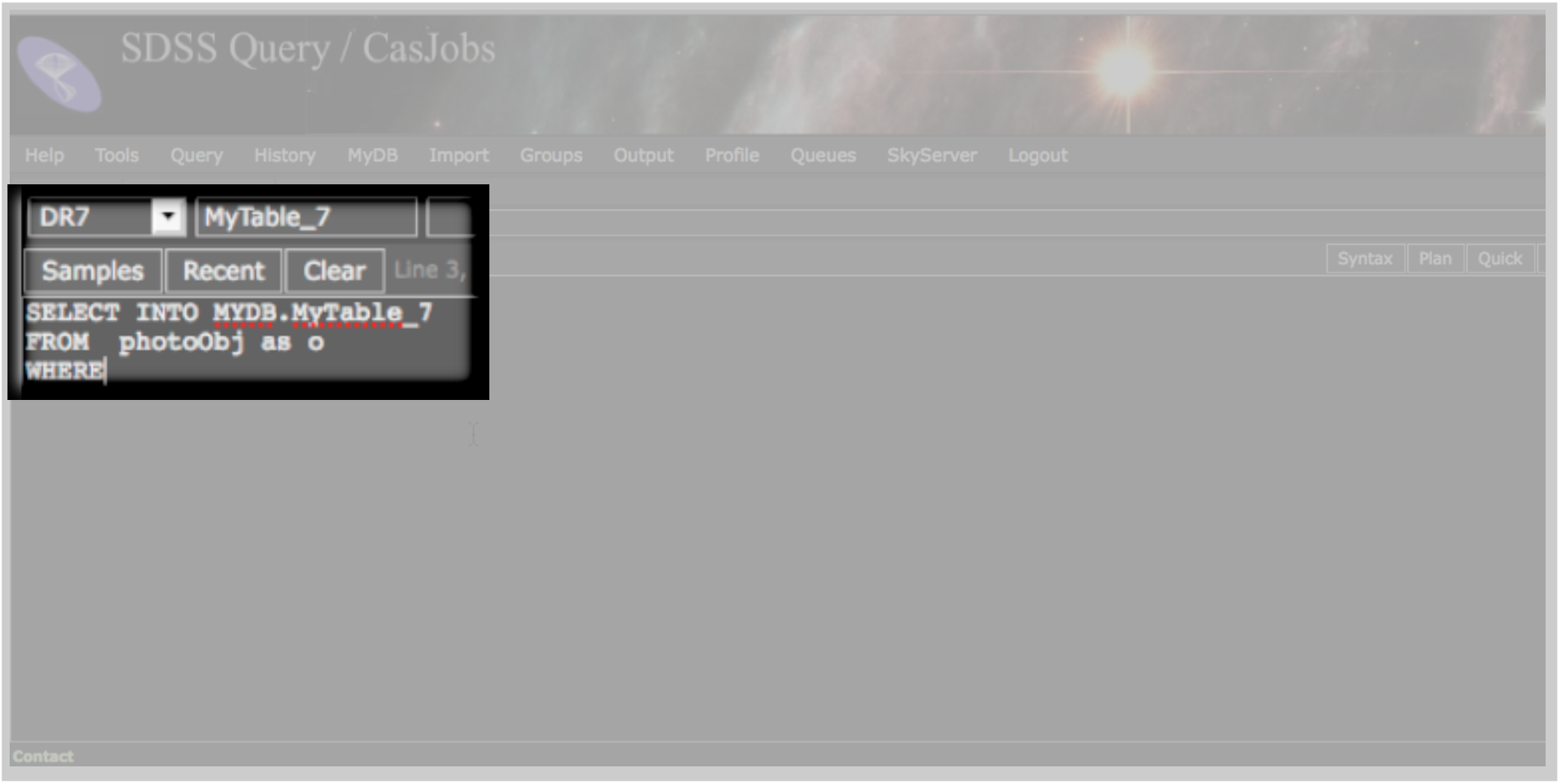

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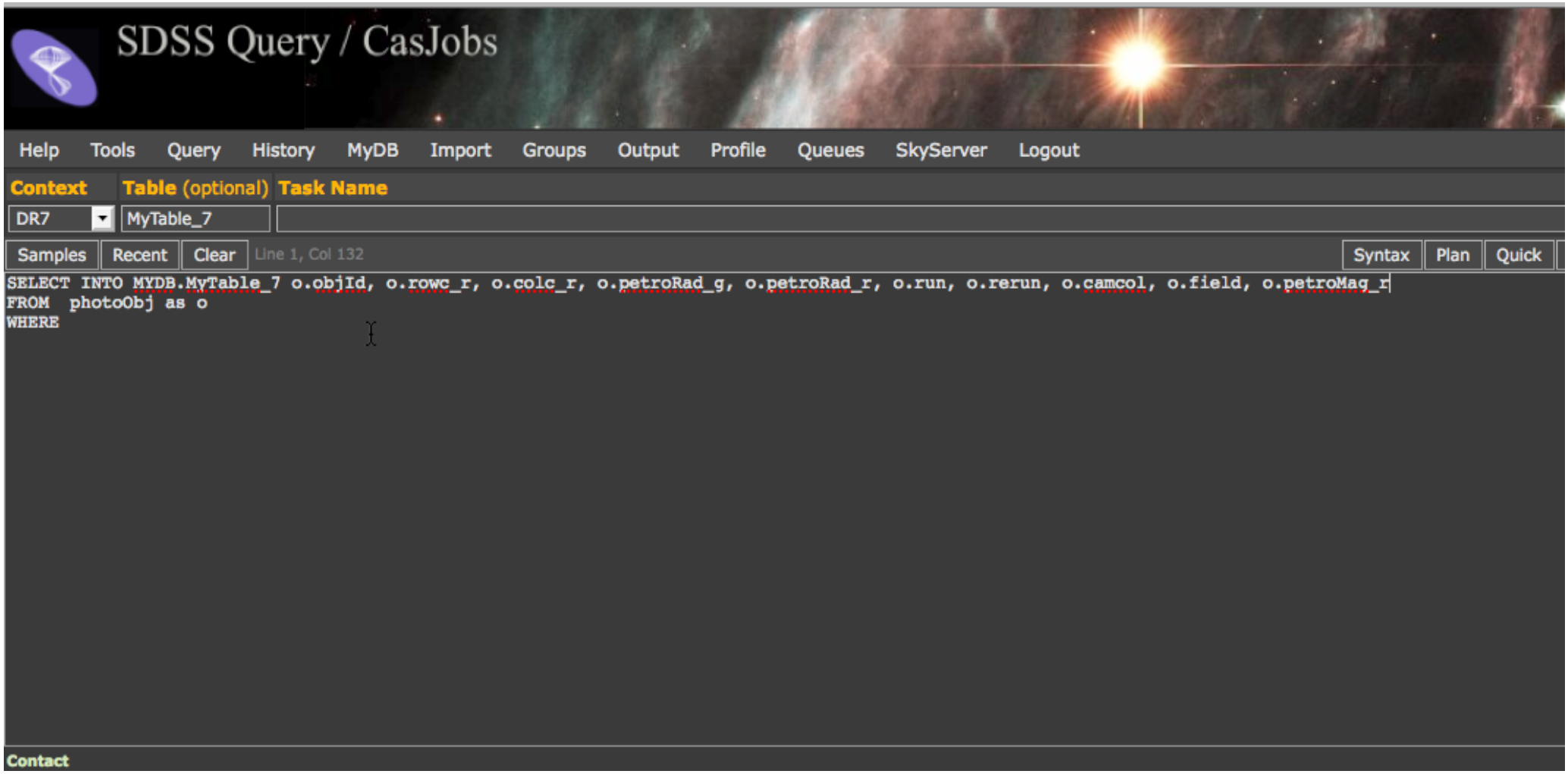

Take advantage of the alias to make “cleaner” looking queries

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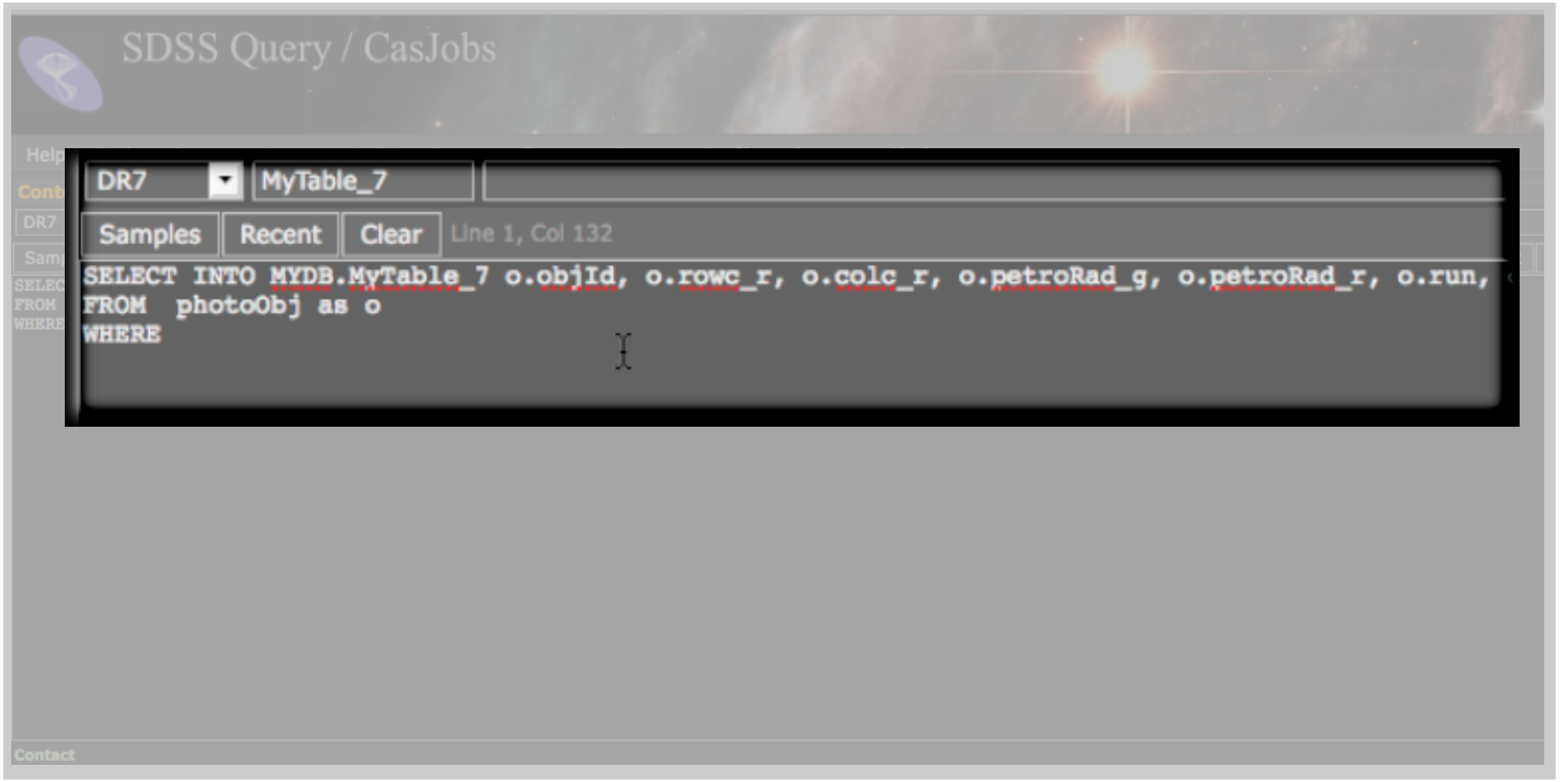

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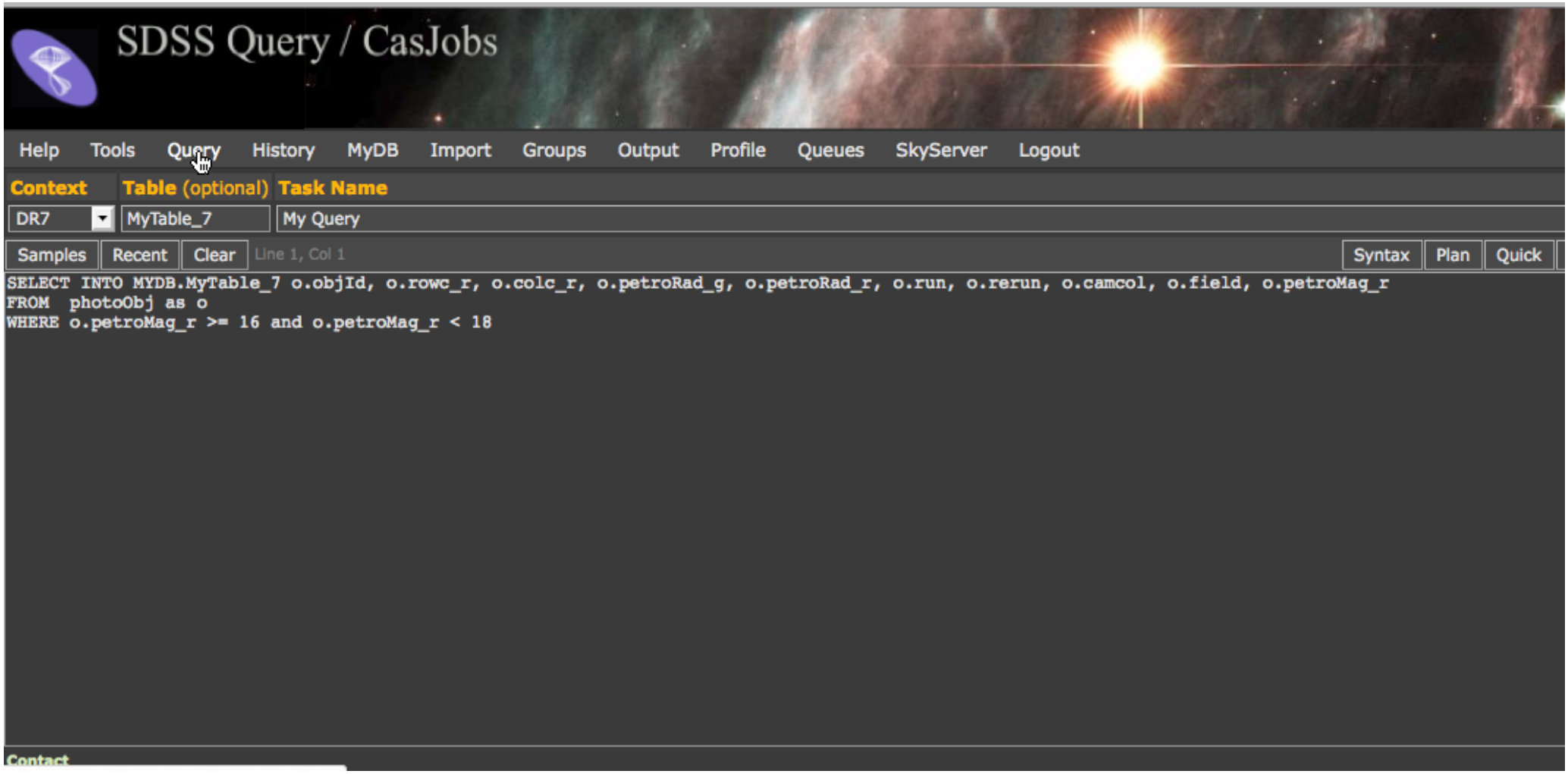
Now tell CasJobs how to constrain your search



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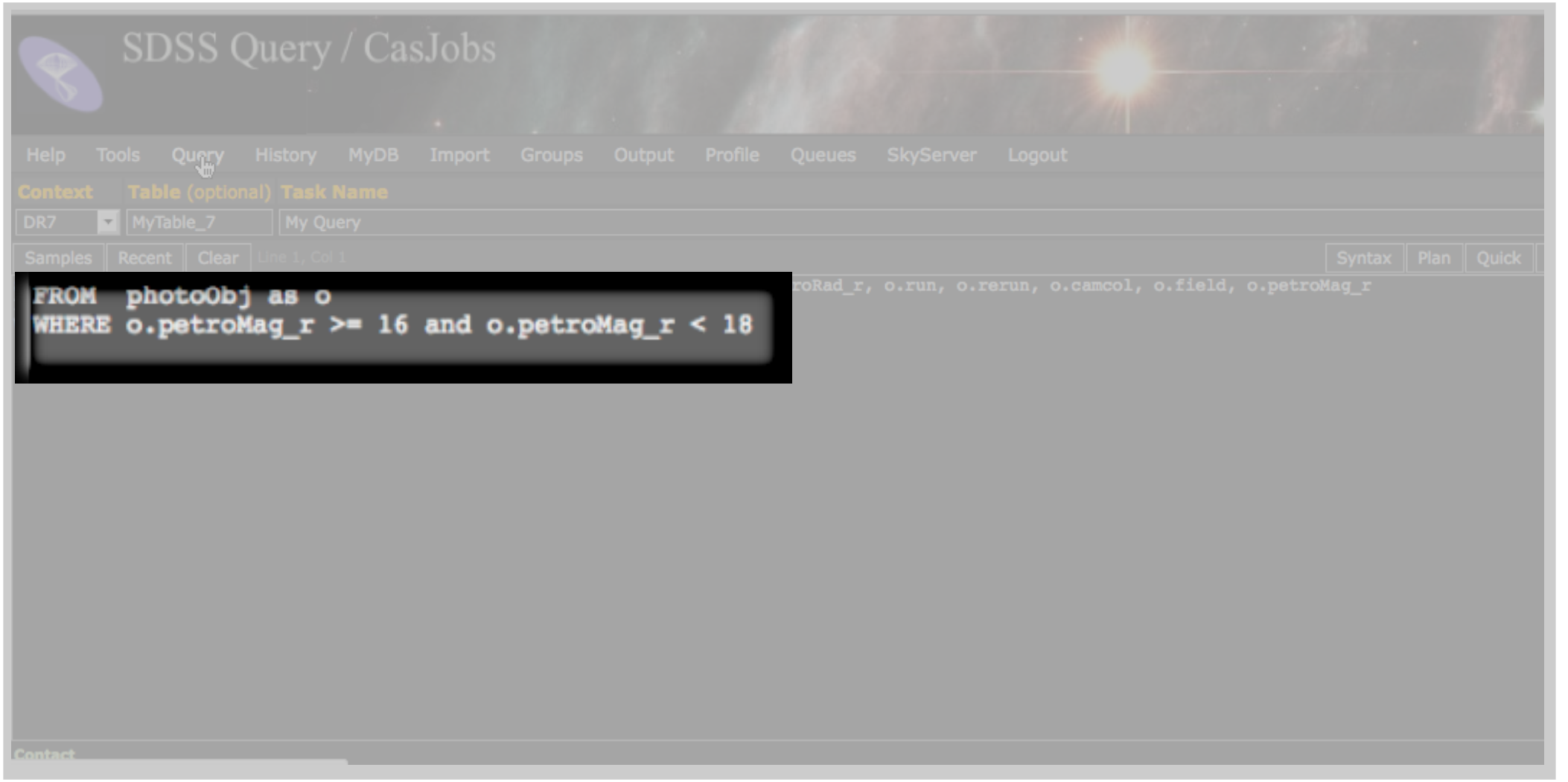
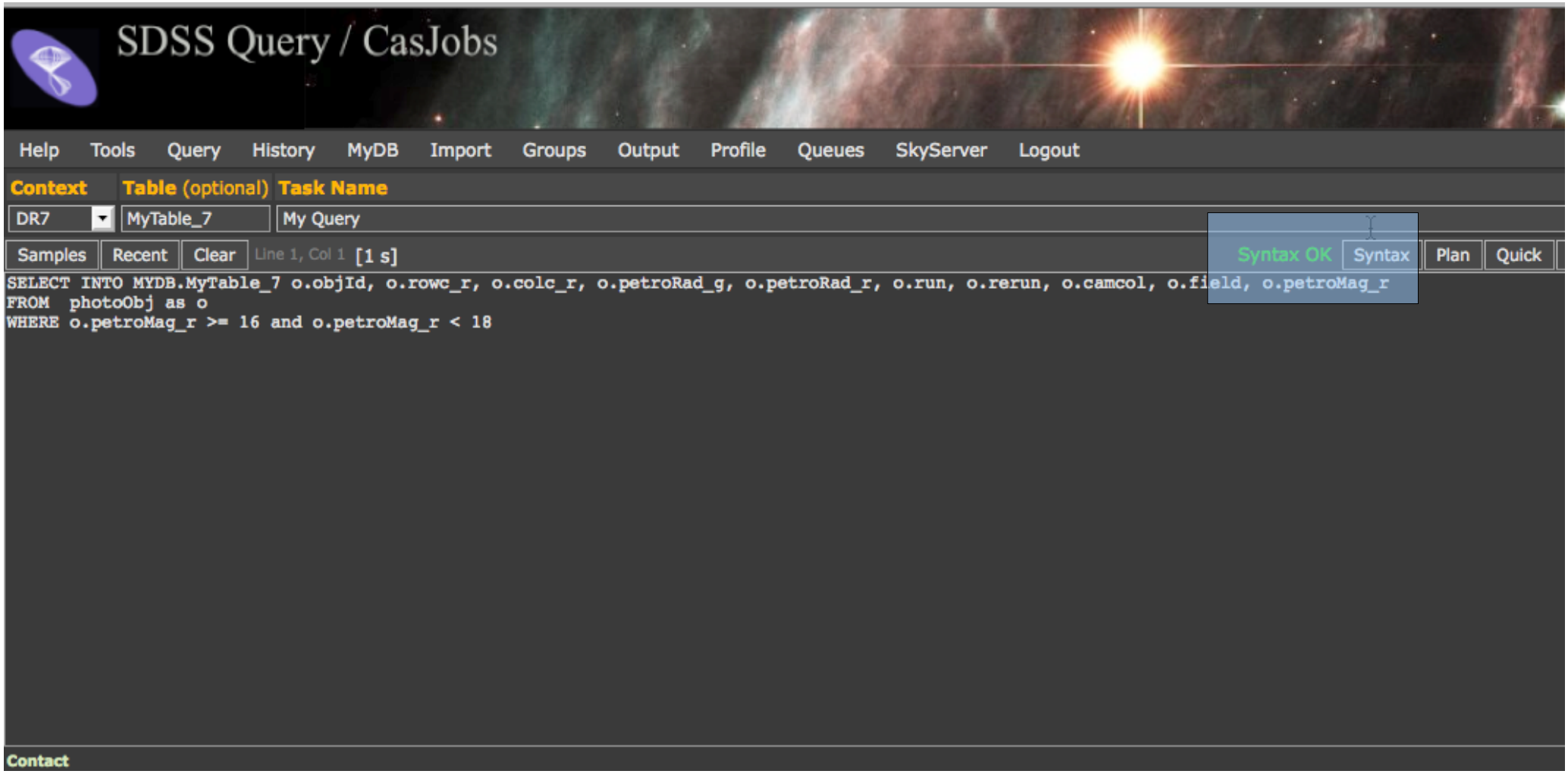


Now I can ask CasJobs to check my spelling (or syntax)



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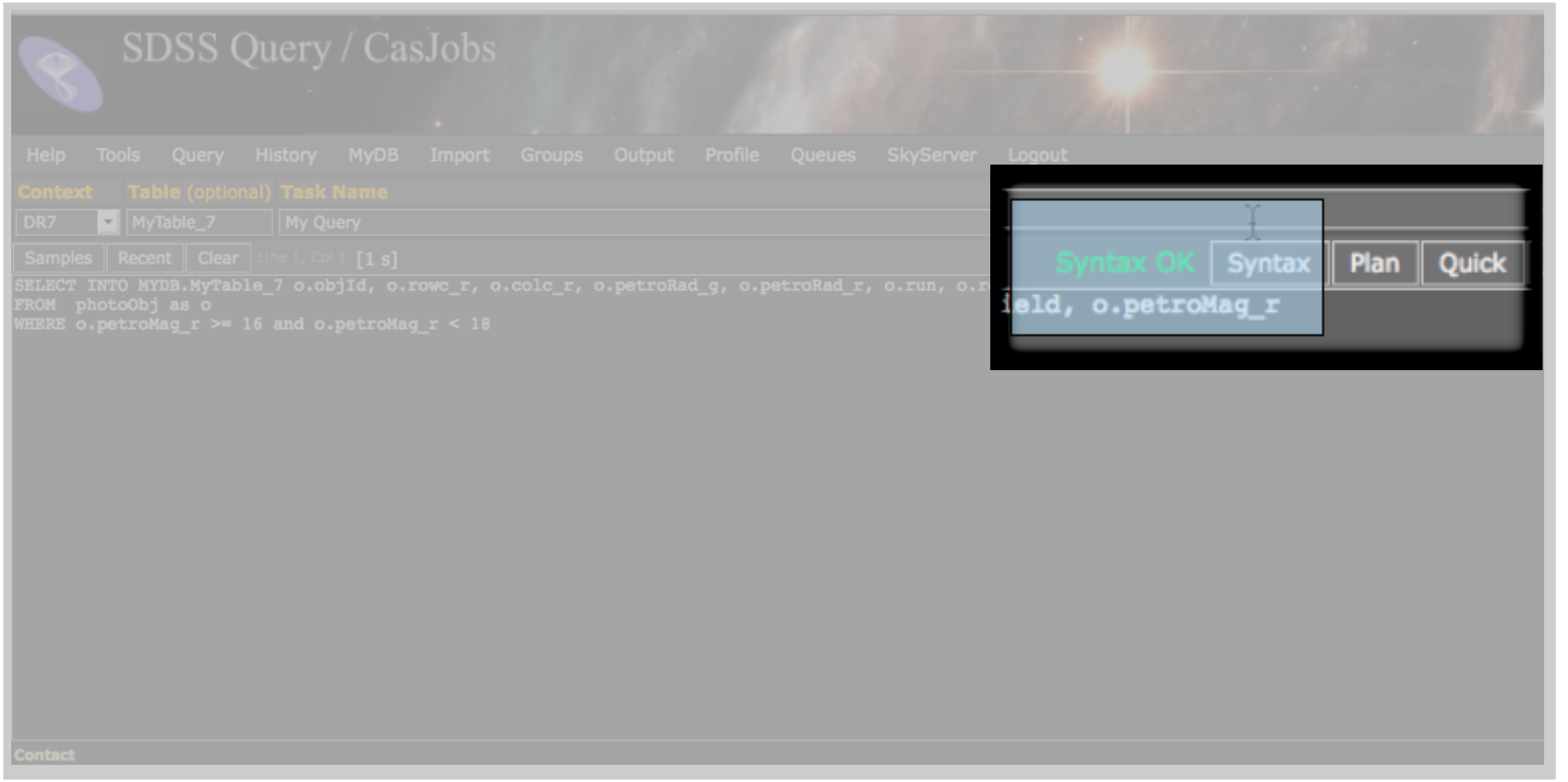
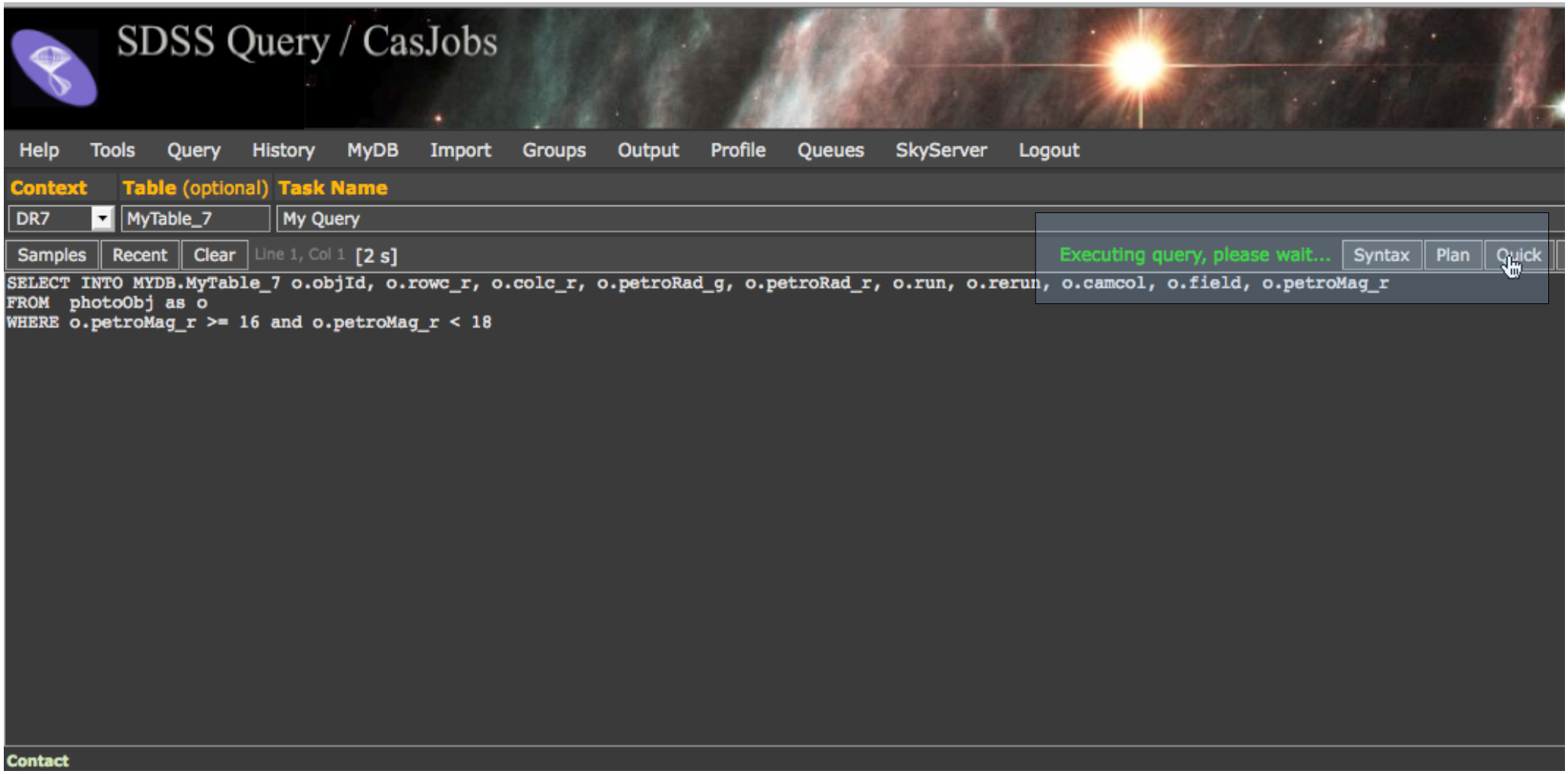
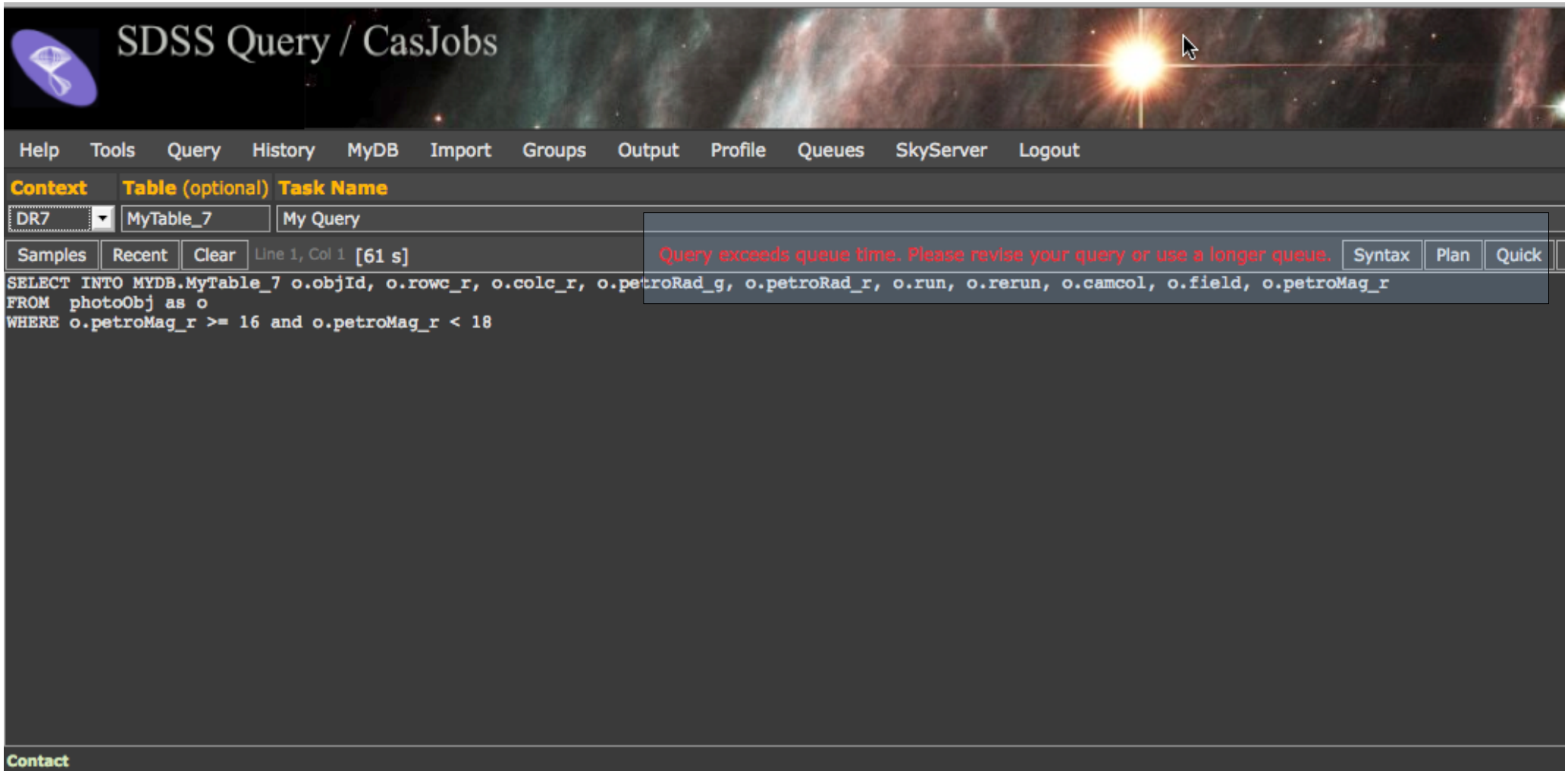


Finally, I submit the job and wait



Timeouts are common



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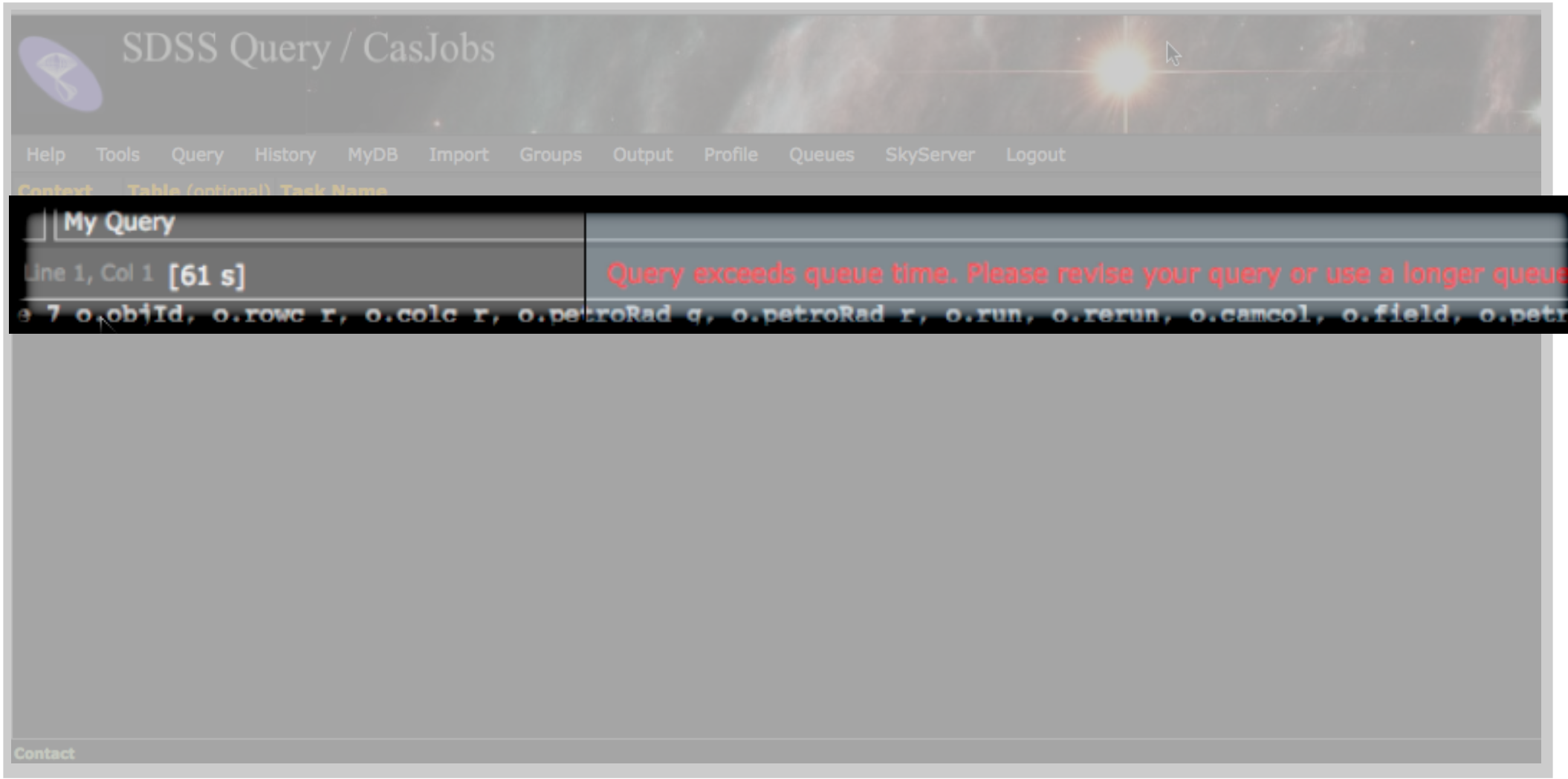
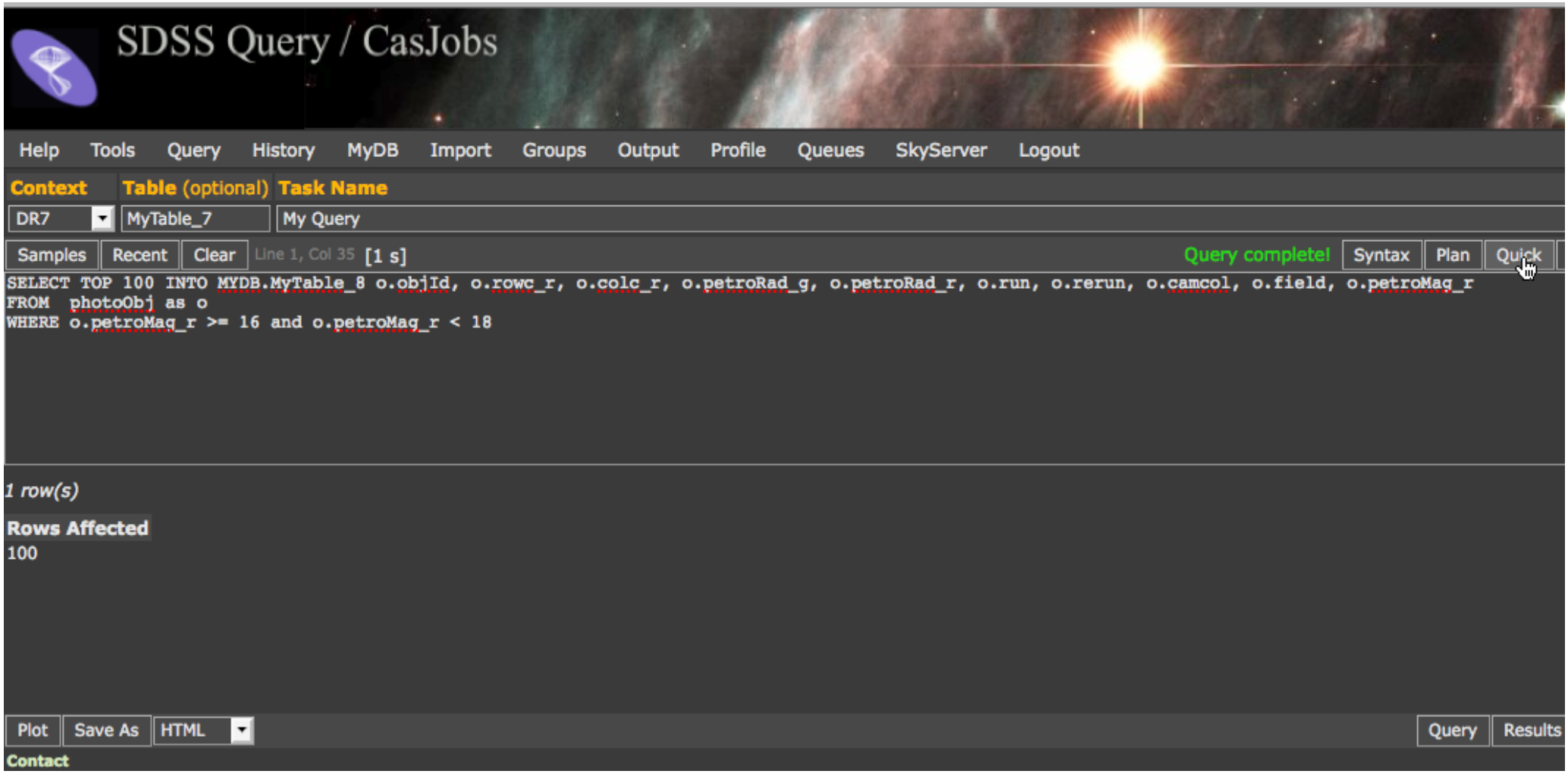


Use controls, like TOP



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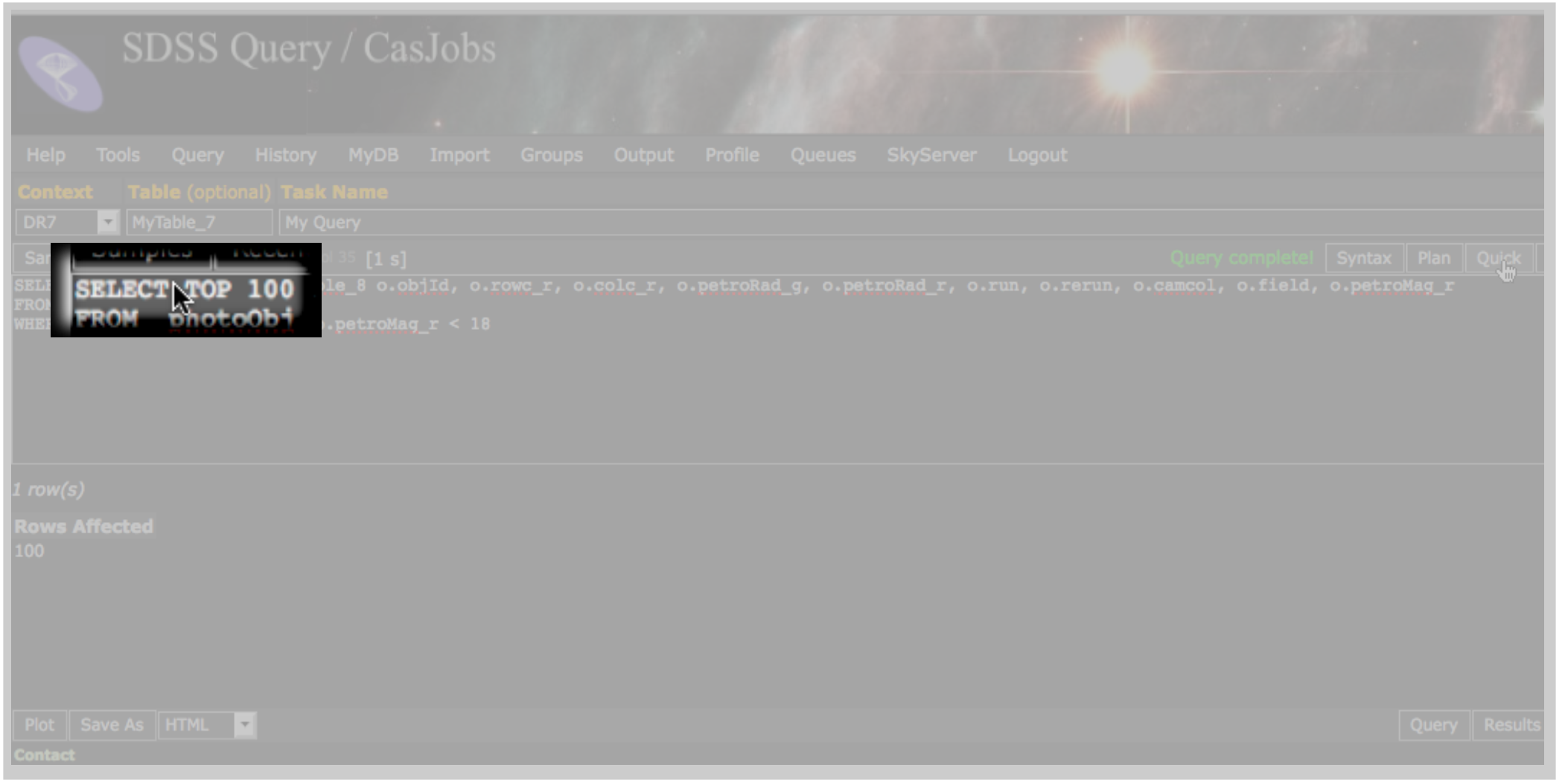
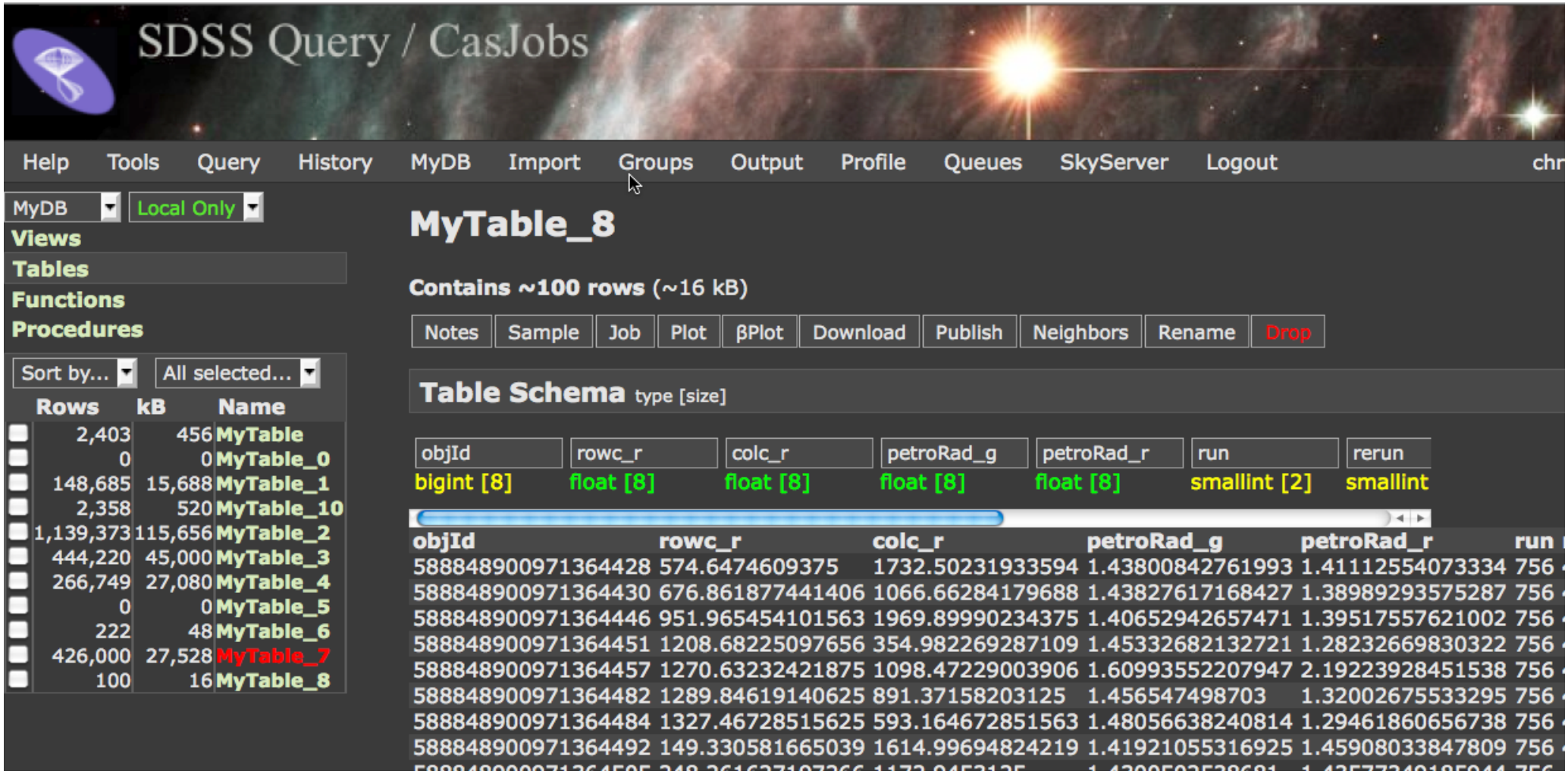


Examining your new Tables



Make sure you look what is INSIDE the table

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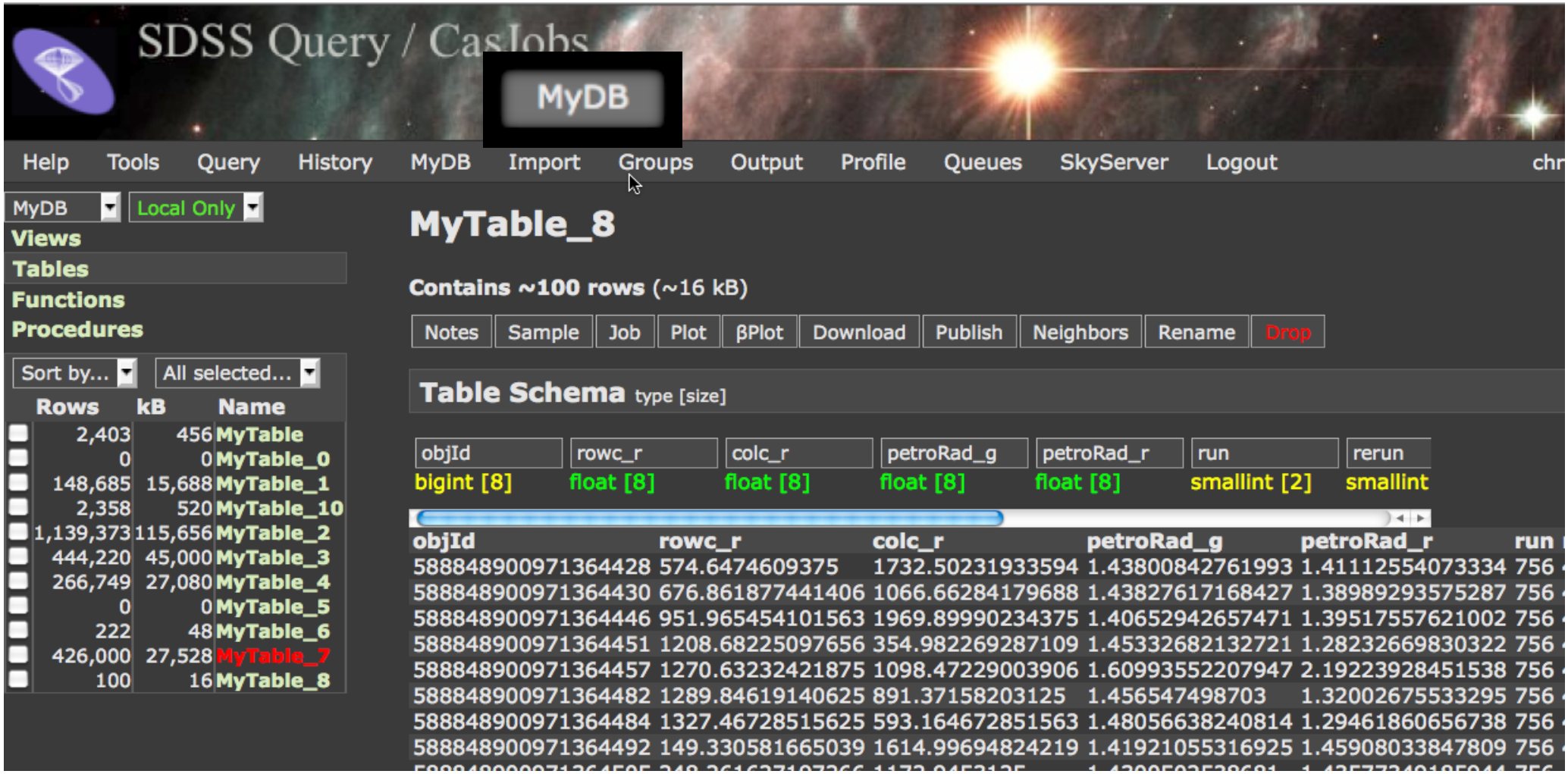

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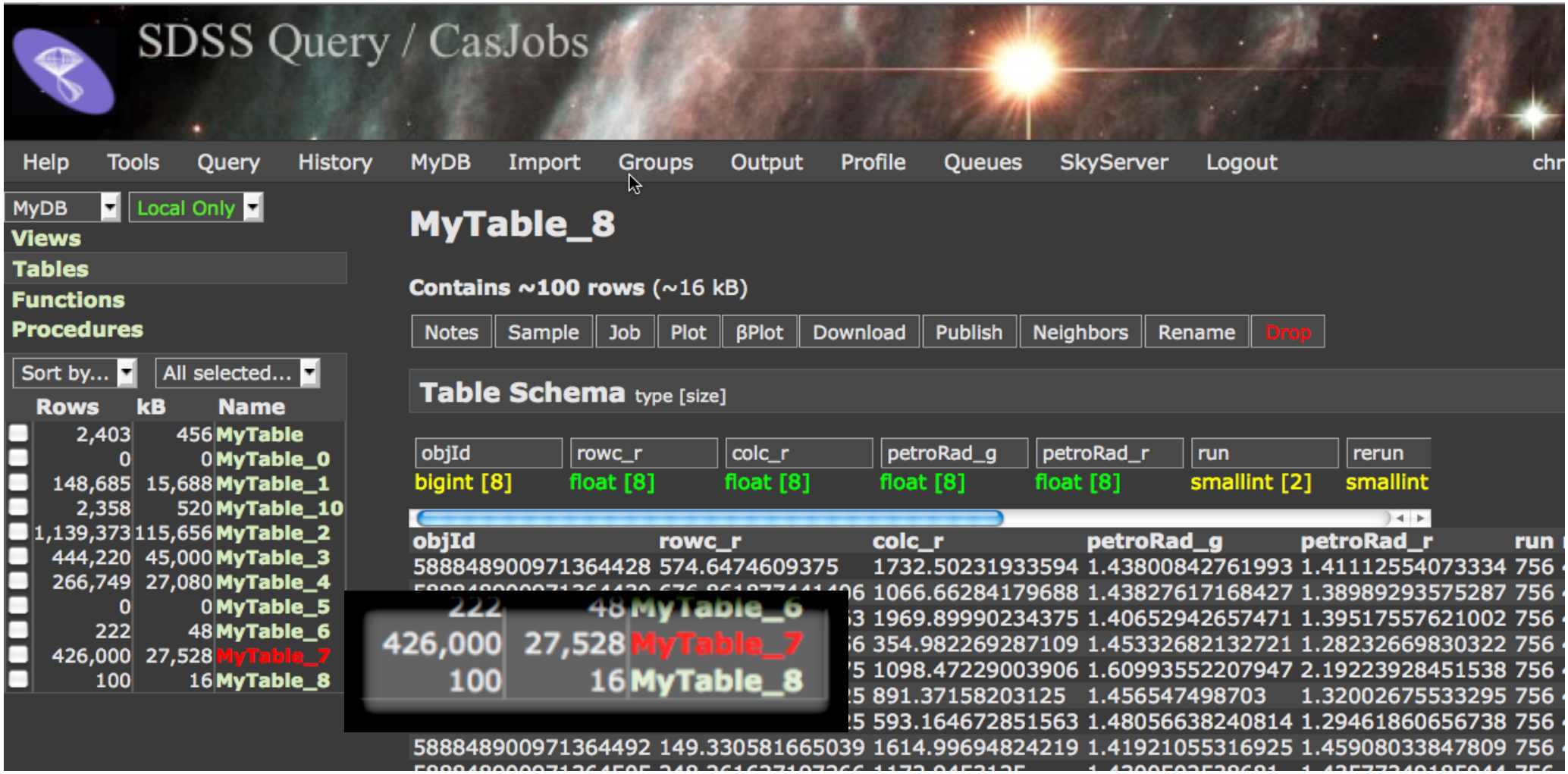

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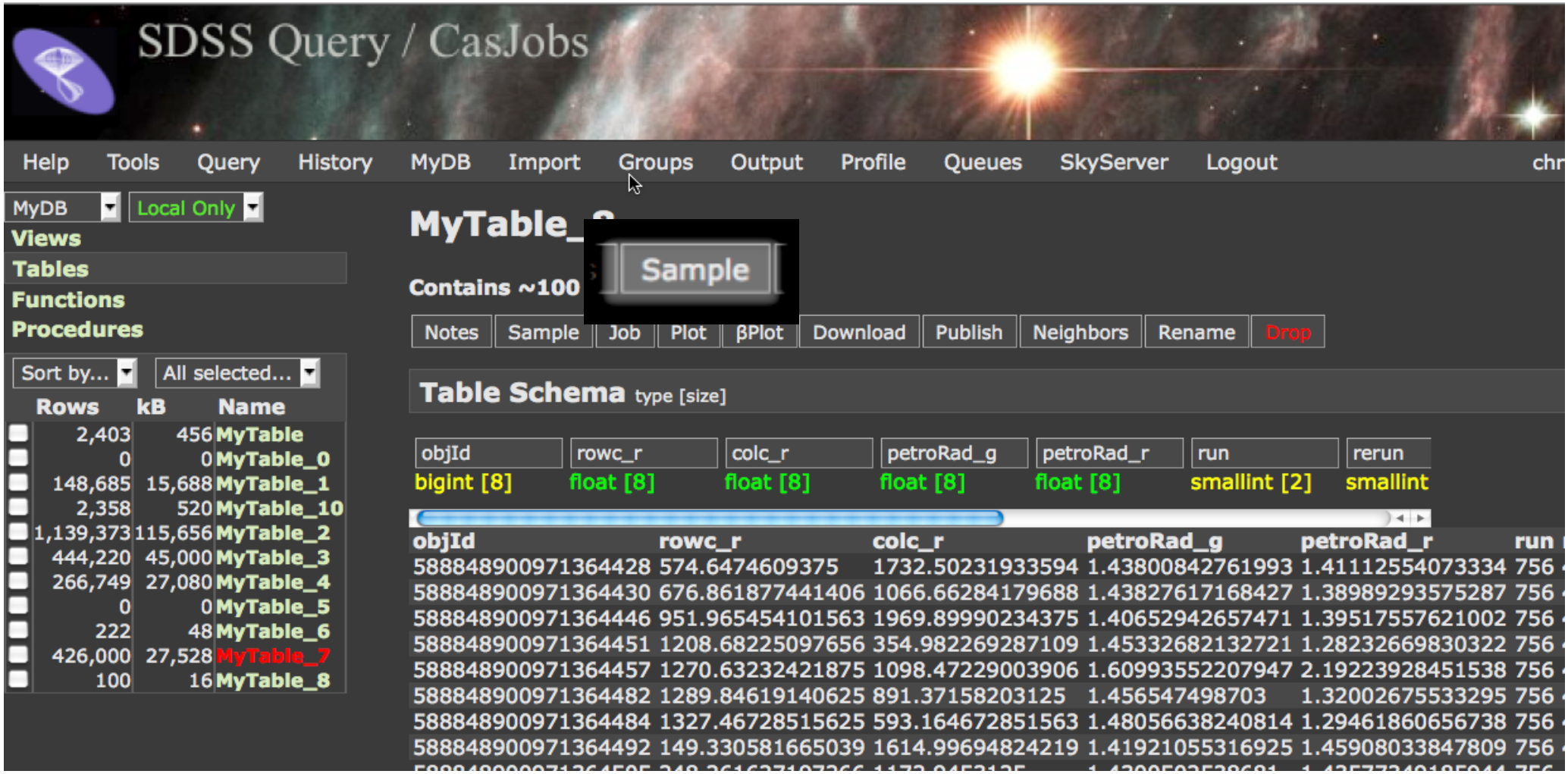

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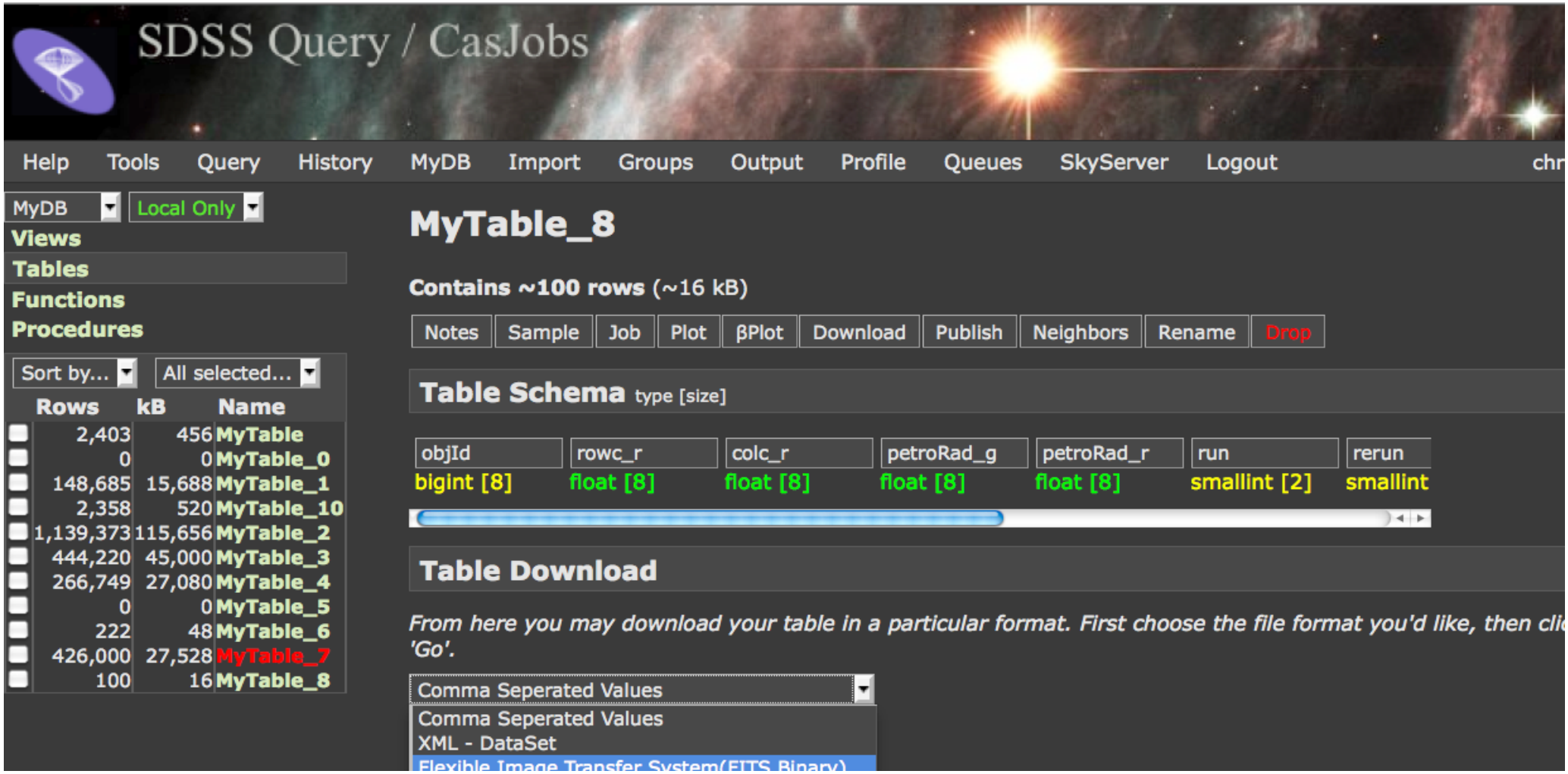
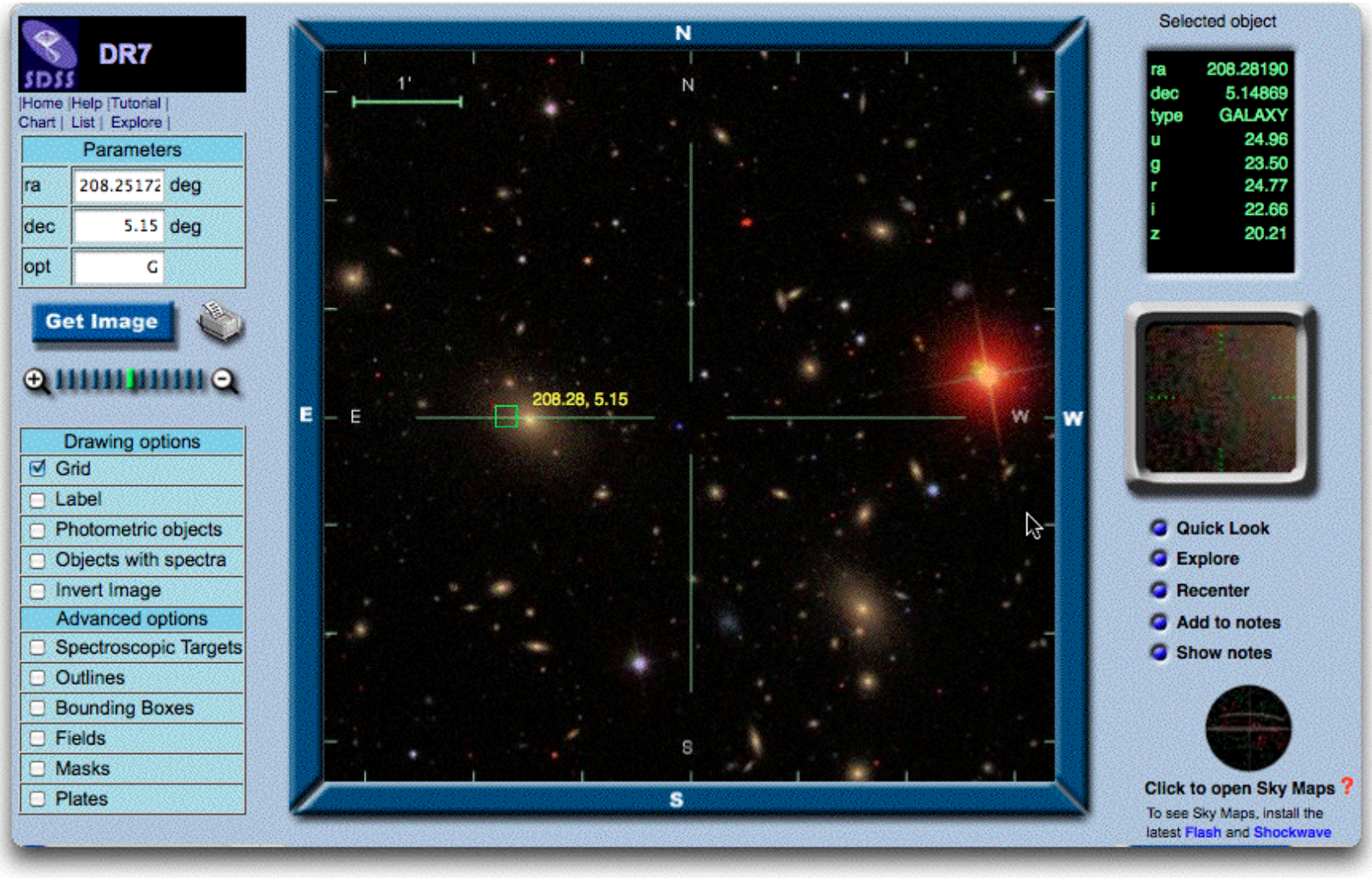
Downloading your new Tables



Use a format that keeps metadata. Do't forgot your provenance (query)

Membership within an Galaxy Cluster



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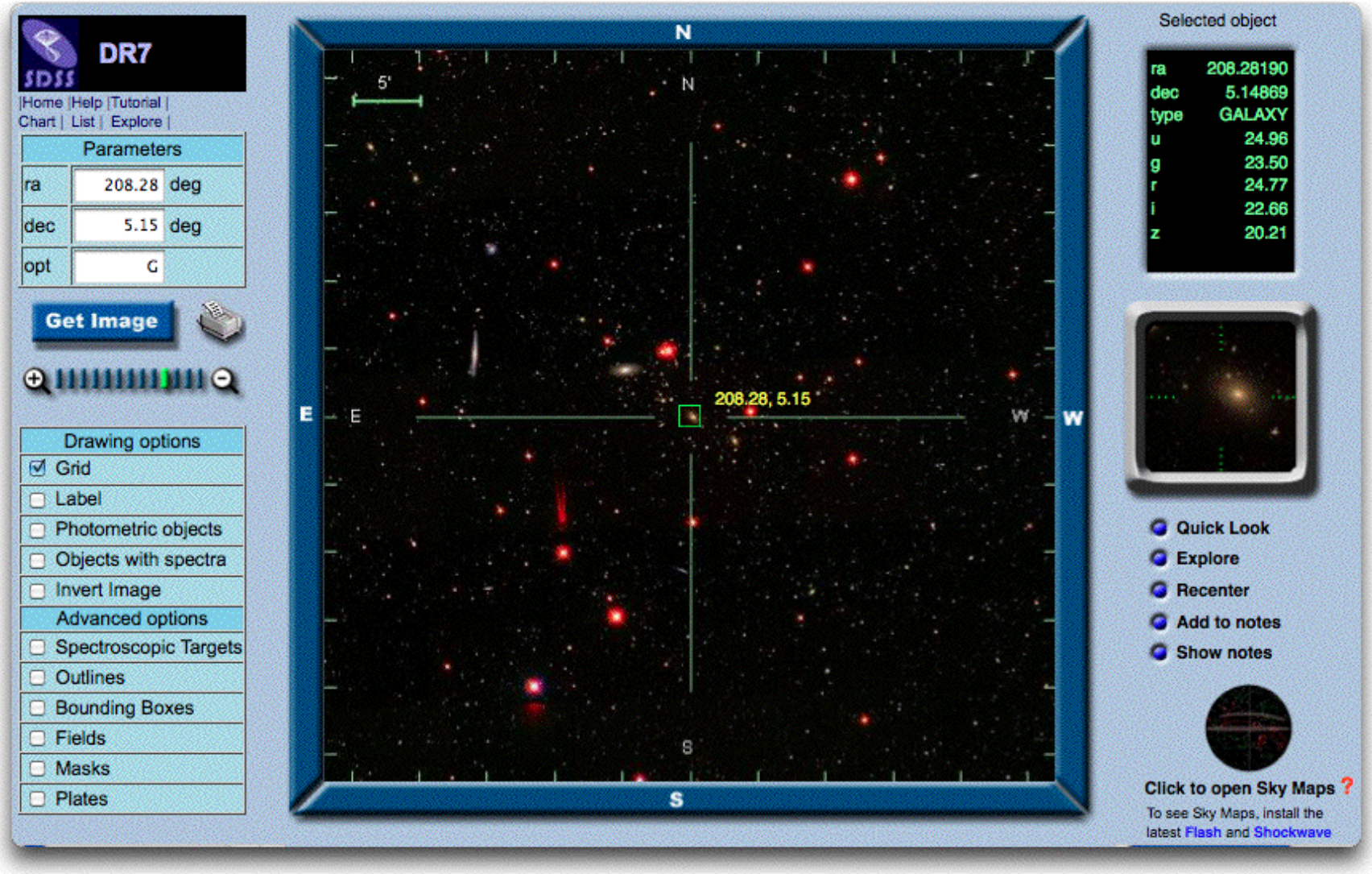
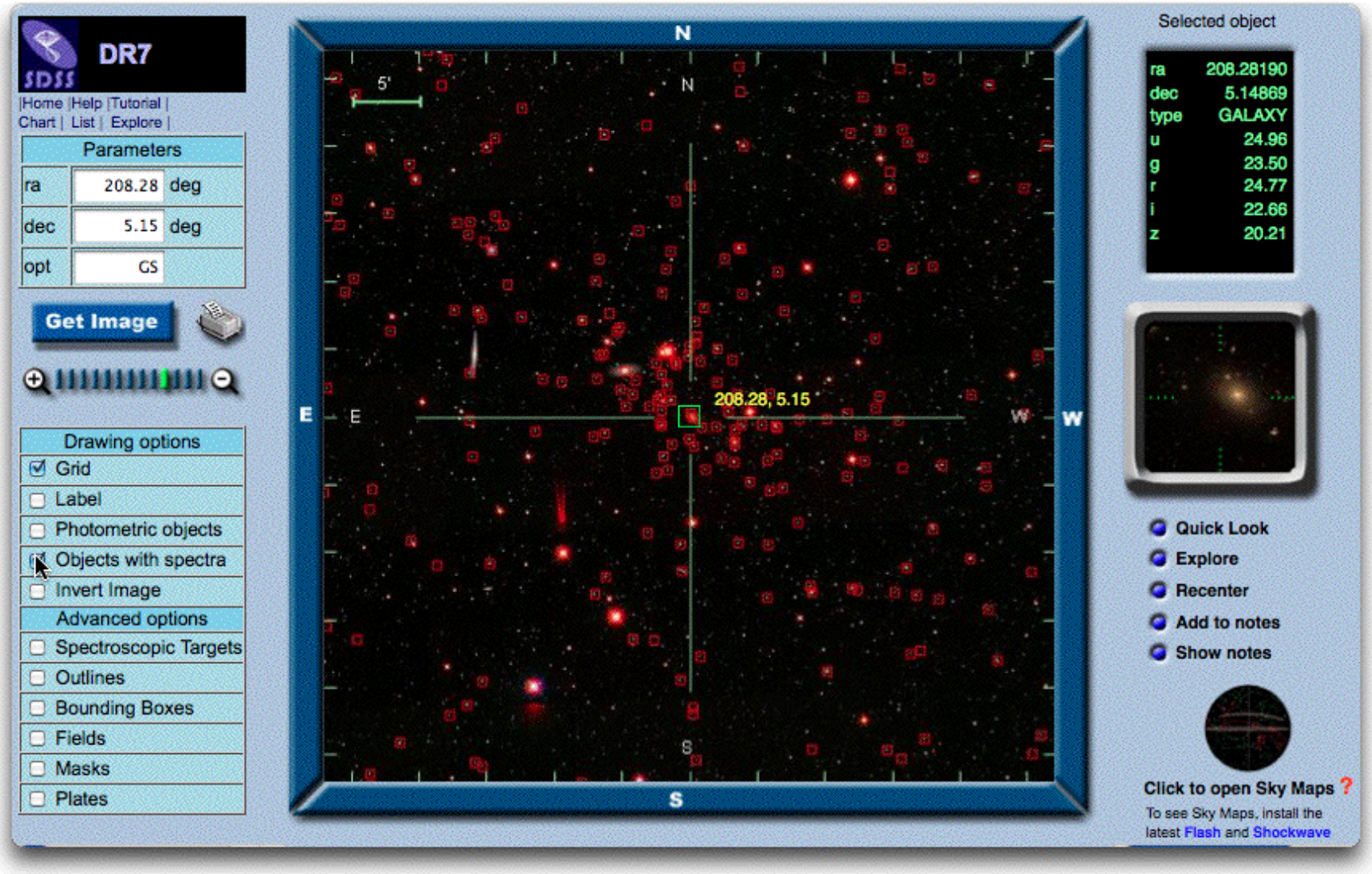
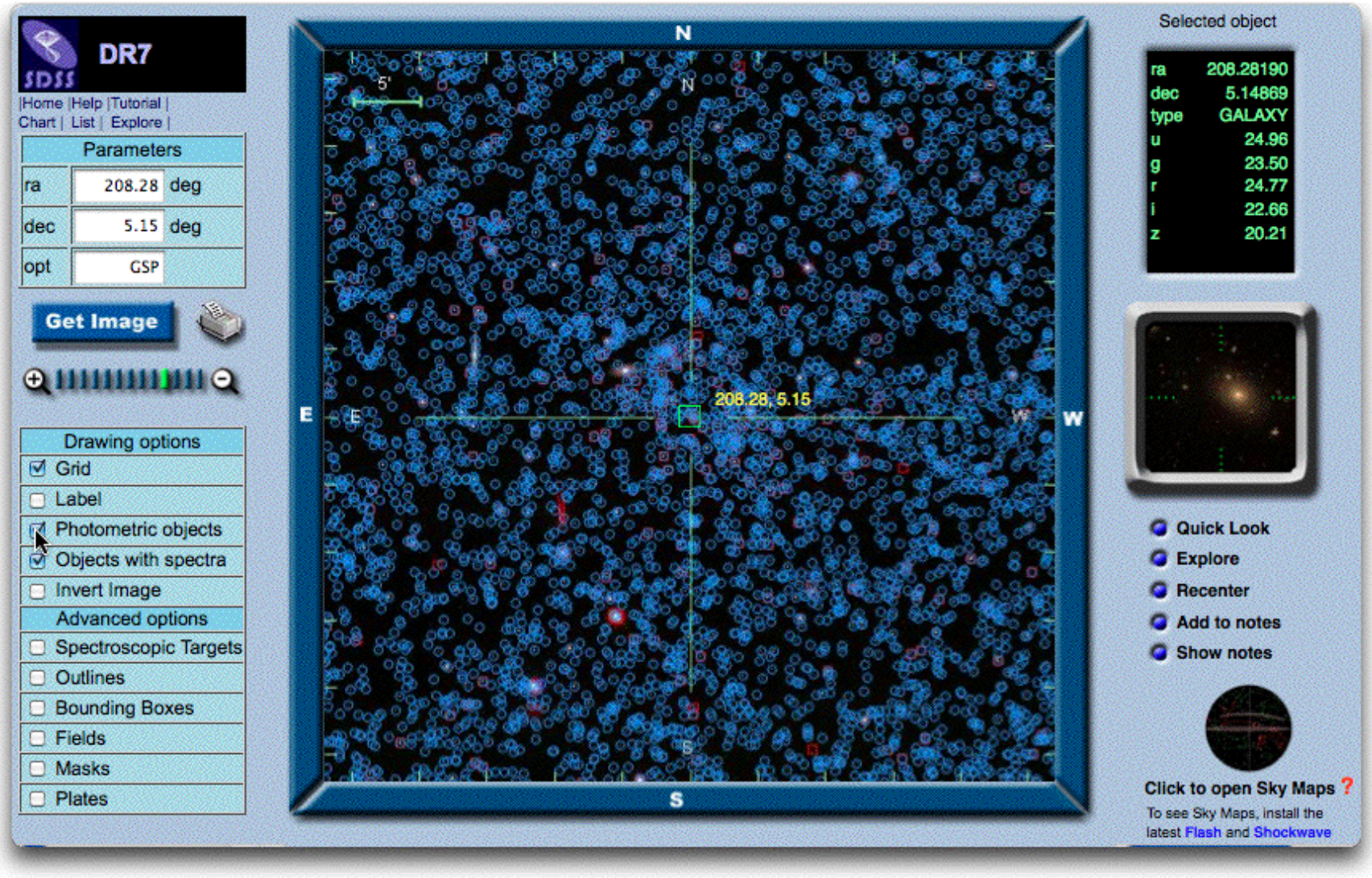


Membership within an Galaxy Cluster: Spectroscopy



Membership within an Galaxy Cluster: Photometry



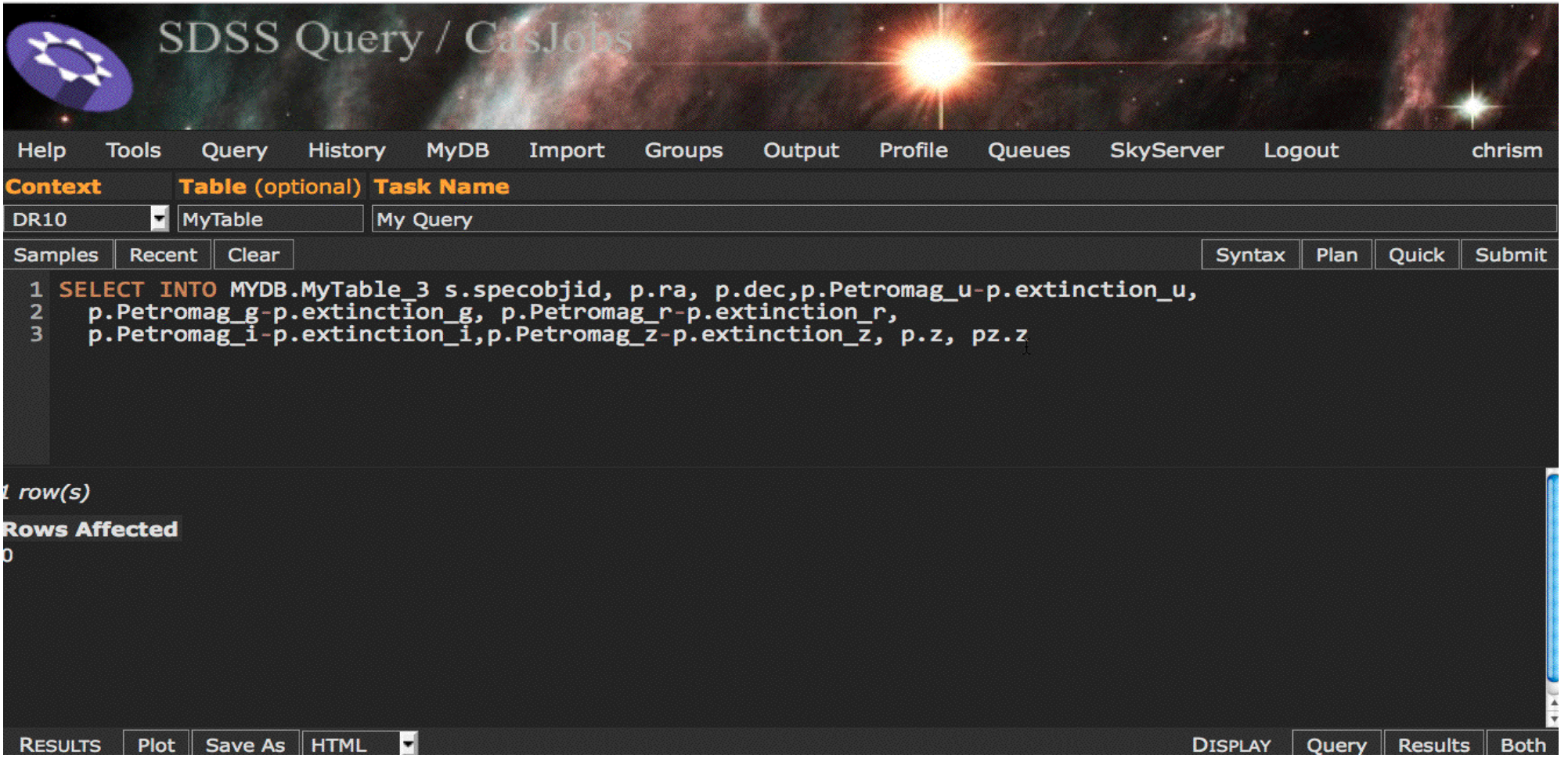
A more complex example

- Research: remove most foreground and background galaxies around a galaxy cluster so that I can study the cluster “member” galaxies and target those galaxies w/o spectra for additional spectroscopic observations.
  - Problem: The SDSS spectroscopic survey is not complete.
  - Answer: Use the spectroscopic data when available. When no spectrum is available use the photometrically determined redshift.

Ingredients to a complex query

- Which attributes?
  - positions, magnitudes,z, or photo-z
- Which tables?
  - SpecObj (z), Photoz (photo-z), Galaxy (mags/position)
- How do I constrain to a circle on the sky?
  - fGetNearbyObjEq(208.28,5.15,58.31)
- How do I “join” the results?
  - three joins
- How do I handle “nulls values”

Select Your Attributes (since you are no an expert on the SDSS schema)



Use the example queries to help you find a solution

Galaxies unsaturated near given location Top

```
-- Find galaxies without saturated pixels within 1' of a given point (ra=185.0, dec=-0.5).
-- This query uses a function fGetNearbyObjEq,which takes 3 arguments (ra,dec,
-- distance in arcmin); this function uses the Neighbors table. The Neighbors and Galaxy
-- tables have in common the objID, so we have to select objects from both where the
-- objIDs are the same. The output of the function is a table with the Galaxy Object ID
-- and distance in arcmin from the input. This query introduces the use of a JOIN to
-- combine table contents. We also use the 'ORDER BY' syntax, which sorts the output.

SELECT TOP 100 G.objID, GN.distance
FROM Galaxy as G
JOIN dbo.fGetNearbyObjEq(185.,-0.5, 1) AS GN -- this function outputs a table, so we have to do a
join
        on G.objID = GN.objID -- get objects from neighbors table GN with desired ObjID
WHERE (G.flags & dbo.fPhotoFlags('saturated')) = 0 -- and the object is not saturated. f.PhotoFlags is a
function that interprets the flag bits.
ORDER BY distance -- sort these by distance
```

Ellipticals odd lines Top

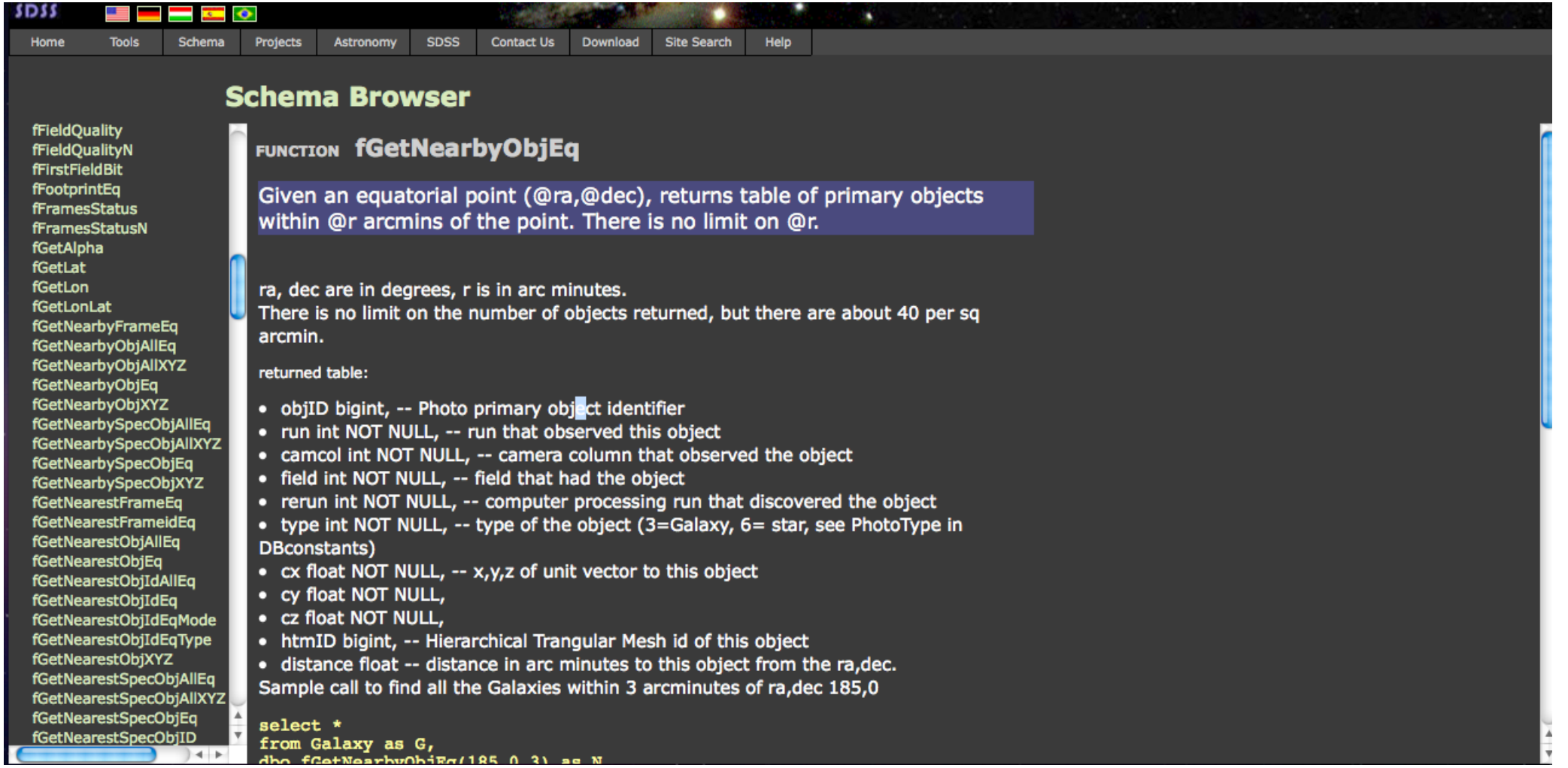
```
-- Find all elliptical galaxies with spectra that have an anomalous emission line.
-- This query introduces the SQL syntax DISTINCT, which will return only one instance
-- of the requested parameter (ObjID, in this case), because our query may return the
-- same object more than once. This is also the first nested query, where we use one
-- SELECT (the inner one) to get a group of objects we are not interested in. The outer
-- SELECT includes the new syntax 'not in', which is used to perform the exclusion.

SELECT DISTINCT G.ObjID
FROM
  JOIN Galaxy as G
  JOIN SpecObj as S ON G.ObjID = S.bestObjID          -- the galaxy has a spectrum
  JOIN SpecLine as L ON S.SpecObjID = L.SpecObjID     -- L is a spectral line
  JOIN XCRedshift as XC ON S.SpecObjID = XC.SpecObjID -- cross-correlation redshift
```

In this case, to the circular range query

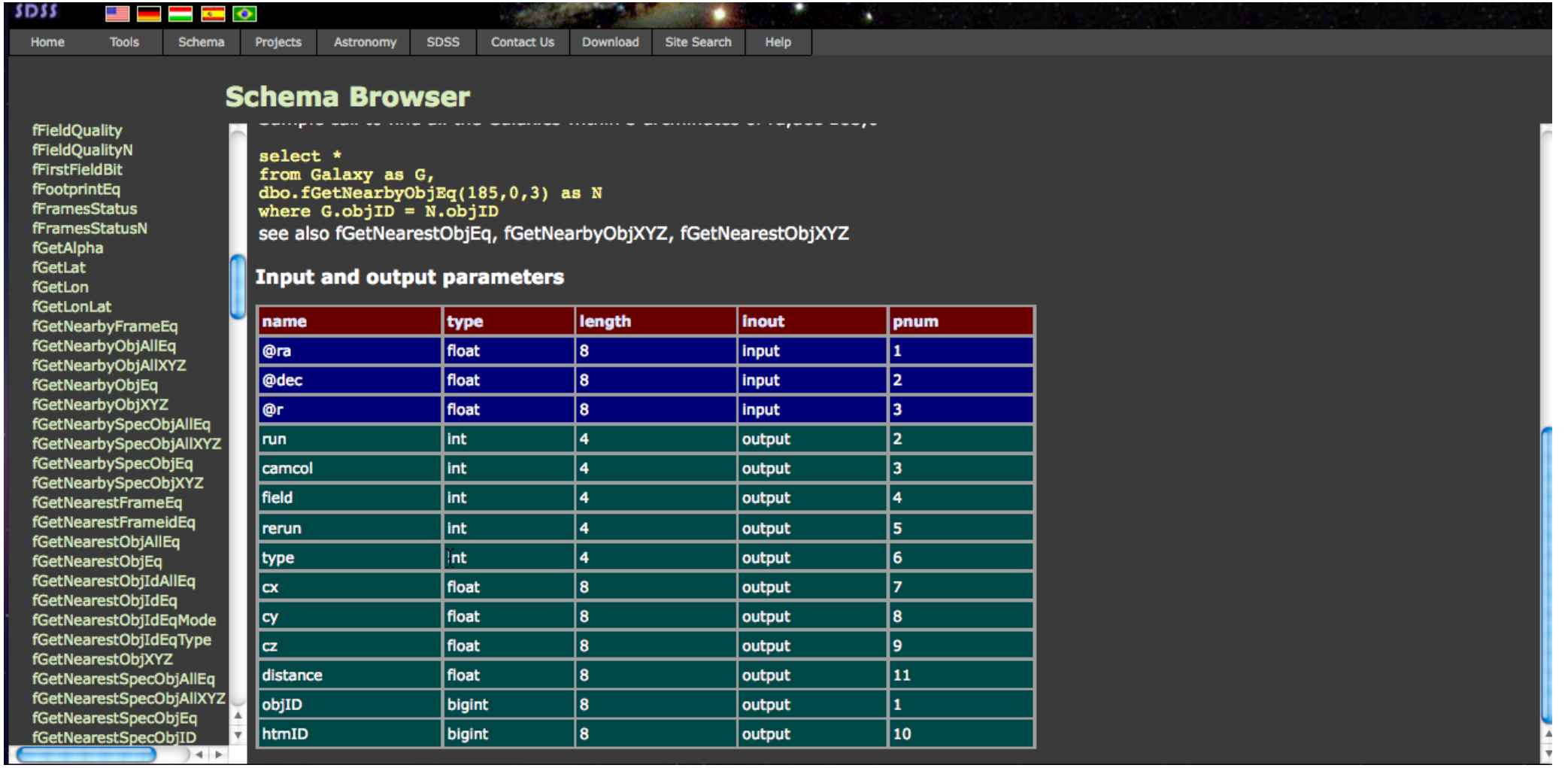
Use the example queries to help you find a solution

In this case, to the circular range query

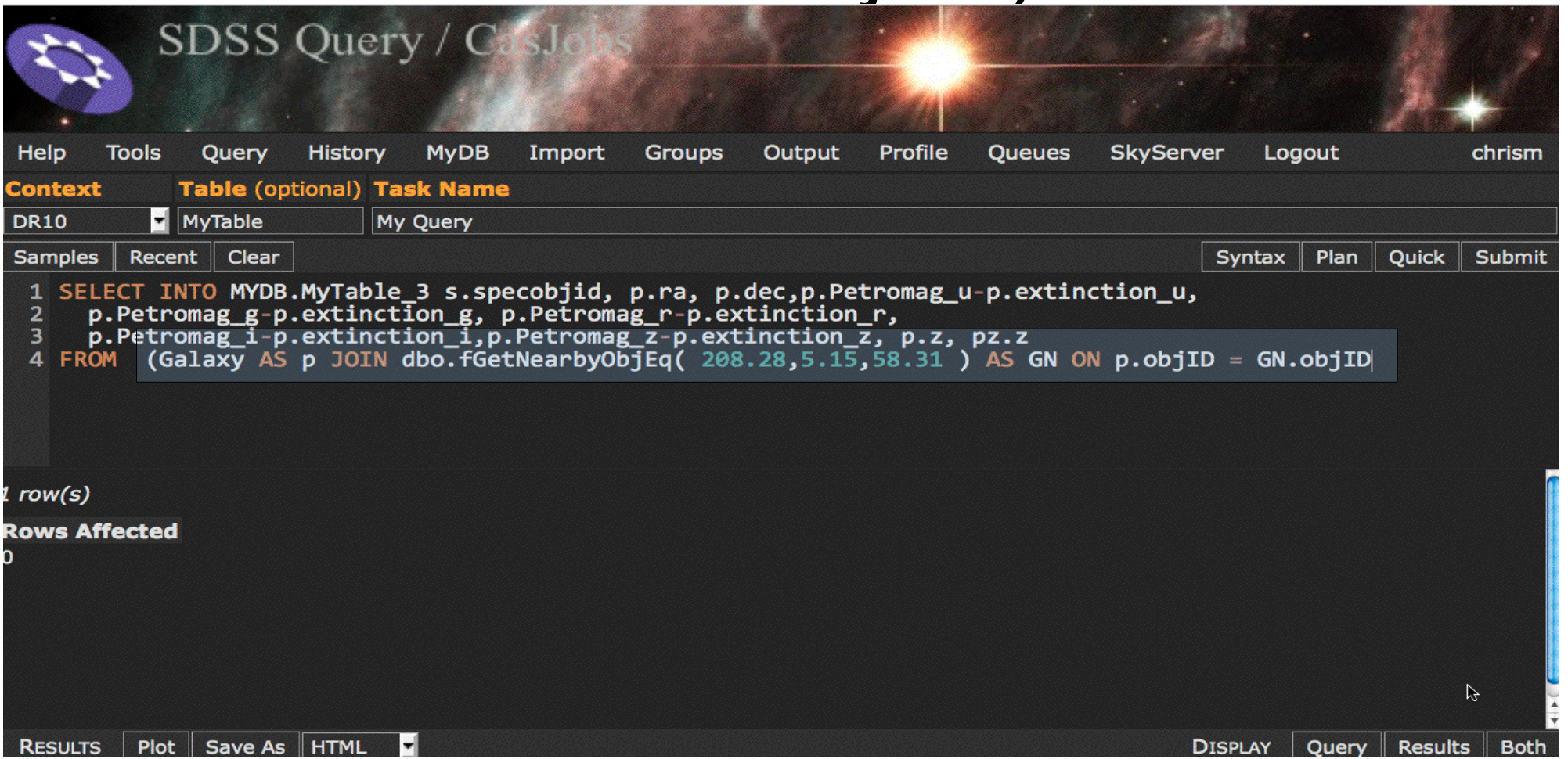
We are using a new function. Spend some time to learn it and others.



We are using a new function. Spend some time to learn it and others.

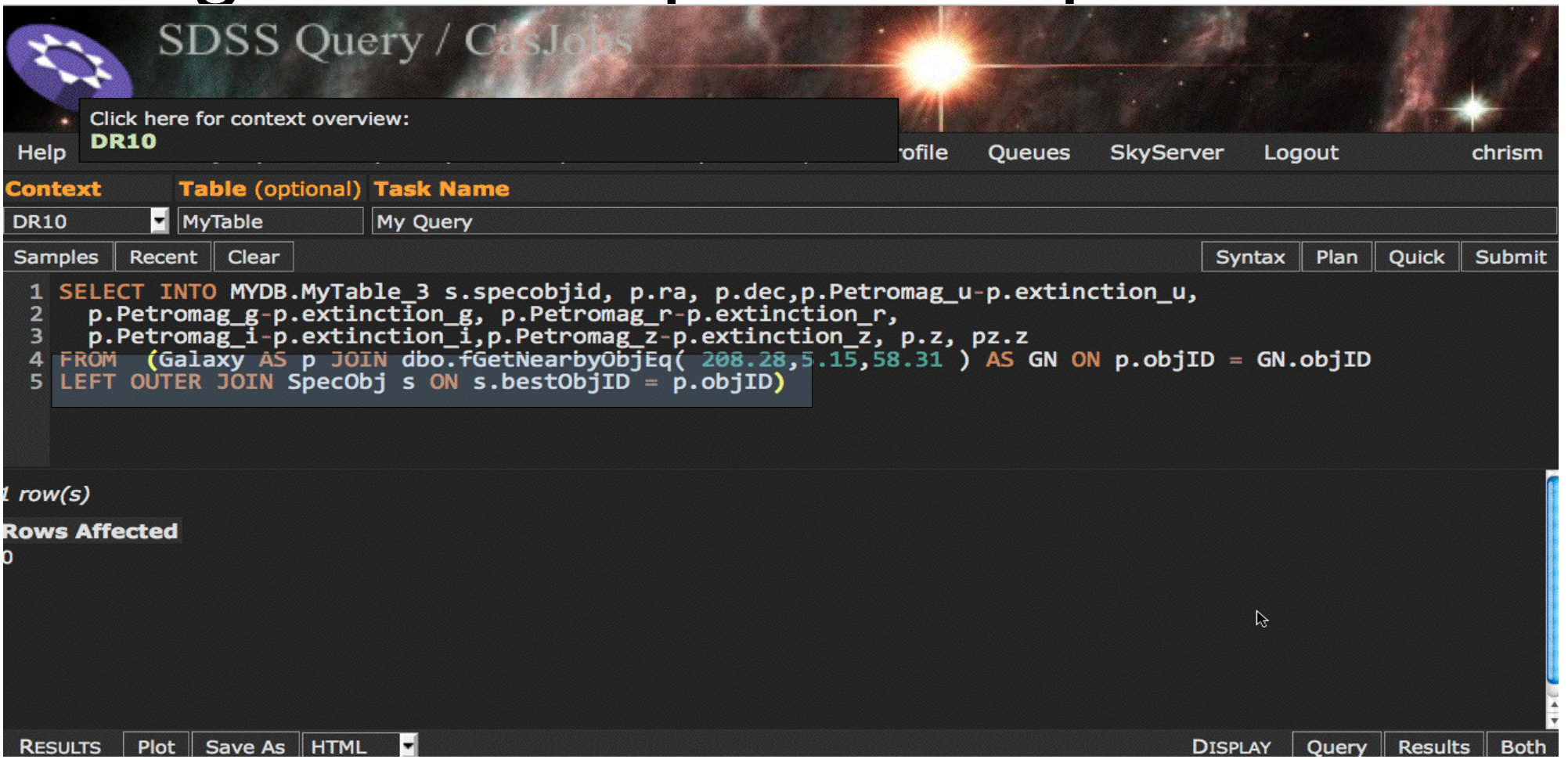


Now, we apply the function (which is an inner join)



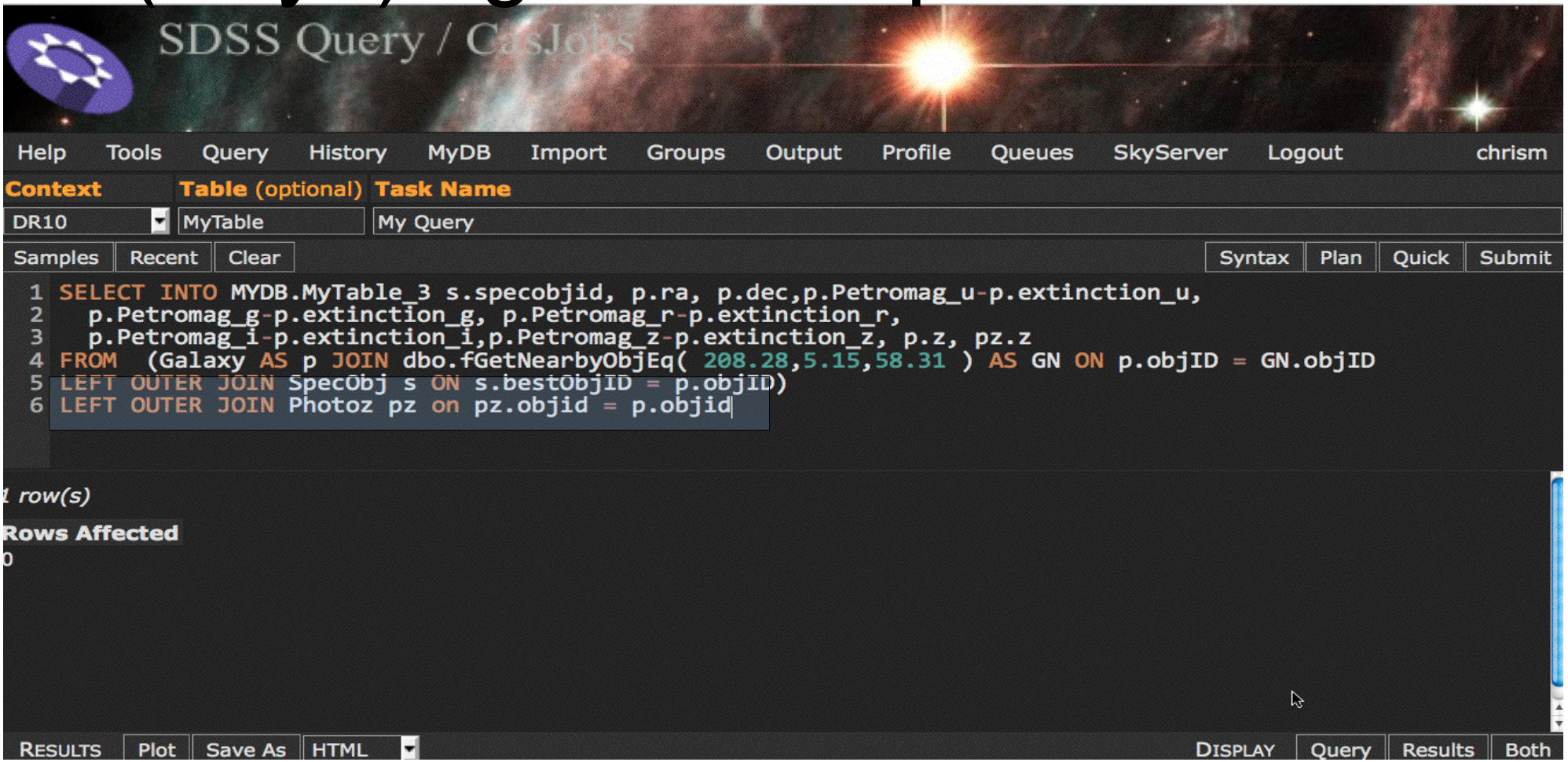
An “equi-join”, which means only “matches” are returned (no nulls)

Now, we use a left outer join (why?) against the spectroscopic table

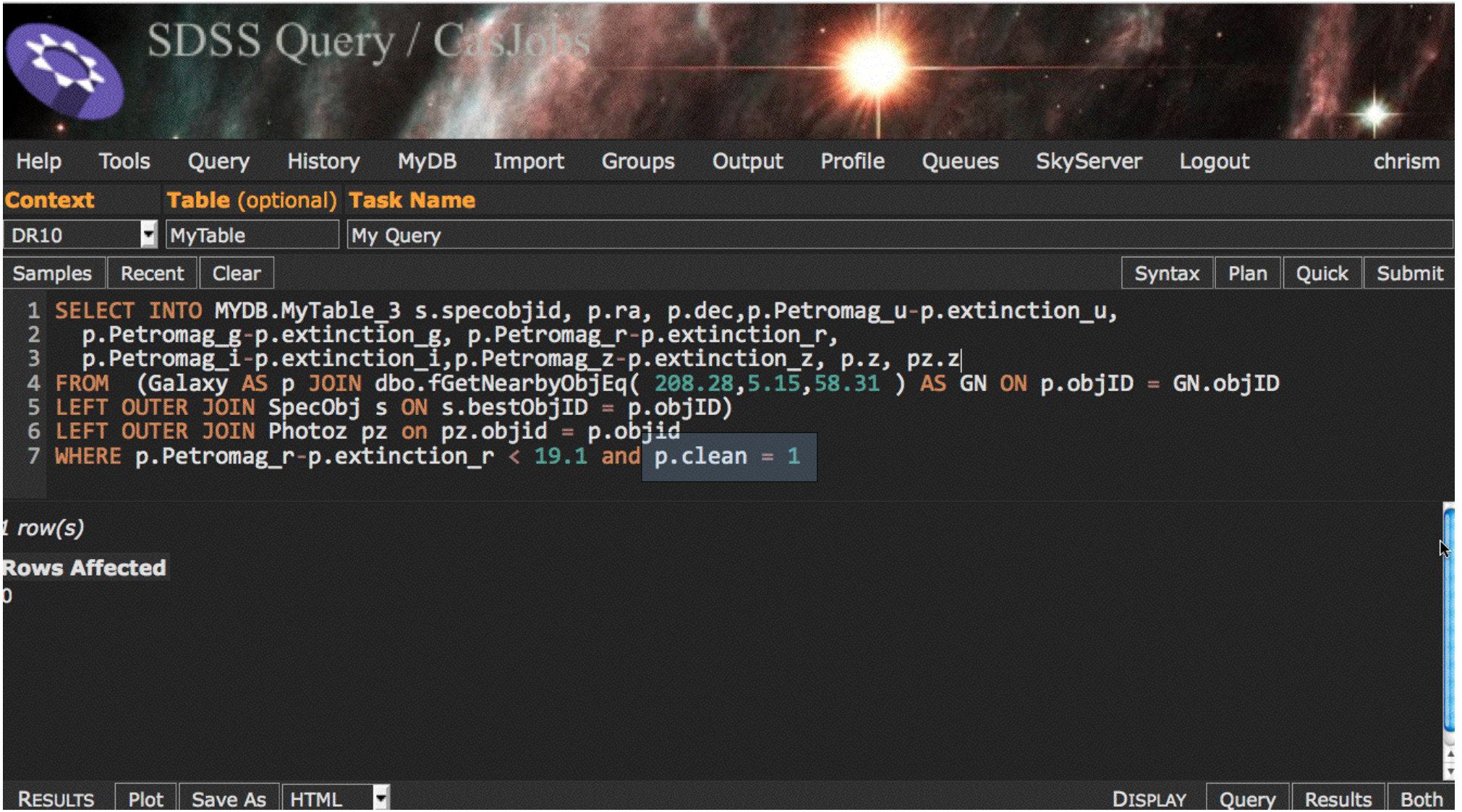


A left outer join: where all objects on the “left” are returned. There will be nulls.

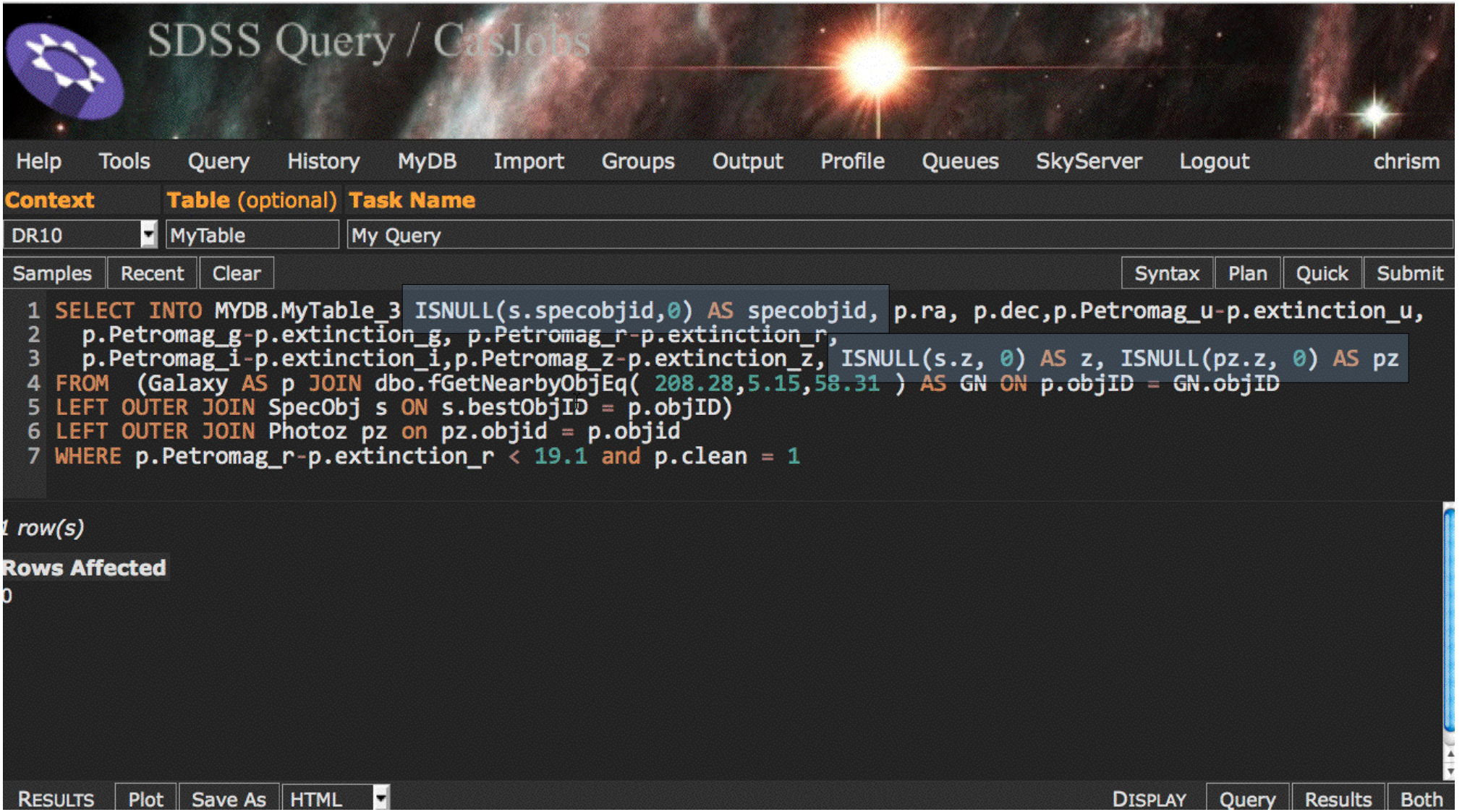
We use another left outer join (why?) against the photo-z table



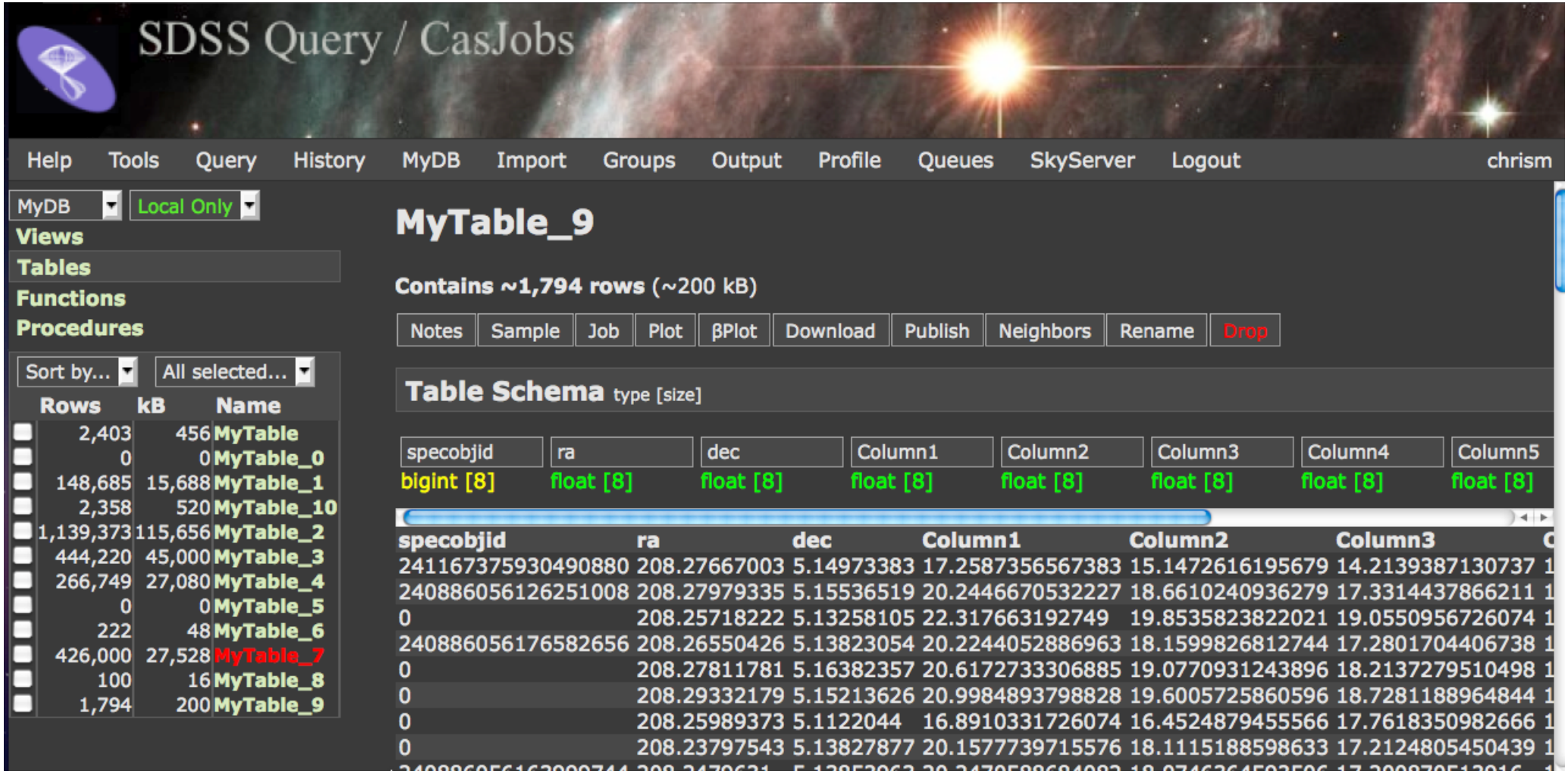
Add the constraints



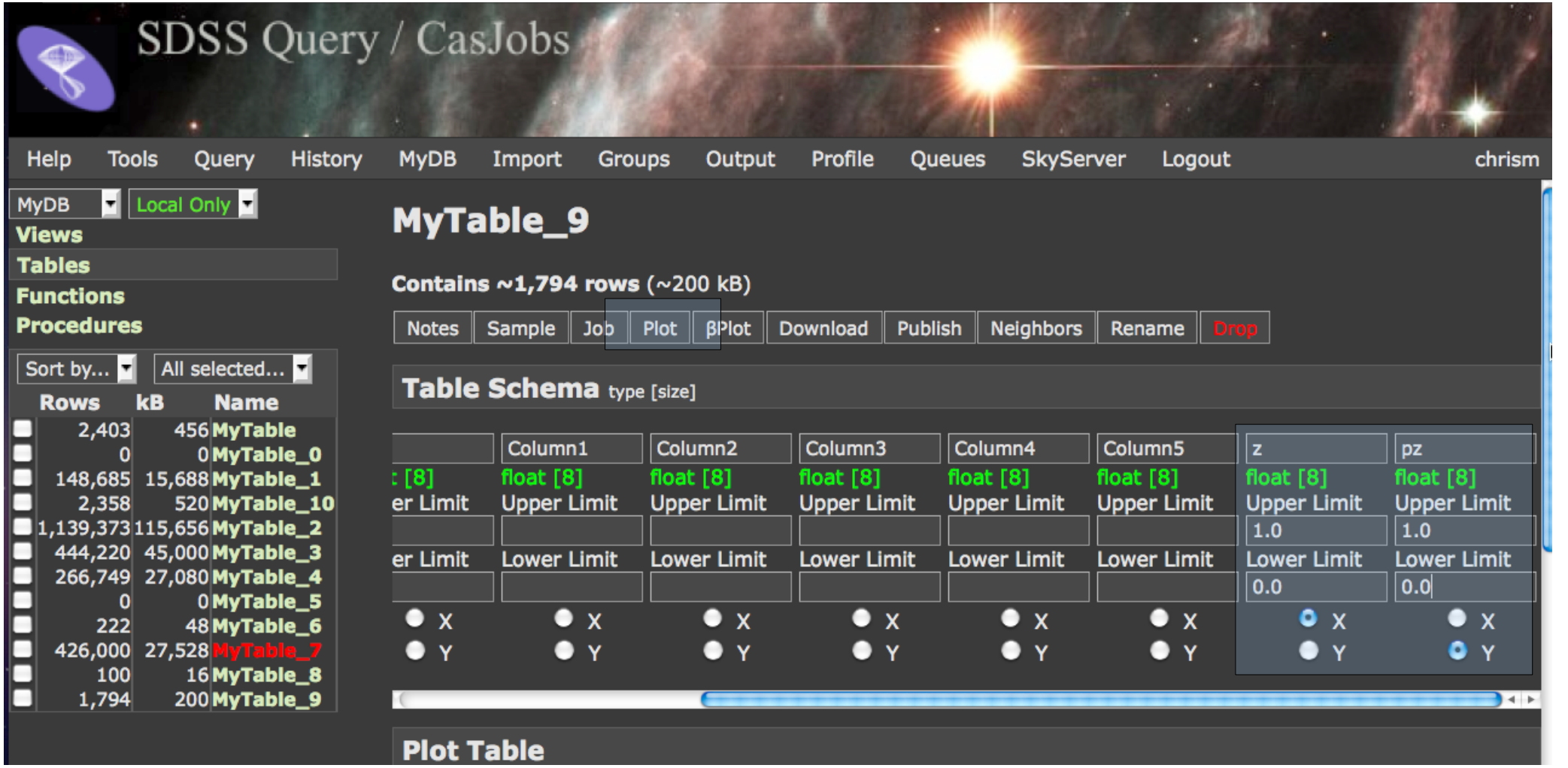
Clean up and replace NULLS



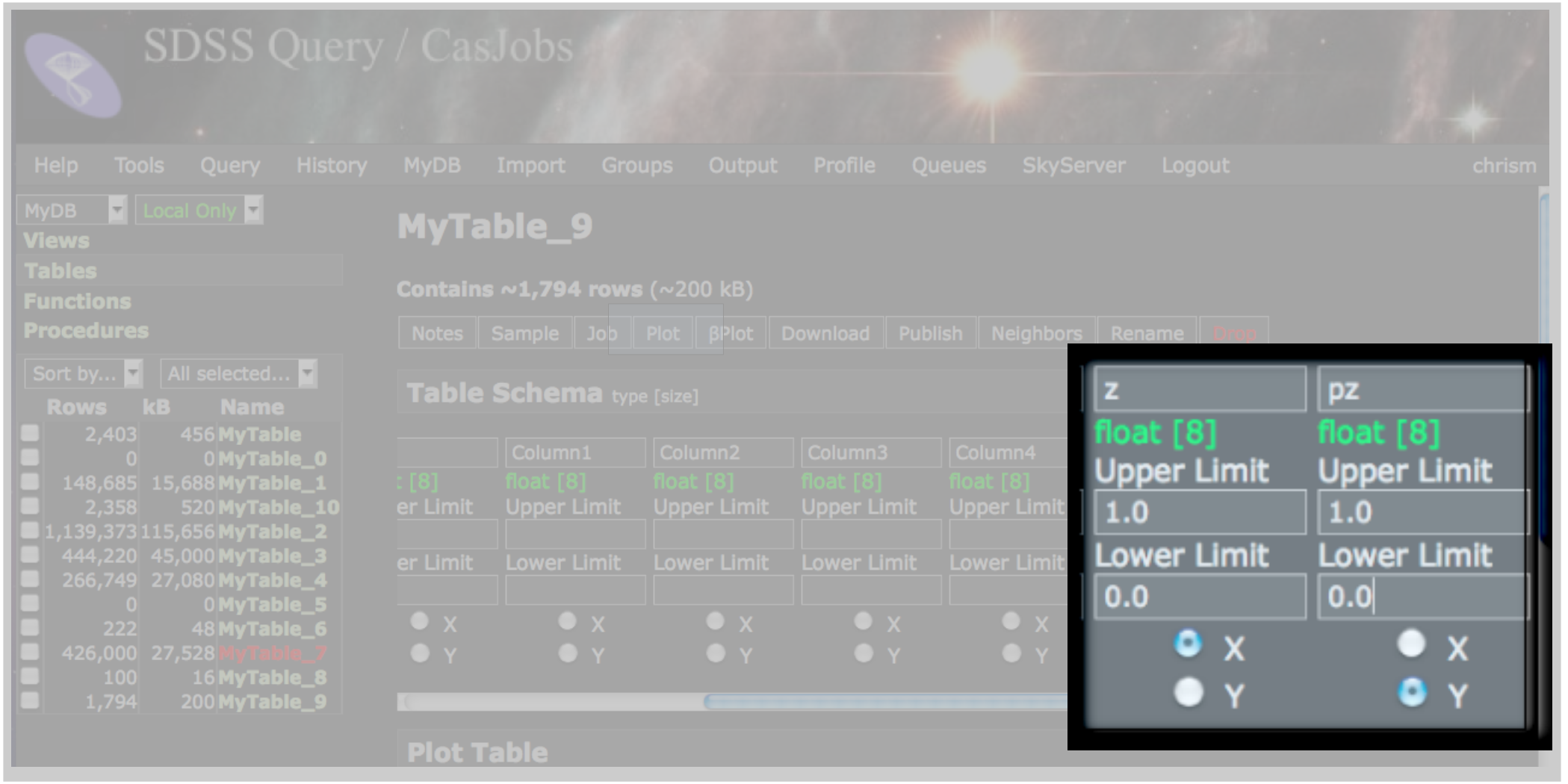
Execute and examine output



Plot your results



Plot your results



Plot your results