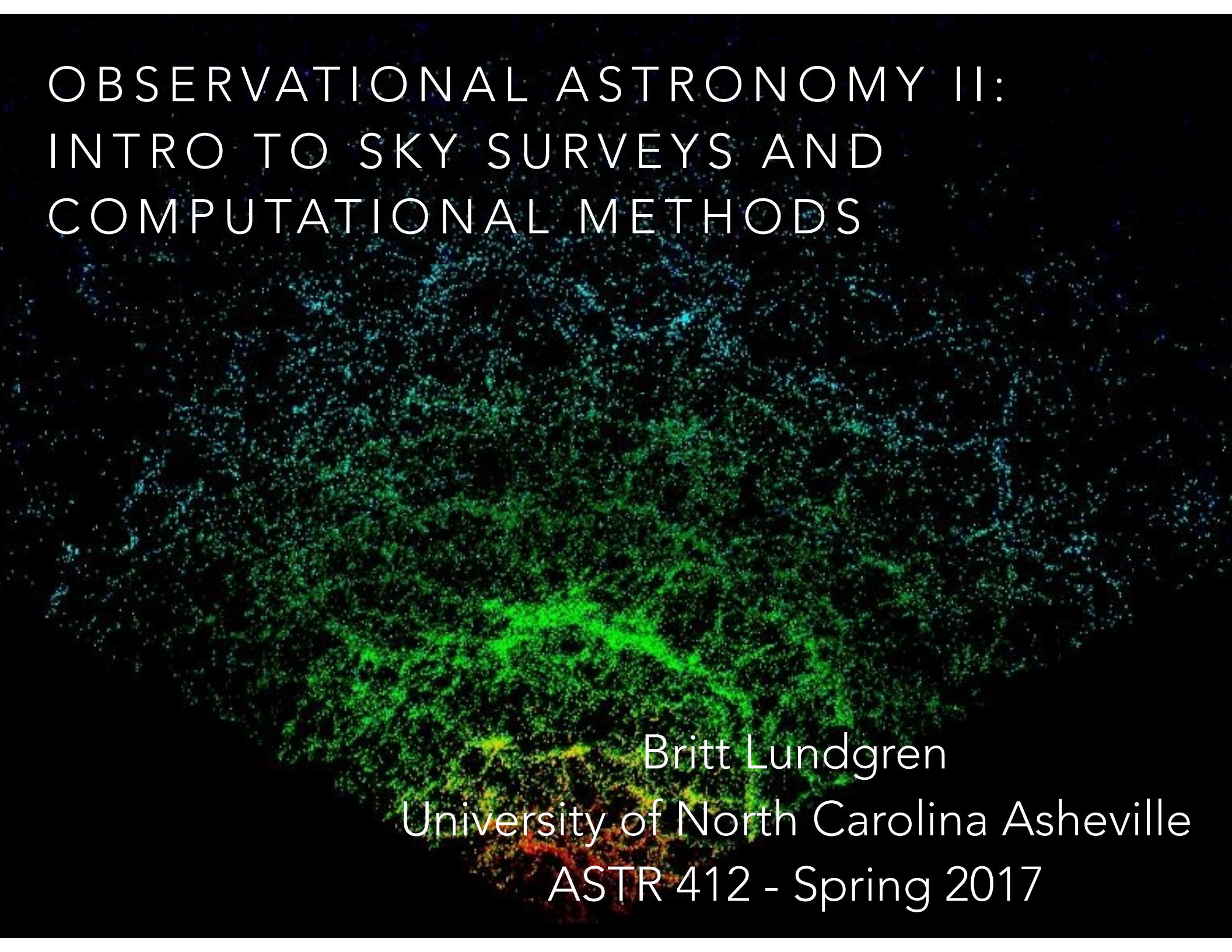
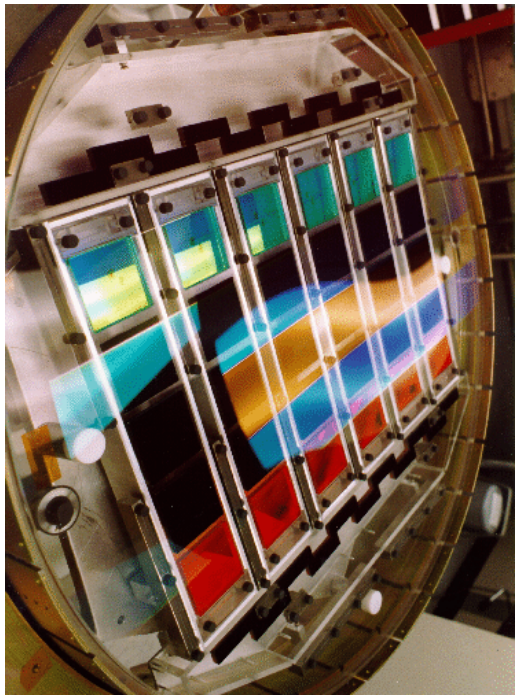
OBSERVATIONAL ASTRONOMY II: INTRO TO SKY SURVEYS AND COMPUTATIONAL METHODS



Britt Lundgren
University of North Carolina Asheville
ASTR 412 - Spring 2017

THE SLOAN DIGITAL SKY SURVEY (SDSS)

- Dedicated 2.5m telescope at Apache Point Observatory, NM
- 120 megapixel camera with 5 filters: u,g,r,i,z
- Multi-object spectrograph (640 fibers)
- 10-year survey to map 1/4 of the night sky
  - 10,000 square degrees
  - spectra of 930,000 galaxies, 106,000 quasars



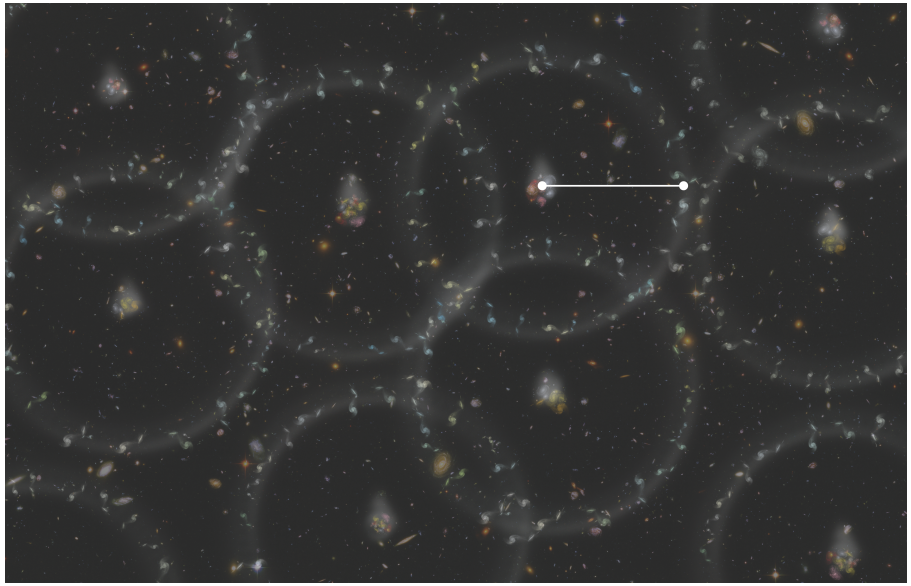
The Sloan Digital Sky Survey

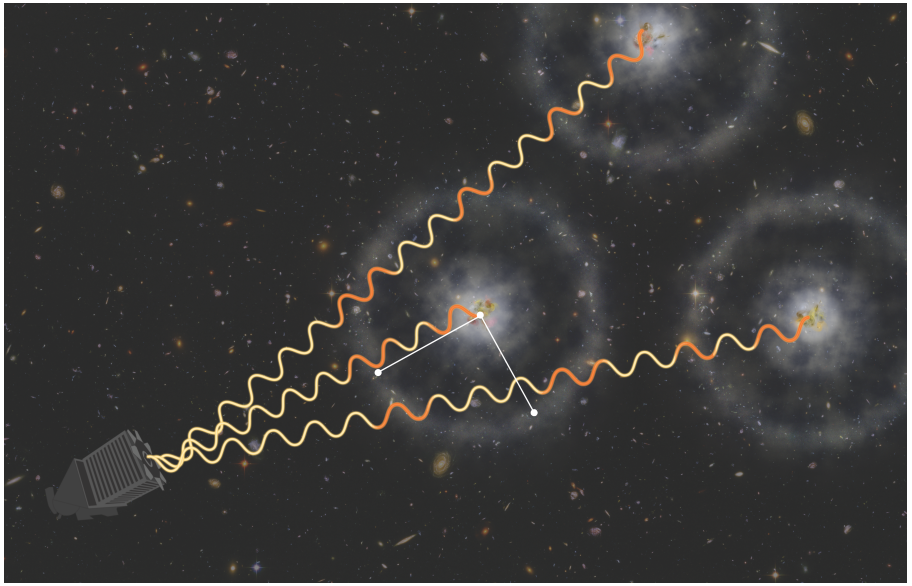
- SDSS-I/II (1999-2009):
  - Digital color imaging of 1/4 of the night sky,
  - Spectra for 1 Million nearby galaxies & 100,000 quasars

- SDSS-III/IV (2009-2018):
  - Spectra for more distant galaxies and quasars
  - The largest 3D map of the distant universe

THE SDSS-III BARYON OSCILLATION SPECTROSCOPIC SURVEY (BOSS)

- Successor to SDSS-I/II Survey (2009-2014)
- Upgrade to original multi-fiber spectrograph (640-> 1000 fibers, increased wavelength range & resolution)
- 5-year survey to measure the expansion history of the Universe using the clustering of galaxies, quasars, and intergalactic Hydrogen gas





SDSS Plug Plate Video

https://www.youtube.com/watch?v=iYyO7pGaJNw

SDSS-III/IV Baryon Oscillation Spectroscopic Survey

Every one of the 1000 fiber-optic cables on a plate is hand-plugged by observers at Apache Point, NM

In good-weather months, they need to plug more than 100 plates (>100,000 fibers!)

The SDSS at Night

https://www.youtube.com/watch?v=AHsS57NMQjE

A Flight through the Universe with the SDSS
https://www.youtube.com/watch?v=08LBlte PDZw

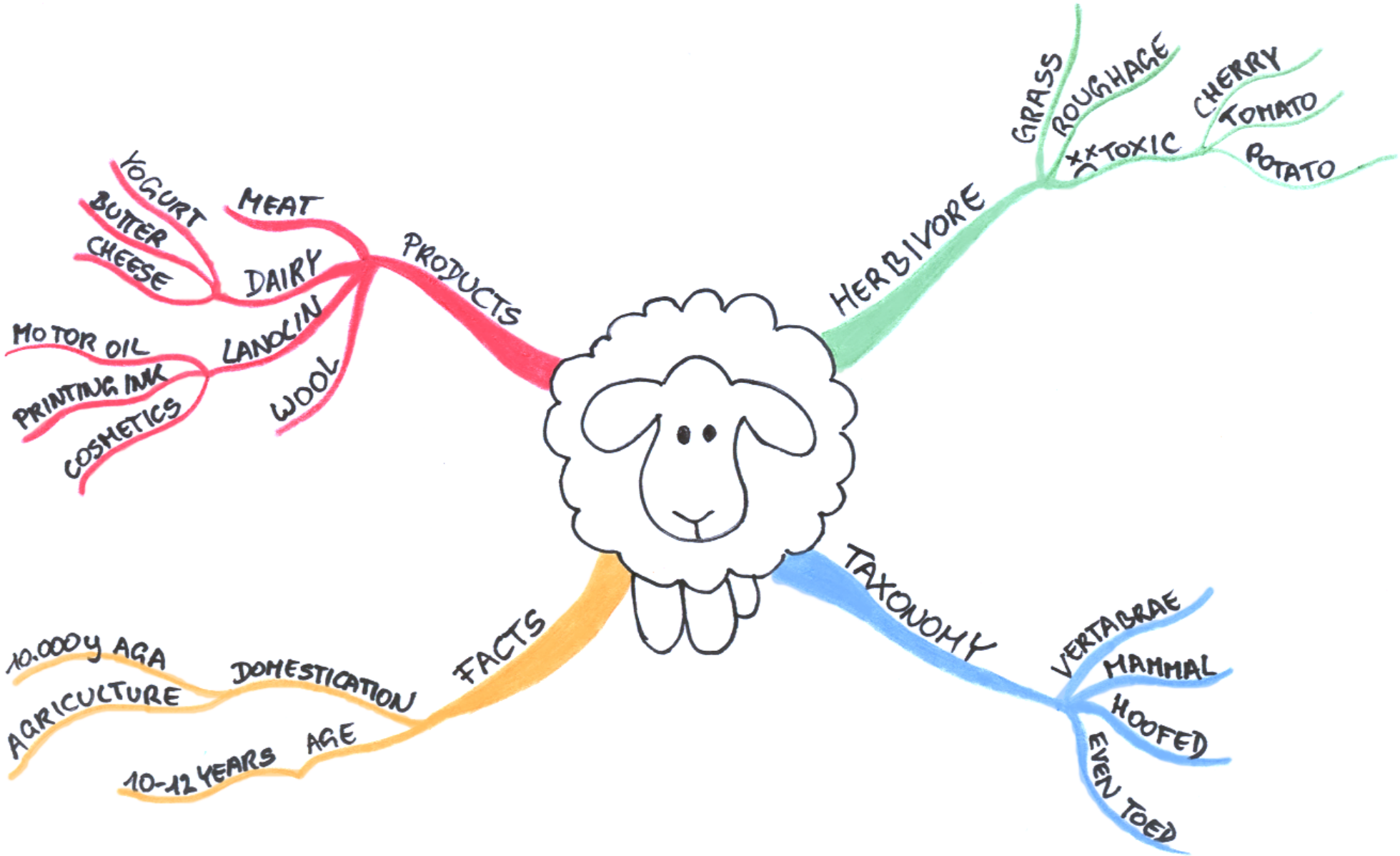
SLOAN DIGITAL SKY SURVEY-IV

- Ongoing survey in progress (2014-2020)

MILLIONS OF OBJECTS...
MULTIPLE PROJECTS AND
INSTRUMENTS...

WHERE TO START?

Mind Maps


PRODUCTS
MEAT
DAIRY
YOGURT
BUTTER
CHEESE
LANOLIN
MOTOR OIL
PRINTING INK
COSMETICS
WOOL
HERBIVORE
GRASS
ROUGHAGE
**TOXIC
CHERRY
TOMATO
POTATO
TAXONOMY
VERTABRAE
MAMMAL
HOOFED
EVEN TOED
FACTS
DOMESTICATION
10.000y AGA
AGRICULTURE
AGE
10-12 YEARS

MIND-MAPPING:
SURVEY PROJECTS & TIMELINE

Make & share, using:

https://coggle.it/

MIND-MAPPING:
SURVEY INSTRUMENTS & DATA

MIND-MAPPING:
WEBSITE & DATA ACCESS

SDSS

This is Data Release 13.

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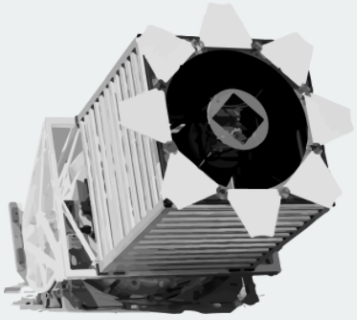
The Sloan Digital Sky Survey has created the most detailed three-dimensional maps of the Universe ever made, with deep multi-color images of one third of the sky, and spectra for more than three million astronomical objects. Learn and explore all phases and surveys—past, present, and future—of the SDSS.



EXPLORE OUR DATA

Go to Data Access

Current data: Data Release 13

News

SDSS Press Releases

The Sloan Digital Sky Survey: Working hard to improve inclusion in astronomy

January 5, 2017

SDSS Science Blog

Data Release 13

Data Release 13 (DR13) is the first data release of the fourth phase of the Sloan Digital Sky Survey (SDSS-IV). DR13 contains SDSS observations through July 2015.

DR13 includes the following:

- ☆ Optical spectra of galaxies and quasars from the SDSS component Baryon Oscillation Spectroscopic Survey (BOSS), as part of the Sloan Extended Quasar, ELG, and LRG Survey (SEQUELS)
- ☆ Newly reduced optical spectra of galaxies from the SDSS component Baryon Oscillation Spectroscopic Survey (BOSS)
- ☆ Newly reduced stellar infrared spectra from the SDSS component Apache Point Observatory Galaxy Evolution Experiment (APOGEE)
- ☆ Updated stellar abundance determinations for additional elements from the SDSS component Apache Point Observatory Galaxy Evolution Experiment (APOGEE)
- ☆ Data cubes from integral field unit (IFU) spectroscopic observations of nearby galaxies from the new component survey Mapping Nearby Galaxies at APO (MaNGA)
- ☆ Reprocessed imaging from the SDSS legacy survey

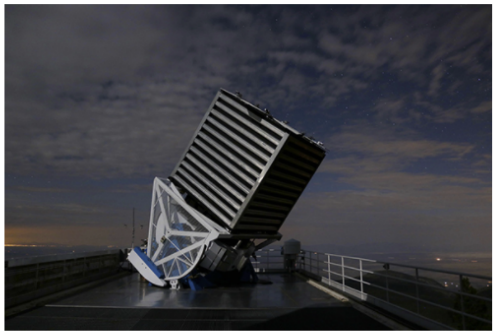
DR13 directly follows DR12. As always, SDSS data releases are cumulative, so DR13 includes all the sky coverage of prior releases. Data Release 12 is still available on this website (DR12), and prior data releases are available from www.sdss3.org (for DR8 through DR10) or classic.sdss.org (for DR1 through DR7).

DR13 Highlights

Data Access

What's New in DR13

Scope of DR13



The SDSS telescope at night

Image Credit: Patrick Galume

Tutorials Overview

Table of Contents

These pages provide detailed worked examples of SDSS data retrieval using the various interfaces provided. In addition, we provide discussions of how to access and read some of the unusual file types used in the survey, and perform certain operations, such as calibration.

Getting Started

- ☆ Get an image
- ☆ Get a spectrum

Getting Data for Individual Objects

- ☆ Get an image of a specific object
- ☆ Get a spectrum of a specific object
- ☆ Find out if SDSS's imaging data for an object are reliable
- ☆ Create a telescope finding chart

Searching for Data

- ☆ Find all objects in a given RA/Dec/Magnitude range
- ☆ Find images and spectra for all objects in a given RA/Dec/Magnitude range
- ☆ Get a random subset of the data
- ☆ Find closely paired objects
- ☆ Get spectra based on color constraints

MILLIONS OF OBJECTS… WHERE TO START?

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in the slowest way possible.

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Cross-match huge tables of data.

…

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skyserver.sdss.org

SLOAN DIGITAL SKY SURVEY

SkyServer DR13

Home | Data | Schema | Education | Astronomy | SDSS | Contact Us | Downlo

SciServer Altair Update 4

NEW: SciServer *Altair* Update 4 is now available! The update includes severa
SkyServer, and a new Python image with development tools in **SciServer Comput**

Welcome to the **DR13 site**!!!

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Navigate | Finding Chart
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Image List
Search
IQS | SQS | IRSQS
SQL Search
Cross-ID
CasJobs

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For Educators
Lesson Plans
College Lab Activities
Instructor Guides
Student/Public Research
Galaxy Zoo
Zooniverse
Voyages

Links

sdss.org
Data Release 13
Surveys | Instruments
SDSS Science
Science Archive Server
About Astronomy
About SkyServer
Credits

Help

Start Here | FAQ
Glossary
Algorithms
Cooking with Sloan
SQL Tutorial
About the Database
Schema Browser
Sample SQL Queries

DR13

|Home |Help |Tutorial |Chart |List |Explore |

Parameters

name		Resolve
ra	179.689293	deg
dec	-0.4543790	deg
opt		

Search

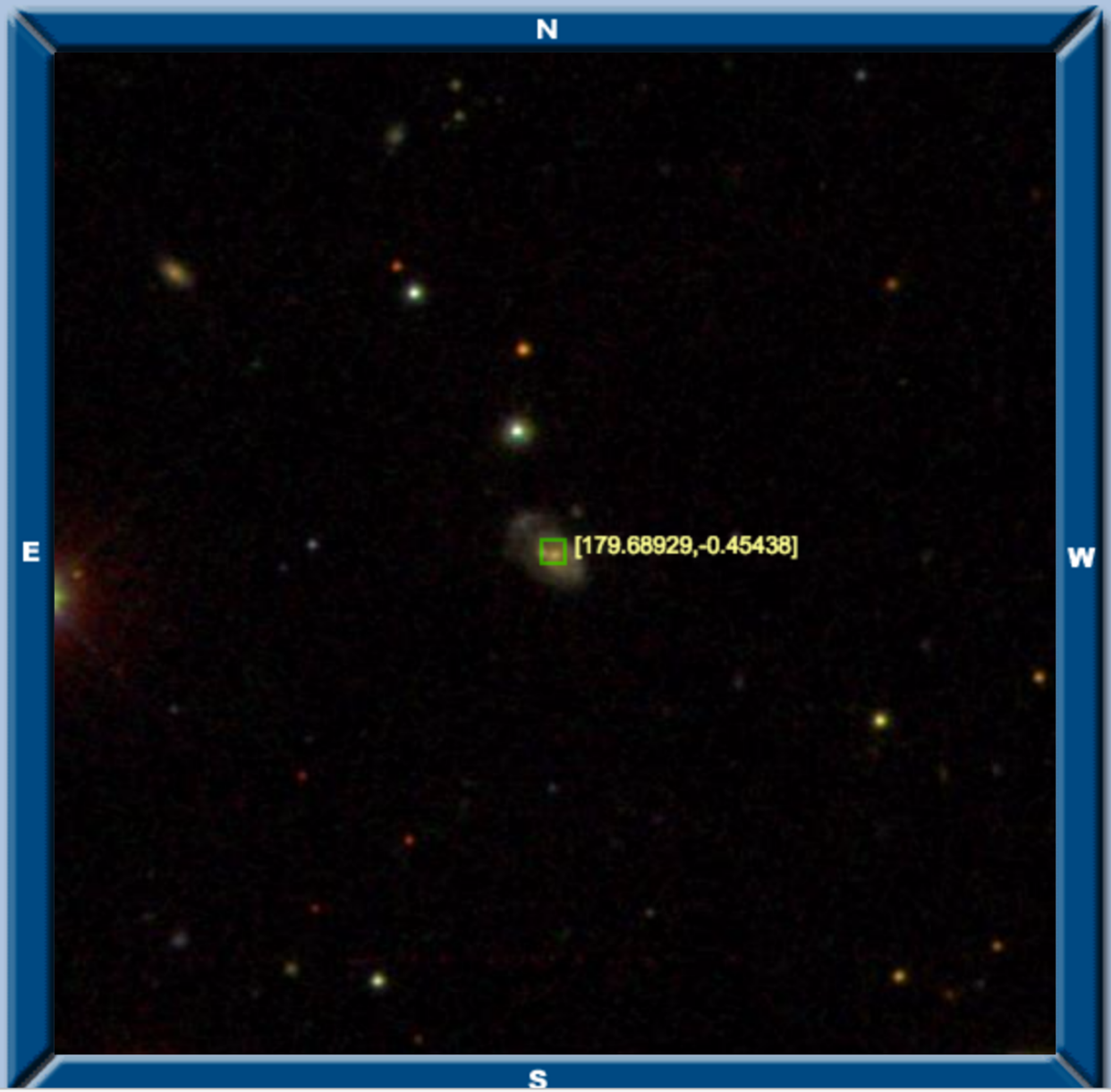
Drawing options

- Grid
- Label
- Photometric objects
- Objects with spectra
- Invert Image

Advanced options

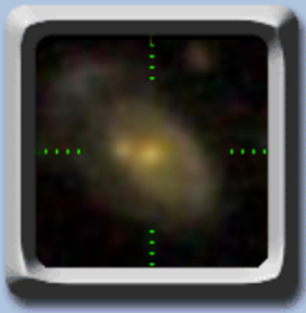
- APOGEE Spectra
- SDSS Outlines
- SDSS Bounding Boxes
- SDSS Fields
- SDSS Masks
- SDSS Plates

Select Image Source : SDSS 2MASS

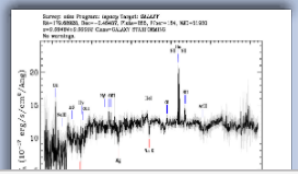


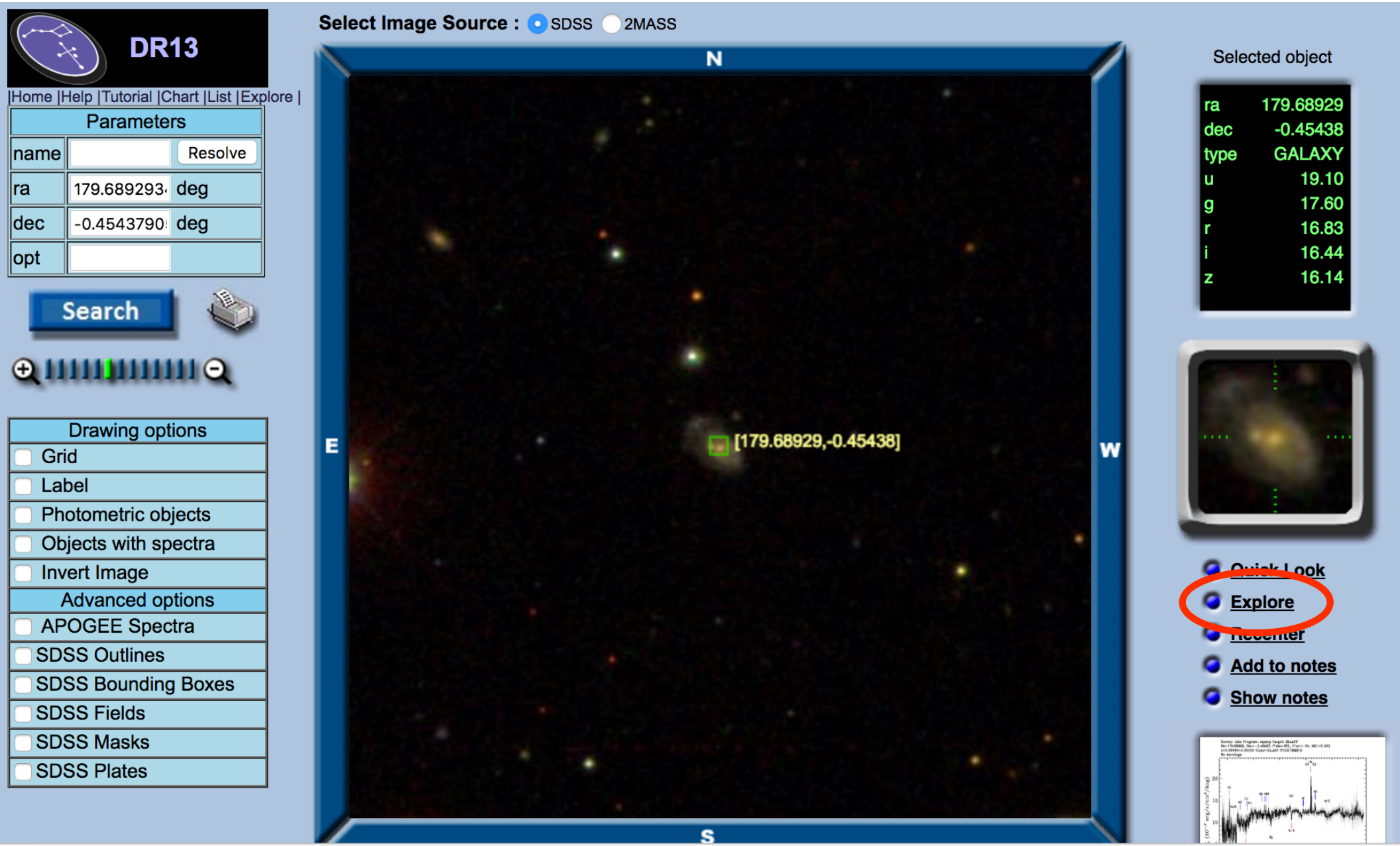
Selected object

ra	179.68929
dec	-0.45438
type	GALAXY
u	19.10
g	17.60
r	16.83
i	16.44
z	16.14



- Quick Look
- Explore
- Recenter
- Add to notes
- Show notes




DR13
|Home |Help |Tutorial |Chart |List |Explore |
Parameters
name
Resolve
ra
179.689293
deg
dec
-0.4543790
deg
opt
Search
Drawing options
Grid
Label
Photometric objects
Objects with spectra
Invert Image
Advanced options
APOGEE Spectra
SDSS Outlines
SDSS Bounding Boxes
SDSS Fields
SDSS Masks
SDSS Plates
Select Image Source : SDSS 2MASS
N
E
W
S
[179.68929,-0.45438]
Selected object
ra 179.68929
dec -0.45438
type GALAXY
u 19.10
g 17.60
r 16.83
i 16.44
z 16.14
Quick Look
Explore
Recenter
Add to notes
Show notes

SDSS J115845.43-002715.7

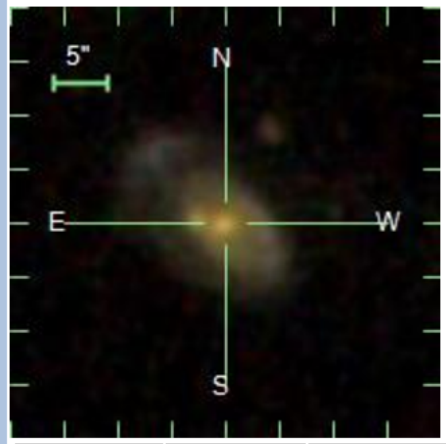
Look up common name

Type	run	rerun	camcol	field	obj	SDSS Object ID
GALAXY	756	301	2	427	14	1237648720693755918

RA, Dec		Galactic Coordinates (*l*, *b*)	
Decimal	Sexagesimal	*l*	*b*
179.689293428, -0.454379058	11:58:45.43, -00:27:15.76	276.131682383	59.647753983

Imaging

Flags	DEBLEND_DEGENERATE DEBLENDED_AT_EDGE STATIONARY BINNED1 INTERP COSMIC_RAY CHILD



Magnitudes				
u	g	r	i	z
19.10	17.60	16.83	16.44	16.14

Magnitude uncertainties				
err_u	err_g	err_r	err_i	err_z
0.04	0.01	0.01	0.01	0.01

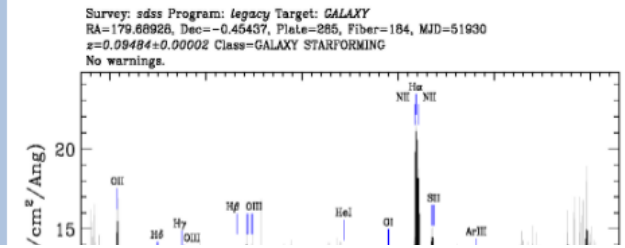
Image MJD	mode	Other observations	parentID	nChild	extinction_r	PetroRad_r (arcsec)
51259	PRIMARY	2	1237648720693755916	0	0.06	7.43 ± 0.418

Mjd-Date	photoZ (KD-tree method)	Galaxy Zoo 1 morphology
03/22/1999	0.090 ± 0.0211	Uncertain

Cross-identifications Show

Optical Spectra SpecObjID = 320932083365079040

Interactive spectrum Coming Soon



Spectrograph	SDSS
class	GALAXY
Redshift (z)	0.095
Redshift error	0.00002
Redshift flags	OK
survey	sdss
programname	legacy

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SkyServer DR13

Home | Data | Schema | Education | Astronomy | SDSS | Contact Us | Download | Site Search | Help | History NEW!

SciServer Altair Update 4

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SDSS is supported by

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Credits

Help

Start Here | FAQ
Glossary
Algorithms
Cooking with Sloan
SQL Tutorial
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Schema Browser
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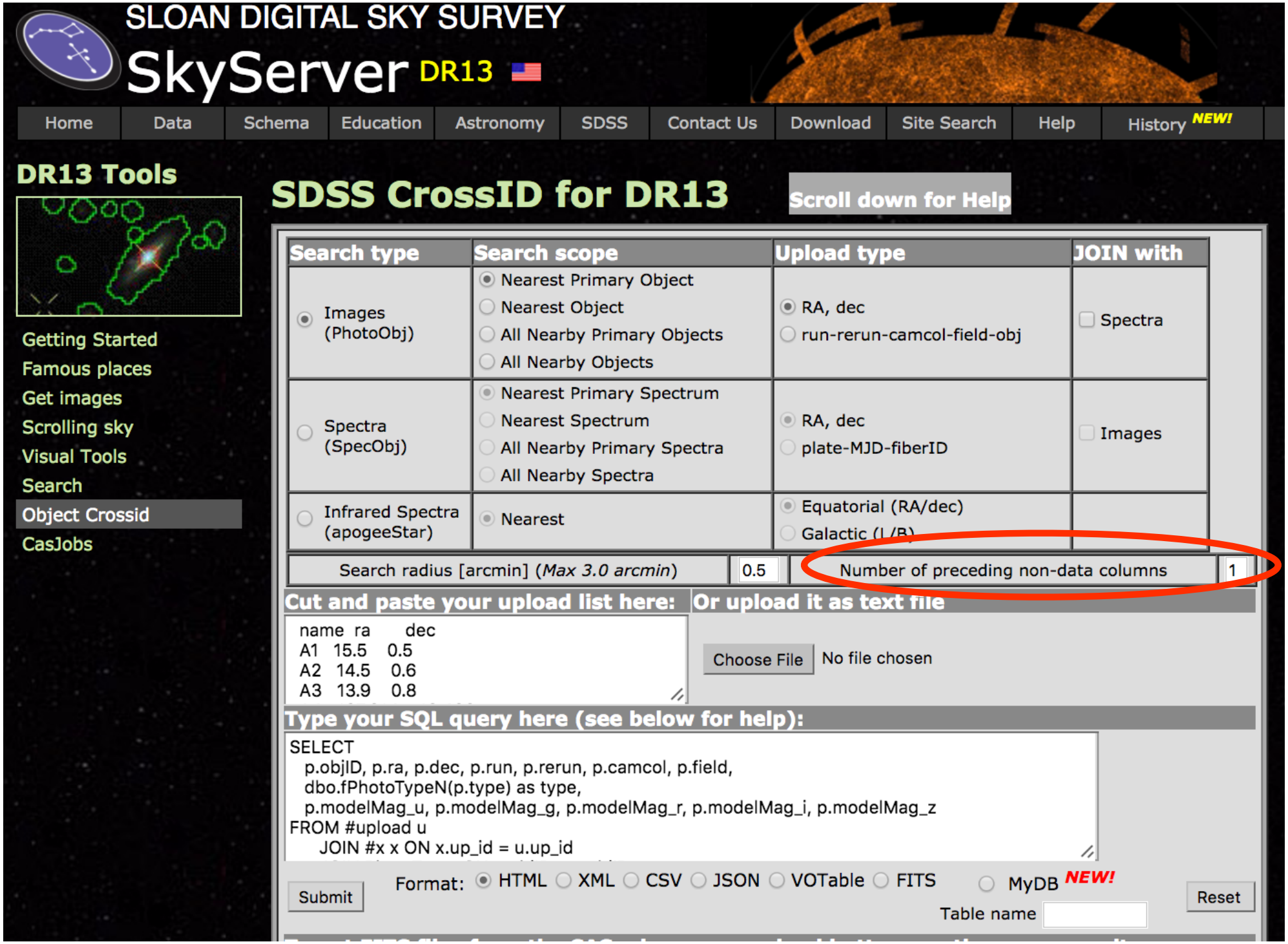
http://skyserver.sdss.org/dr13/en/tools/crossid/crossid.aspx



Your SQL command was:

```
CREATE TABLE #upload ( up_id int, up_name varchar(32), up_ra float, up_dec float )
INSERT INTO #upload values ( 1, 'A1', 15.5, 0.5),( 2, 'A2', 14.5, 0.6),( 3, 'A3', 13.9, 0.8),( 4, 'A4', 197.614, 18.438)
create table #x (up_id int,objID bigint)
INSERT INTO #x
SELECT up_id, dbo.fGetNearestObjIdEq(up_ra,up_dec,0.5) as objId
     FROM #upload WHERE dbo.fGetNearestObjIdEq(up_ra,up_dec,0.5) IS NOT NULL
SELECT u.up_name as [name],
   p.objID, p.ra, p.dec, p.run, p.rerun, p.camcol, p.field,
   dbo.fPhotoTypeN(p.type) as type,
   p.modelMag_u, p.modelMag_g, p.modelMag_r, p.modelMag_i, p.modelMag_z
FROM #upload u
      JOIN #x x ON x.up_id = u.up_id
      JOIN PhotoTag p ON p.objID = x.objID
ORDER BY x.up_id
```

Your query output (max 500,000 rows):

name	objID	ra	dec	run	rerun	camcol	field	type	modelMag_u	modelMag_g	modelMag_r	modelMag_i	modelMag_z
A1	1237663784741045437	15.5022412183639	0.493596074914063	4263	301	5	219	GALAXY	22.92439	23.19065	22.51986	21.62165	21.1054
A2	1237663784740586925	14.4988099940347	0.601315790471128	4263	301	5	212	GALAXY	24.90403	24.89659	22.37838	22.48927	20.94322
A3	1237663204920263075	13.8964276004192	0.799057884274859	4128	301	5	216	STAR	24.38976	22.77014	21.32578	20.29712	19.78329
A4	1237668296598749280	197.614455634642	18.438168849489	5314	301	1	136	GALAXY	16.51686	14.95543	14.0022	13.32461	13.13738

Use the button below to upload the results of the above query to the SAS and retrieve the corresponding FITS files:

Submit Upload list of fields to SAS

DR12 Science Archive Server (SAS)

SDSS-III | Home | Imaging | Optical Spectra | IR Spectra | Documentation

Bulk Imaging Search — Imaging

Names

m42
NGC 5866
arcturus

Submit

RA, Dec

228.66942|27.13082
228.75516 27.54503
228.60244,27.51250

Submit

Run, Camcol, Field

4263,5,219
4263,5,212
4128,5,216
5314,1,136

Submit

Names File Upload

Choose File No file chosen
Submit

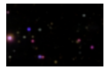
RA, Dec File Upload

Choose File No file chosen
Submit

Run, Camcol, Field File Upload

Choose File No file chosen
Submit

Clear Filters | Table as Comma-Delimited Text (CSV) | Filters to Download: u g r i z | Download FITS

Run	Camcol	Field	RA (degrees)	Dec (degrees)	All None Inverse	Open in CAS	Thumbnail
5314	1	136	197.68359	18.39144		CAS	
4263	5	212	14.44656	0.52313		CAS	
4128	5	216	13.92449	0.73438		CAS	
4263	5	219	15.49444	0.52314		CAS	

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SDSS SkyServer DR10 | CasJobs | Bulk Data Downloads - SD

www.sdss3.org/dr10/data_access/bulk.php

Apps NYT Facebook weather maps NASAads cosmocalc arXiv dr7QALs BOSS BOSSQALs 3DHST AUS

Search

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SDSS III

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Home Surveys Results Instruments Data Releases Education Collaboration Future Contact

What's New? Scope Data Access Imaging Optical Spectra IR Spectra Algorithms Software Help Tutorials

:: Overview
:: Available Tools
:: Value Added Catalogs
:: SDSS Supernovae
:: Bulk Downloads
:: Data Volume
:: System Status

Bulk Data Downloads

Introduction

All data can be downloaded directly from data.sdss3.org using the rsync or wget commands. See the Data Model for a description of the directory structure and file formats.

Note that the total SDSS-III data volume is ~70 TB; see the data volume table. If you need a substantial fraction of that data (>1 TB), please contact the helpdesk to arrange a custom data transfer. This will be faster for you and easier on our servers.

NOTE: all rsync commands on this page have `--dry-run` added to them, and all wget commands have `--spider` added to them. You have to remove those command line arguments for these commands to actually download data.

wget commands use the same URL as you would in a web browser, *e.g.*,

```
wget --spider http://data.sdss3.org/sas/dr10/sdss/spectro/redux/plates-dr10.fits
```

or for rsync drop the "sas" from the URL, *e.g.*,

```
rsync --dry-run -v rsync://data.sdss3.org/dr10/sdss/spectro/redux/plates-dr10.fits .
```

If you are having any difficulty with rsync URLs, check the notes below.

The number of rsync connections is throttled but the number of wget connections is not. Thus it is recommended to use wget to initially fetch the data, and use rsync only to confirm that the data you have is correct and complete.

The SAS website data.sdss3.org/sas/dr10 (US West Coast) is completely mirrored at mirror.sdss3.org/sas/dr10 (US East Coast). If you have difficulty connecting to data.sdss3.org, try mirror.sdss3.org instead. Also check the status page for outage announcements.

Globus Online

SDSS data are also available via Globus Online using the endpoint sdss3#orion (US East Coast). For large transfers, Globus is significantly faster than using wget or rsync. Globus Online requires a separate account, but once that is setup Globus offers a "fire-and-forget" transfer that automatically optimizes transfer settings, retries any failures, and emails you when your transfer is done. The Globus Connect tool allows you to use globus to download data to your laptop or other computers which are not permanent Globus endpoint servers.

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DR10 Tools

SQL Search

This page allows you to directly submit a SQL (Structured Query Language) query to the SDSS database server. You can modify the default query as you wish, or cut and paste a query from the SDSS Sample Queries page.

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.

Clear Query

```
-- This query does a table JOIN between the imaging (PhotoObj) and spectra
-- (SpecObj) tables and includes the necessary columns in the SELECT to upload
-- the results to the SAS (Science Archive Server) for FITS file retrieval.
SELECT TOP 10
   p.objid,p.ra,p.dec,p.u,p.g,p.r,p.i,p.z,
   p.run, p.rerun, p.camcol, p.field,
   s.specobjid, s.class, s.z as redshift,
   s.plate, s.mjd, s.fiberid
FROM PhotoObj AS p
  JOIN SpecObj AS s ON s.bestobjid = p.objid
WHERE
   p.u BETWEEN 0 AND 19.6
   AND g BETWEEN 0 AND 20
```

Submit | Check Syntax Only? | Output Format: (•) HTML ( ) XML ( ) CSV ( ) JSON ( ) VOTable ( ) FITS | 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 Searching for Data How-To tutorial. In particular, please read the Optimizing Queries section

SQL Tutorial

NOTE: This is a step-by-step tutorial for those new to SQL. If you already know some SQL and want a more in-depth introduction to how SQL applies to SkyServer, see **Using SQL with SkyServer**.

Another great way to learn SQL is to modify and submit queries that other people have already written. To jump right in to modifying queries written by scientists, see the **Sample SQL Queries.**

Searching for Data: A Tutorial

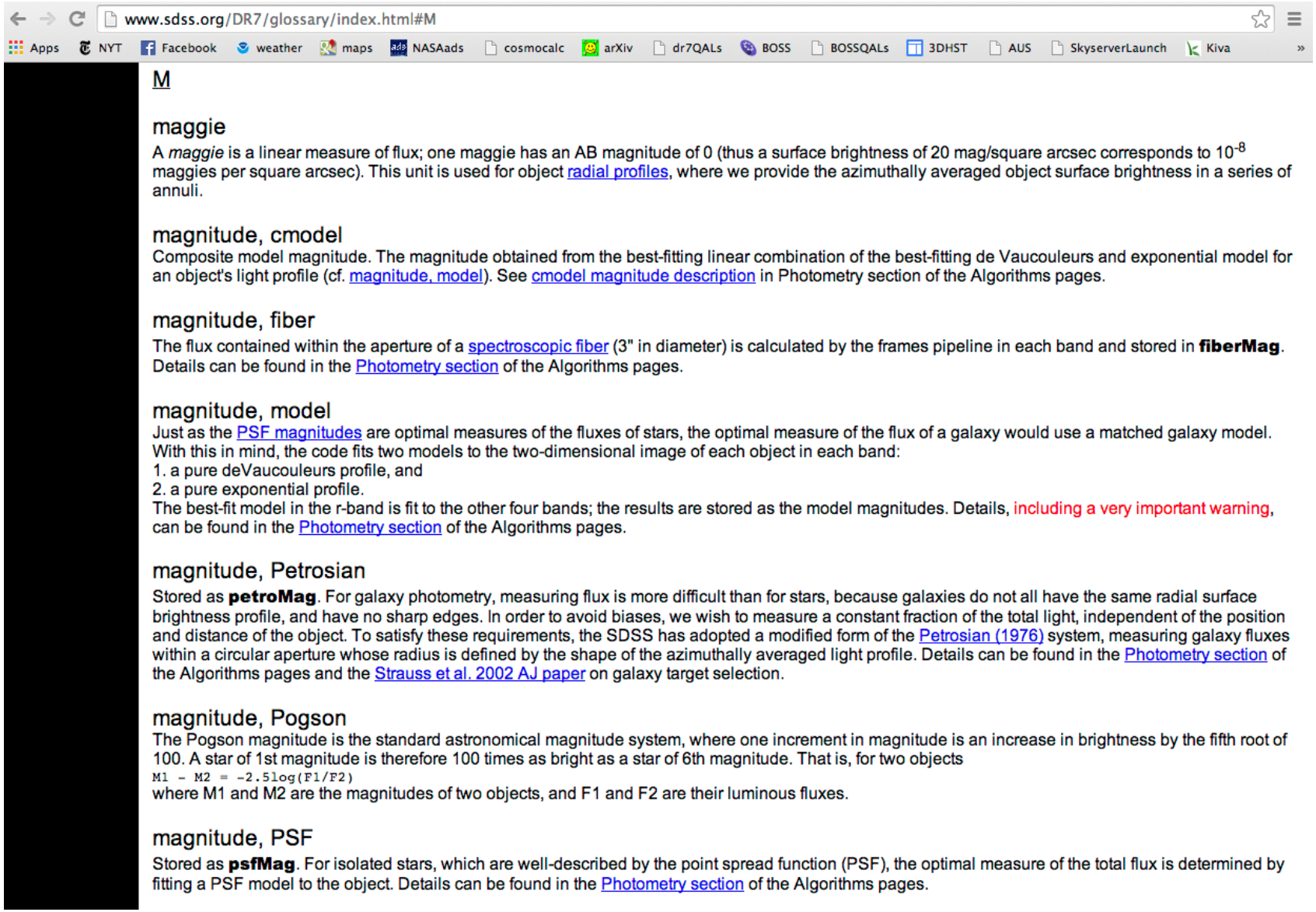
Did you know that you can search through SkyServer's database for only the objects you are interested in? For example, you might want to find all the bright blue galaxies for which we have obtained spectra. Looking through all 14 million objects with the Navigation tool could take years. But using **the right search**, you could find all the bright blue galaxies with spectra in seconds!

If you know how to retrieve the right data, you can ask millions of different questions. Searching SkyServer is an incredibly powerful tool for conducting astronomy research; in fact, many professional astronomers search the data in the same way you can.

In this tutorial, you will learn how to search SkyServer to answer many useful astronomical questions. Do the tutorial at your own pace, and use the links to the right to return to points later in the tutorial. As you work, you may also want to look at the **Sample Queries**, which are examples of real queries that other people have written to search the database.

Click Next to start learning.

A MAGNITUDE BY ANY OTHER NAME…



www.sdss.org/DR7/glossary/index.html#M

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M

maggie

A *maggie* is a linear measure of flux; one maggie has an AB magnitude of 0 (thus a surface brightness of 20 mag/square arcsec corresponds to 10^{-8} maggies per square arcsec). This unit is used for object radial profiles, where we provide the azimuthally averaged object surface brightness in a series of annuli.

magnitude, cmodel

Composite model magnitude. The magnitude obtained from the best-fitting linear combination of the best-fitting de Vaucouleurs and exponential model for an object's light profile (cf. magnitude, model). See cmodel magnitude description in Photometry section of the Algorithms pages.

magnitude, fiber

The flux contained within the aperture of a spectroscopic fiber (3" in diameter) is calculated by the frames pipeline in each band and stored in **fiberMag**. Details can be found in the Photometry section of the Algorithms pages.

magnitude, model

Just as the PSF magnitudes are optimal measures of the fluxes of stars, the optimal measure of the flux of a galaxy would use a matched galaxy model. With this in mind, the code fits two models to the two-dimensional image of each object in each band:
1. a pure deVaucouleurs profile, and
2. a pure exponential profile.

The best-fit model in the r-band is fit to the other four bands; the results are stored as the model magnitudes. Details, including a very important warning, can be found in the Photometry section of the Algorithms pages.

magnitude, Petrosian

Stored as **petroMag**. For galaxy photometry, measuring flux is more difficult than for stars, because galaxies do not all have the same radial surface brightness profile, and have no sharp edges. In order to avoid biases, we wish to measure a constant fraction of the total light, independent of the position and distance of the object. To satisfy these requirements, the SDSS has adopted a modified form of the Petrosian (1976) system, measuring galaxy fluxes within a circular aperture whose radius is defined by the shape of the azimuthally averaged light profile. Details can be found in the Photometry section of the Algorithms pages and the Strauss et al. 2002 AJ paper on galaxy target selection.

magnitude, Pogson

The Pogson magnitude is the standard astronomical magnitude system, where one increment in magnitude is an increase in brightness by the fifth root of 100. A star of 1st magnitude is therefore 100 times as bright as a star of 6th magnitude. That is, for two objects

$$M1 - M2 = -2.5\log(F1/F2)$$

where M1 and M2 are the magnitudes of two objects, and F1 and F2 are their luminous fluxes.

magnitude, PSF

Stored as **psfMag**. For isolated stars, which are well-described by the point spread function (PSF), the optimal measure of the total flux is determined by fitting a PSF model to the object. Details can be found in the Photometry section of the Algorithms pages.

CasJobs

casjobs.sdss.org/CasJobs/default.aspx

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SDSS Query / CasJobs

Help Tools Query History MyDB Import Groups Output Profile Queues SkyServer Logout blundgr2

News

Welcome to the **SDSS CasJobs site**. This is the CasJobs site for SDSS-I and SDSS-II, if you are looking for the **SDSS-III CasJobs site**, that is a separate (new) site at **http://skyserver.sdss3.org/casjobs/**.

As of January 29, 2009, this site has been upgraded to v3_5_16, which contains several bug fixes and changes since the previous upgrade (v3_5_15 on January 28, 2009).

To see the full list of changes in this version, please see the **Change Log**. Please send feedback to the SDSS Help Desk using the **Contact** link at the bottom of each page.

Accounts inactive for more than one year may be marked idle and detached, but will be restored upon request. Please contact the helpdesk **HERE** if you have trouble accessing your account

CasJobs is an online workbench for large scientific catalogs, designed to emulate and enhance local free-form query access in a web environment.

Some features of this application include...

- Both synchronous and asynchronous query execution, in the form of 'quick' and 'long' jobs.
- A query 'History' that records queries and their status.
- A server-side, personalized user database, called 'MyDB', enabling persistant table/function/procedure creation.
- Data sharing between users, via the 'Groups' mechanism.
- Data download, via MyDB table extraction, in various formats.
- Multiple interface options, including a browser client as well as a java-based command line tool.

The web interface for CasJobs is fully compatible with recent versions of the following browsers:

- Internet Explorer
- FireFox

CasJobs is partially compatible with recent versions of the following browsers:

- Mozilla
- Opera
- Safari

For more information, try the CasJobs **FAQ**, or **guide**. Or, to get started right away, either **login** or **create** an account.

Contact

$Name: v3_5_16 $,$Revision: 1.31 $, Last modified: Wednesday, November 28, 2007 at 12:44:47 PM

DR7 Help

Site News
Introduction
Cooking with Sloan
FAQ

Query Form Guide
SQL Tutorial
SQL in SkyServer
Sample SQL Queries
Query Limits
Searching Advice

Archive Intro
Table Descriptions
Schema Browser
Glossary
Algorithms
Web Browsers

Sample SQL Queries

The following is a selection of actual queries submitted by SDSS users, and some are in response to scientific questions posed by users. The queries are listed in increasing order of difficulty/complexity. Where applicable, query execution times for the latest SDSS data releases are noted.

NOTE: Please also read the **Optimizing Queries** and **Bookmark Lookup Bug** sections of the **SQL Intro page** to learn how to run faster queries, and the **Query Limits page** to see the timeouts and row limits on queries.

Click on the name of the query from the list below to go directly to that sample query. The queries are roughly in order of increasing complexity. You can cut and paste queries from here into your favorite search tool.

MILLIONS OF OBJECTS…
WHERE TO START?

I want to:

Download an image or spectrum for a single object…
in the slowest way possible.

Download an image or spectrum for a list of objects.

Find all (or the first x) objects with specific observable properties.

Find all objects near to a point in the sky with detections in the SDSS.

Cross-match huge tables of data.

…

Fixed Radius Search

This example shows how to do a fixed radius (same search radius for all objects) neighbors search and add extra columns to the result.

a) First, create a new table in your MYDB (select context MYDB and run a command like the following), in this example it is called **MyTable_34**, but you can call it whatever you want:

```
CREATE TABLE MyTable_34 (
 objid bigint,
 ra float,
 dec float,
 search_id int,
 matched_id bigint,
 z real
);
```

Note that this table includes the extra spec column "z". Add whatever spec columns you want to the end of this table.

b) Then get the neighbor query by running the neighbor search with your upload file and copying the query in the Query window. Paste that query in a new query buffer in context DR3. Then modify it as in the following example:

```
CREATE TABLE #UPLOAD(
 up_ra FLOAT,
 up_dec FLOAT,
 up_id int
)
INSERT INTO #UPLOAD
SELECT RA AS UP_RA,DEC AS UP_DEC,search_id AS UP_ID
FROM MYDB.MyTable_32

CREATE TABLE #tmp (
  up_id int,
  objid bigint
)

INSERT INTO #tmp
EXEC spgetneighbors 1
INSERT INTO MYDB.MyTable_34
select a.*,t.objid as matched_id, s.z from #tmp t, MYDB.MyTable_32 a,
specobj s
where t.up_id = a.search_id and s.bestobjid=t.objid
```

Note that the MyTable name has been manually set to MyTable_34, added "s.z" to the select list (again, add more columns here if you need), "specobj s" to the from, and "and s.bestobjid=t.objid" to the where. You need to run this query in the DR3 context using the Submit button (wont work with Quick).

Variable Radius Search

Here is a way to do a proximity search in casjobs on a list of ra,dec pairs with variable search radius. You should have an ra,dec table (called **xrayradii** in this example, but you can call it what you want). For spGetNeighborsRadius, you have to add another column up_rad to the #upload table. Your ra,dec MyDB table needs to have at least the columns that are in the first SELECT statement in b) below (*ra,dec,xrayradius* and *cluster* in this example). Note that this requires that *xrayradii.cluster* is an **int** id that identifies the cluster.

a) Create the table to hold the results:

```
CREATE TABLE MyTable_45 (
 ra float,
 dec float,
 rad float,
 cluster int,
 objid bigint,
);
```

b) Run the neighbors search for variable radius, saving results into table created in a):

```
CREATE TABLE #UPLOAD(
 up_ra FLOAT,
 up_dec FLOAT,
 up_rad FLOAT,
 up_id int
)
INSERT INTO #UPLOAD
SELECT ra AS UP_RA,
 dec AS UP_DEC,
 xrayradius as UP_RAD,
 cluster AS UP_ID
FROM MYDB.XrayRadii

CREATE TABLE #tmp (
  up_id int,
  objid bigint
)
INSERT INTO #tmp
EXEC spGetNeighborsRadius

INSERT INTO MYDB.MyTable_45
SELECT a.*, t.objid
FROM #tmp t, MYDB.XrayRadii a
WHERE
 t.up_id = a.cluster
```