

14.5: Wrapping It Up 14 - Map the Universe

Learning Objectives

- You will use galaxy survey data to explore some typical objects and a 3D map of the Universe.

In this activity you explore some typical objects as well as make a three-dimensional map of the Universe with actual data from the Sloan Digital Sky Survey.


14.5.1: Part I: The Coordinates and Distances of Galaxies in the SDSS

The SDSS database is hosted publicly online. Launch the [SkyServer](#). The menu on the left hand side of the webpage lists the types of searches we can do to pull information out of the database.

- Click on “Visual Tools” from the left hand navigation menu.
- At the very top of the left hand menu is a small row of links. Be sure to click on “Navigate”.
- In the “Parameters” box, enter a right ascension (RA) of 180 deg and a declination (DEC) of 0 degrees.
- In the “Drawing options” box select “Objects with spectra .”
- Click “Search.”

Now we can begin!

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Use your browser back button to return to the search page. Enter the following coordinates: RA: 130 deg, DEC: 11 deg. Again click the “Objects with spectra” check box and hit “Search.”

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We can make a three-dimensional map of galaxies by transforming their RA, DEC, and distance coordinates to familiar x , y , and z space.

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These calculations you just performed are just what astronomers do to make the incredible maps of large-scale structure. In this next section a computer program will take care of calculating the distances and (x, y, z) coordinates for 100 stars, galaxies, and quasars and plot them on an interactive data viewer.

14.5.2: Part II: Mapping the Galaxies

Play Activity

What you are looking at is the SDSS data viewer. It allows you to load a saved data file downloaded from the Sloan Digital Sky Survey database and allows you to view, rotate, and zoom around positions of galaxies and other distant objects. Earth is located at the intersection of the three axes. A simulated dataset has already been provided for you.

- To rotate your view of the data, click on the axes and drag them around.
- To read the distances to objects (in Mpc), click “3D Cursor” and adjust the sliders.

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