

Workshop 1: Downloading a simulated galaxy catalog and visualizing the data

SIDES is a simulation of the extragalactic sky performed by Bethermin, et al. The catalog simulate a square region of the sky of 1.4 deg x1.4 deg, covering a redshift from 0 to 10. In this workshop we will download and explore this simulated catalog of galaxies. From this catalog we will select two sub-samples of galaxies and work with them.

1. Download the catalog and the readme from <http://cesam.lam.fr/sides/index/download>.
2. The catalog contains the coordinates (RA, Dec, z) and physical properties of 1,489,628 galaxies. Read the readme to see which column contain which information. Open the file (this is a fits table) and read some columns.
3. Read the the redshift, ra, dec and Mhalo columns, and only select galaxies at redshift between 1 and 1.5. How many galaxies are in this redshift range? For the rest of the activity we will only use this subsample of galaxies.
4. Now, we will create two different catalogs: One of them containing the more massive galaxies, and the other the less massive galaxies. The first one will contain galaxies with mhalo between $1.3e12$ and $8e12$ Msun, and the second one will contain galaxies with mhalo between $1e11$ and $1.12e11$ Msun. How many galaxies contain each catalog?
5. Compute the median mhalo for each catalog?
6. Make a plot showing the redshift distribution for both catalogs (histogram). Are they similar?
7. Make a log-log plot showing the mass distribution for both catalogs (histogram). Choose the binning that you consider more convenient. Are they similar?
8. Save the positions ra, dec of galaxies for both catalogs in two separated files (call them high.dat and low.dat).
9. Make a plot of the sky distribution of galaxies for both catalogs (ra vs dec). How are they distributed over the sky? what is the maximum and minimum values for ra and dec?
10. Do you see clear differences in the distribution of galaxies (just by eye)?