

ASTR 400B: Homework 3

Due on Feb 6, 2020

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2. Mass Breakdown

This is raw output from `pandas.DataFrame.to_latex()`, with rows sorted alphabetically:

Galaxy Name	Halo Mass	Disk Mass	Bulge Mass	Total	f_bar
M31	1.921	0.120	0.019	2.060	0.068
M33	0.187	0.009	0.000	0.196	0.047
MW	1.975	0.075	0.010	2.060	0.041
All	4.082	0.204	0.029	4.316	0.054

With a bit of manual formatting:

Galaxy Name	Halo Mass ($M_{\odot} \times 10^{12}$)	Disk Mass ($M_{\odot} \times 10^{12}$)	Bulge Mass ($M_{\odot} \times 10^{12}$)	Total ($M_{\odot} \times 10^{12}$)	f_bar
MW	1.975	0.075	0.010	2.060	0.041
M31	1.921	0.120	0.019	2.060	0.068
M33	0.187	0.009	0.000	0.196	0.047
Local Group	4.082	0.204	0.029	4.316	0.054

3. Questions

1. Total mass: M31 and the MW have the same total mass in this simulation. Dark matter in the halo dominates in most cases, but especially for the MW.

2. Stellar mass: Disk + bulge mass is about 60% higher for M31 than the MW. Assuming a roughly similar distribution of star types and ages, M31 is likely to be more luminous.

3. Dark matter mass:

4. Baryon fraction: