ASTR400B HW3 Table

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1 Table

Galaxy Name	Halo Mass [10^{12} $M_\odot$]	Disk Mass [10^{12} $M_\odot$]	Bulge Mass [10^{12} $M_\odot$]	Total [10^{12} $M_\odot$]	f_{bar}
MW	1.975	0.075	0.010	2.060	0.041
M31	1.921	0.120	0.019	2.060	0.067
M33	0.187	0.009	N/A	0.196	0.046
Local Group				4.316	0.054

2 Questions

1. Total mass of MW and M31 is the same. DM halo dominates this total mass.

2. Stellar mass of M31 is larger (1.6 times). M31 more luminous.

3. DM mass of M31 is 1.028 times the DM mass of MW. Naively, one would expect a linear correlation between the DM mass and stellar mass, so would expect M31 DM mass to be 1.6 times MW. But in reality, the relationship is non-linear and can have a scatter.

4. MW is 0.041, M31 is 0.067 and M33 is 0.046. The baryon fraction of the universe is more than twice the baryon fraction of the galaxies. There might be baryons elsewhere in the universe, like the IGM.