ASTR 400B: HOMEWORK 3

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GALAXY MASS TABLE

Galaxy Name	Halo Mass ($10^{12} M_\odot$)	Disk Mass ($10^{12} M_\odot$)	Bulge Mass ($10^{12} M_\odot$)	Total Mass ($10^{12} M_\odot$)	f_{bar}
Milky Way	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	0.000	0.196	0.046
Local Group				4.316	0.054

Table 1: Total mass information of the galaxies in the local group at the snapshot 0.

QUESTIONS

1. **The total masses of the Milky Way and the M31 galaxy are almost the same. For both the galaxies, the dark matter halo masses dominates these total masses.**
2. **The stellar mass of the M31 galaxy is 1.634 times greater than that of the Milky Way. Thus, we expect the M31 galaxy to be more luminous.**
3. **The dark matter mass of the Milky Way is 1.028 times greater than that of the M31 galaxy. It is not surprising at all since they both have the same total mass, but the M31 galaxy's stellar mass is greater compared to that of the Milky Way. Thus, the dark matter mass of the Milky Way must be greater compared to that of the M31 galaxy.**
4. **The ratios of stellar mass to total mass (the Baryon fraction) of each galaxies is given in Table 1. The given Baryon fraction (0.16) of the entire Universe is much higher than the Baryon fraction computed for any of the galaxy. These difference may come from the fact that much of the Baryon mass is in the form of intergalactic gas. Thus, when only computing the Baryon fraction of a particular galaxy, it is lower than the cosmic Baryon fraction.**