GalaxyMass Table for HW3

by farah fauzi

February 2020

1 Local Group Galaxies Mass

Local Group Galaxy					
Galaxy Name	Halo Mass ($10^{12} M_{sun}$)	Disk Mass ($10^{12} M_{sun}$)	Bulge Mass ($10^{12} M_{sun}$)	Total Mass of Galaxy ($10^{12} M_{sun}$)	f_{bar}
Milky Way	1.975	0.075	0.010	2.060	0.041
Andromeda	1.921	0.120	0.019	2.060	0.067
Triangulum	0.187	0.009	0.000	0.196	0.046
Total	4.083	0.204	0.029	4.316	—

Table 1: Mass of Galaxies in Local Group.

2 Answers to Questions

1. The total mass of MW and M31 is 2.06*1e12*Msun, which is equal to each other. The Halo dominates the mass.

2. Stellar mass of M31 is more than the MW. I expect M31 to be more luminous since it has more stellar mass.

3. The total dark matter mass is almost the same for both M31 and MW. Yes, this is surprising.

4. Baryon fraction is the amount of hydrogen in the stars and galaxies. The ratio compute for each galaxy has a higher percentage compared to the Universe's ratio of 16 percent. The baryon fraction calculated for these galaxies does not account for the dark matter and dark energy that is in the Universe. Also, the baryon fraction for galaxy is much higher than the fraction for clusters because of the other contribution like X-Ray measurement to the mass.