400B Mass Table and Questions

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Mass Break Down of the local group						
Galaxy Name	Halo Mass $10^{12} M_{\odot}$	Disk Mass $10^{12} M_{\odot}$	Bulge Mass $10^{12} M_{\odot}$	Total Mass $10^{12} M_{\odot}$	Stellar Mass Fraction	Local Group Total Mass $10^{12} M_{\odot}$
MW	1.97	0.075	0.01	2.06	0.041	-
M31	1.92	0.12	0.019	2.06	0.068	-
M33	0.187	0.0093	none	0.196	0.047	-
LG Total Mass $10^{12} M_{\odot}$	-	-	-	-	-	4.315

1 Questions

1. In this simulation, the total masses of the Milky Way (MW) and M31 are approximately the same, sitting at 2.06*$10^{12} M_{\odot}$. The Halo is the dominant component in the total mass.

2. One can see that M31 has a greater stellar mass than MW, in both the bulge and disk portions of the galaxy. Thus M31 will have a greater luminosity, as it has more massive stars which dominate galaxy luminosity.

3. Although it has a lower stellar mass, MW has the larger total dark matter mass. This is surprising, as I expected M31 to have a higher dark matter mass to pair with its higher stellar mass.

4. The baryon fractions for MW, M31, and M33 are 4.1%, 6.8% and 4.7%, respectively. They are approximately the same for each galaxy and much smaller than the baryon fraction of the universe of 16%. These fractions may be different because the baryon fraction of the universe includes all of the mass in the intergalactic medium. That is, the baryon fraction of the universe includes all the gas sitting between galaxies.