Paarth Parab
ASTR 400B

Homework 3 (Problem 4 Questions)
(Next page is my table)

1.

From this simulation the mass of the Milky Way (MW) and Andromeda (M31) are the same. It is the total Halo Mass for each galaxy that dominates the total mass. Around 95% for each of the galaxies.

2.

The stellar mass of Andromeda is more than that of the Milky Way and I would expect Andromeda to be more luminous.

3.

The Milky Way has more Dark Matter mass compared to M31 as a ratio of 1.03. (Doing 1.975/1.921). This is not too surprising when we know the total mass for each galaxy, but the ratio is still interesting as Andromeda is much more luminous but also is close to the same Dark Matter mass.

4.

For the Milky Way the Baryon Fraction is 0.041, Andromeda is 0.067, and M33 is 0.046. About 5% is for each of these, so about 1/3 of the 16% for the universe ratio. The ratio differs due to the galaxies not having a higher Disk Mass, relative to the rest of the Universe these galaxies just have much less Disk Mass, could be just that the disks of these galaxies are thin.

Galaxy name Units	Halo Mass 10^12Msun	Disk Mass 10^12Msun	Bulge Mass 10^12Msun	Total mass 10^12Msun	fbar
Milky Way	1.975	0.075	0.01	2.06	0.0412621
M31	1.921	0.12	0.019	2.06	0.0674757
M33	0.187	0.009	0	0.196	0.0459184
Local Group	4.083	0.204	0.029	4.316	0.0539852