ASTR400B HW3

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1 Table

Mass Breakdown for Local Group					
Galaxy Name	Halo Mass $[10^{12}\ M_\odot]$	Disk Mass $[10^{12}\ M_\odot]$	Bulge Mass $[10^{12}\ M_\odot]$	Total Mass $[10^{12}\ M_\odot]$	f_{bar}
Milky Way	1.975	0.075	0.010	2.06	0.041
M31	1.921	0.041	0.019	2.06	0.067
M33	0.187	0.009	0	0.196	0.046
Local Group	4.083	0.125	0.029	4.237	0.036

2 Questions

1. The Milky Way and M31 are the same, but the distribution is slightly different. For each, dark matter is by far the largest component.

2. M31 had more stellar mass than the Milky Way. This implies that there would be more stare in M31, so we should expect M31 to be brighter that the Milky Way.

3. The Milky Way has roughly 1.02 times more dark matter than M31, means that the f_{bar} is larger for M31. This makes since we assumed that the have the same total mass, so that mass would have to be in the stellar mass.

4. I found that the simulation uses a a baryonic ratio of 3.6%, which is significantly less than 16%. There could be several reasons why this my be true:

   - Our values in the simulation are wrong. This would mean that we overestimated the percent of dark matter in the galaxies. This might be from trying to make things computationally faster.
   - The Universe's Baryon fraction is wrong. This could come from observational bias towards baryonic matter.