# Questions

1) The total masses of the Milky Way and M31 are equal with halo dark matter dominating the mass budget.
2) The stellar mass of M31 is an order of magnitude larger than that of the Milky Way therefore M31 should be more luminous.
3) The halo dark matter masses are close to equal between the two galaxies. I don't find it surprising since the stellar mass makes up only a few percent of the total mass of a galaxy, a factor of a few might not have a huge effect on the large scale dynamics of the galaxies.
4) The baryon fraction is only a few percent (4-7%) of the total mass of each galaxy which is much lower than the universal 16%. More mass may be present in the intergalactic medium or elliptical galaxies with low dark matter content.

| Galaxy Name | Halo Mass(1e12 Msun) | Disk Mass(1e12Msun) | Bulge Mass(1e12 Msun) | Total(1e12 Msun) | Baryon Fraction |
|---|---|---|---|---|---|
| Milky Way | 1.974925 | 0.075 | 0.010005 | 2.05993 | 0.0413 |
| M31 | 1.92088 | 0.12 | 0.01905 | 2.05993 | 0.0675 |
| M33 | 0.186613 | 0.0093 | 0.0 | 0.195913 | 0.0475 |
| Local Group | 0 | 0 | 0 | 4.315773 | 0.0541 |