- 1. MW and M31 have the same total mass and very similar mass components. The largest and smallest components are also the same. MW and M31 have their total masses dominated by the halo component of their galaxies.
- 2. M31 has a larger stellar mass (i.e. has a larger mass sum of the disk and bulge components). Since the stellar mass of M31 is larger, I would expect it to also be more luminous.
- 3. If the total mass of MW and M31 is the same, but M31 has a larger stellar mass, it is necessary that MW have a greater dark matter mass. Though the difference is only about two and a half percent of the mass ratio.
- 4. MW is 4.1% baryonic mass, M31 is 6.7% baryonic mass, and M33 is 4.6% baryonic mass. All of these ratios are lower than the given universal baryonic mass fraction of 16%. As stated in the question, there is very little mass from gas within the disks of these galaxies compared to the stellar mass. This means that the gas found elsewhere is likely the reason the universal baryon fraction is higher.