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Homework 3

1. How does the total mass of the MW and M31 compare in this simulation? What galaxy component dominates this total mass?

The total mass ratio of MW/M31 is \_\_\_. The dark matter component dominates the total mass of both the MW and M31.

1. How does the stellar mass of the MW and M31 compare? Which galaxy do you expect to be more luminous?

The ratio of stellar masses between the MW and M31 is \_\_\_\_. The MW should be more luminous since it has

1. How does the total dark matter mass of MW and M31 compare in this simulation (ratio)? Is this surprising, given their difference in stellar mass?

The dark matter mass ratio of the MW/M31 is \_\_\_. This is surpiring since M31 has a larger stellar mass, but relatively similar dark matter mass when compared to the Milky Way.

1. What is the ratio of stellar mass to total mass for each galaxy (i.e. the Baryon fraction)? In the Universe, Ωb/Ωm ∼16% of all mass is locked up in baryons (gas & stars) vs. dark matter. How does this ratio compare to the baryon fraction you computed for each galaxy? Given that the total gas mass in the disks of these galaxies is negligible compared to the stellar mass, any ideas for why the universal baryon fraction might differ from that in these galaxies?

The Baryon fraction for the galaxies are: This ratio of baryons vs. dark matter is much \_\_ for the galaxies considered,

MW: Ωb/Ωm =

M31: Ωb/Ωm =

M33: Ωb/Ωm =