

Homework 3

- 1) MW and M31 have similar mass of $2.06 \cdot 10^{12}$ Solar Mass. And the Halo is the most massive element with 1.975 for MW and 192.088 for M31.
- 2) The stellar mass of M31 is 1.6 time greater than MW. Therefore I expect M31 to be more Luminous since there is either more stars or more massive stars.
- 3) $1.975 \cdot 10^{12}$ Solar mass for MW and $1.921 \cdot 10^{12}$ Solar mass for M31, meaning that MW has 1.03 more Dark Matter. No because we know they have the same global mass so there must be more Dark matter in one and more stellar mass in the other.
- 4) 0.0412 for MW and 0.0675 for M31 so M31 is 1.6 time greater which represent their difference in stellar mass we saw in question 2).

Since the universe is expanding, assuming Dark Matter combine or something, we have less galaxies in a DM Halo now than during Early universe where galaxies where closer together (because of expansion). Therefore when looking at the universe, we see the past, when it was more Baryons contribution to the total mass.

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MacBook-Pro-de-Adrien:Homework3 adrienmasini$ python GalaxyMass.py
[[list(['MW', 'M31', 'M33'])
 list(<Quantity 1.975 solMass>, <Quantity 1.921 solMass>, <Quantity 0.187 solMass>)]
 list(<Quantity 0.075 solMass>, <Quantity 0.12 solMass>, <Quantity 0.009 solMass>)]
 list(<Quantity 0.01 solMass>, <Quantity 0.019 solMass>)]
 list(<Quantity 2.06 solMass>, <Quantity 2.06 solMass>, <Quantity 0.196 solMass>)]
 <Quantity 4.316 solMass>
 list(<Quantity 0.04126214>, <Quantity 0.06747573>, <Quantity 0.04591837>, <Quantity 0.05398517>)]]
```

Galaxy name	Halo Mass (10 ¹²)	Disk Mass (10 ¹²)	Bulge Mass (10 ¹²)	Total Mass (10 ¹²)	Baryon Fraction (10 ¹²)
MW	1.975	0.075	0.01	2.06	0.0413
M31	1.921	0.12	0.009	2.06	0.0675
M33	0.187	0.009	/	0.196	0.0459
Local Group	/	/	/	4.316	0.0540