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motivation

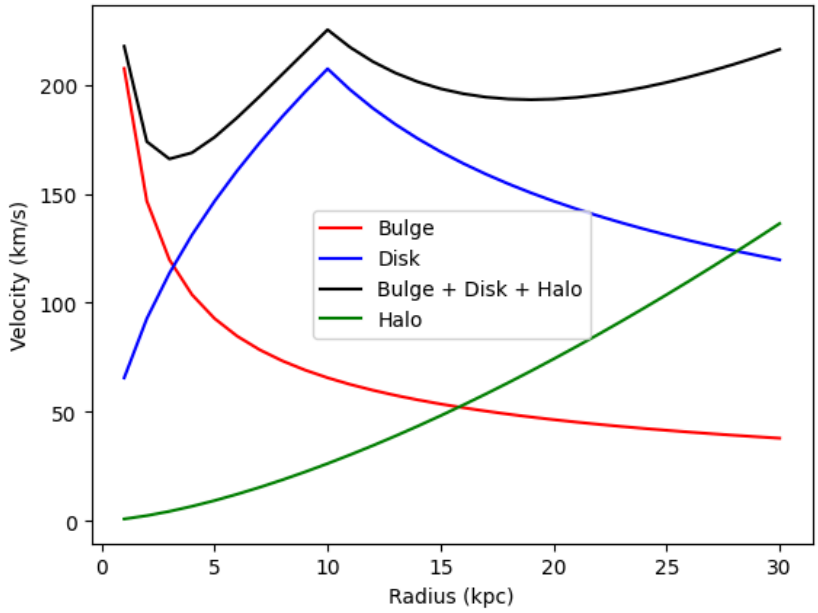
This project covered calculating the rotation curve of the Milky Way galaxy by individually finding the orbital velocity of the bulge, halo, and disk, and then adding them all together.

methods

assumptions + calculations

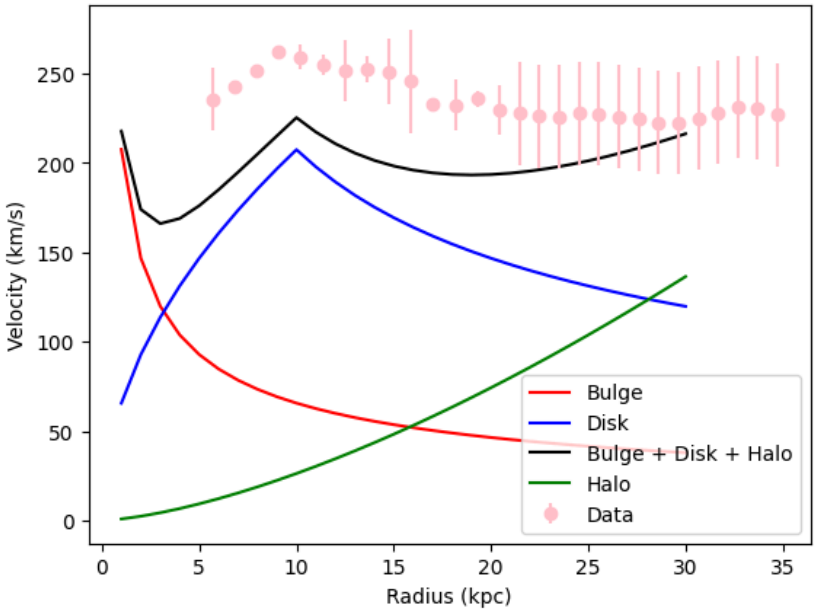
Some general boundaries we have is that the graph spans 30 kiloparsecs.
For calculating the bulge, we assume that it weighs 10^10 solar masses and, again, spans from 1-30 KPC in radius. For the disk, we approximate it as a disk. We have it's mass as 10^11 solar masses, and cut off it's radius at 10 kpc. Finally, for the halo, we approximate it as a sphere with mass as 10^12 solar masses, and a radius of 30kpc.

results



Putting all of the data together, we receive this graph, which is a pretty solid graph, though when compared to other graphs of the rotational curve of the Milky Way, there seems to be another

component missing. This missing chunk of mass of course is dark matter, which we can add to



the graph using collected data.

conclusions

Factoring in this data would result in a more standard rotational curve of the Milky Way. This is a strong indicator of dark matter in the galaxy.

AI acknowledgement

I used AI to generate code for the volume and enclosed volume of a sphere. Thank you to geminiAI to knowing what those were when I did not.