Milky Way Rotation Curve

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Methods & Assumptions

R ≤ 30 kiloparsecs

Bulge

M = 10^10 solar masses

1≤ R ≤ 30 kiloparsecs

Disk, approximated as a disk

M = 10^11 solar masses

1 ≤ R ≤ 10 kiloparsecs

Halo, approximated as a sphere

M = 10^12 solar masses

1 ≤ R ≤ 30 kiloparsecs

Calculations

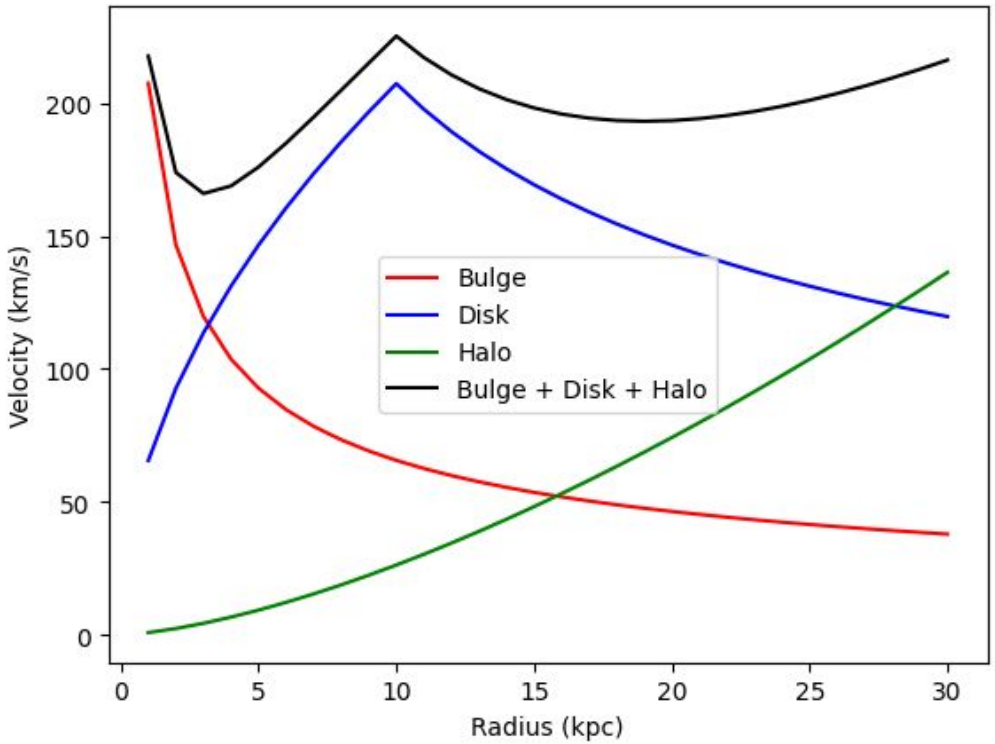
Orbital velocity = $\sqrt{(GM/R)}$

Enclosed mass of disk = $\pi * R^2 * \text{density}$

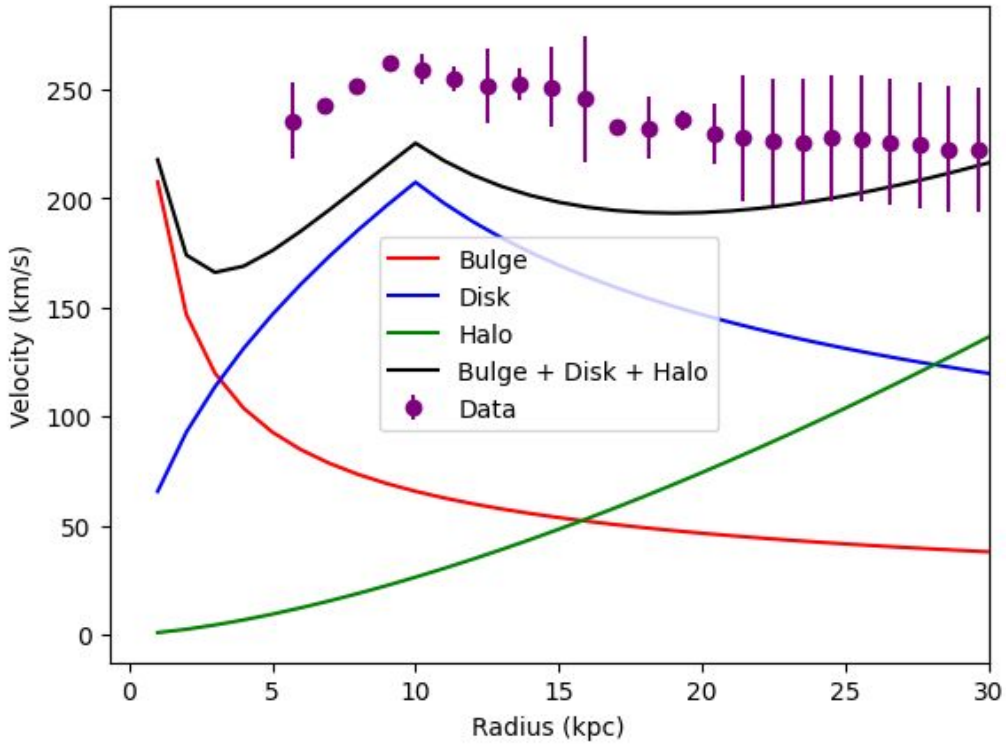
Volume of sphere = $4/3 * \pi * R^3$

Enclosed mass of sphere = $4/3 * \pi * R^3 * \text{density}$

The Graph


Velocity (km/s)
Radius (kpc)
Bulge
Disk
Halo
Bulge + Disk + Halo
0
50
100
150
200
0
5
10
15
20
25
30

The Graph (With Data)



Works Cited

Carignan, Claude, et al. “The extended HI rotation curve and mass distribution of M31.” The Astrophysical Journal, vol. 641, no. 2, 30 Mar. 2006, https://doi.org/10.1086/503869.