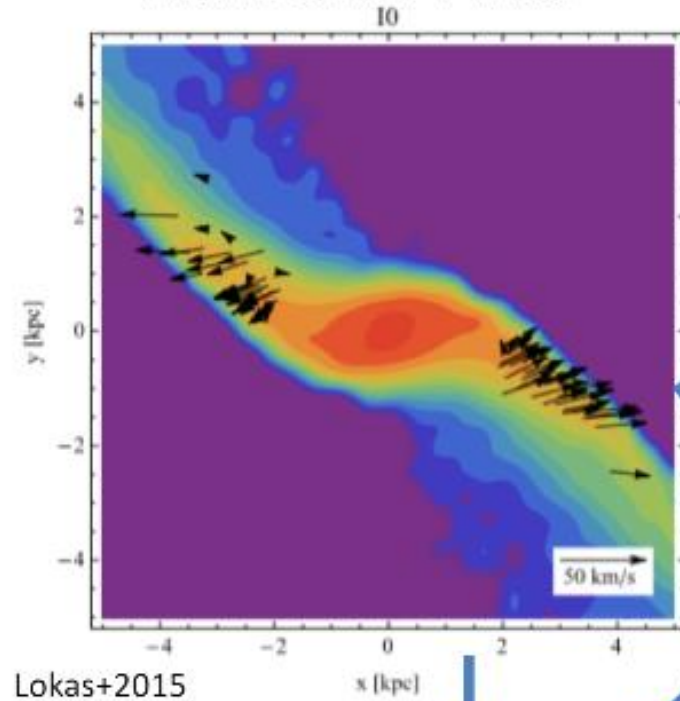


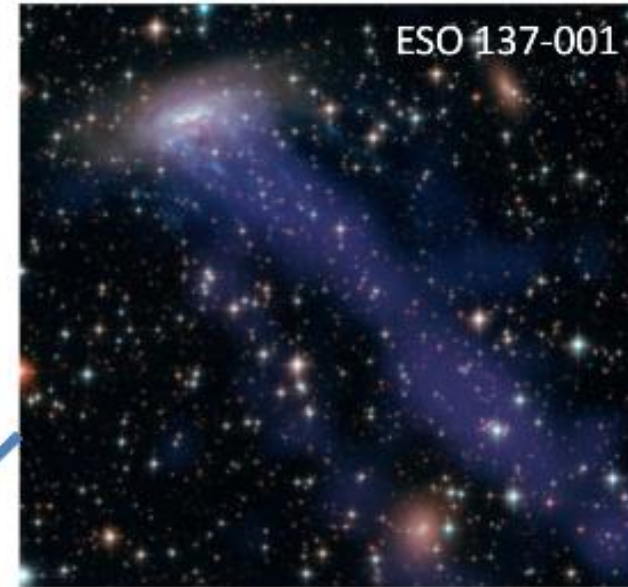
EVOLUTION OF THE INTERNAL STELLAR STRUCTURE OF M₃₃

By: Nicole Zawadzki

TIDAL STRIPPING



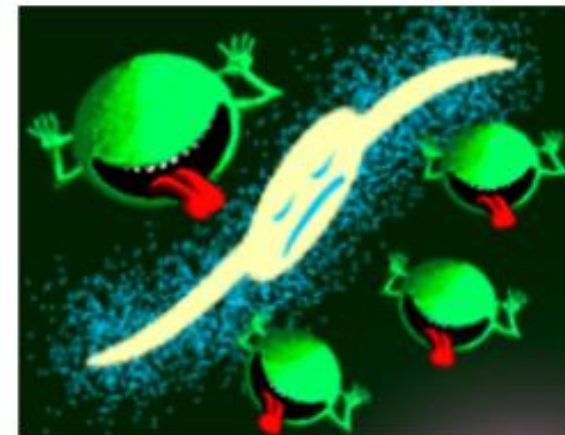
RAM PRESSURE STRIPPING



ESO 137-001

+

HARRASSMENT



STRANGULATION

“out of fuel”

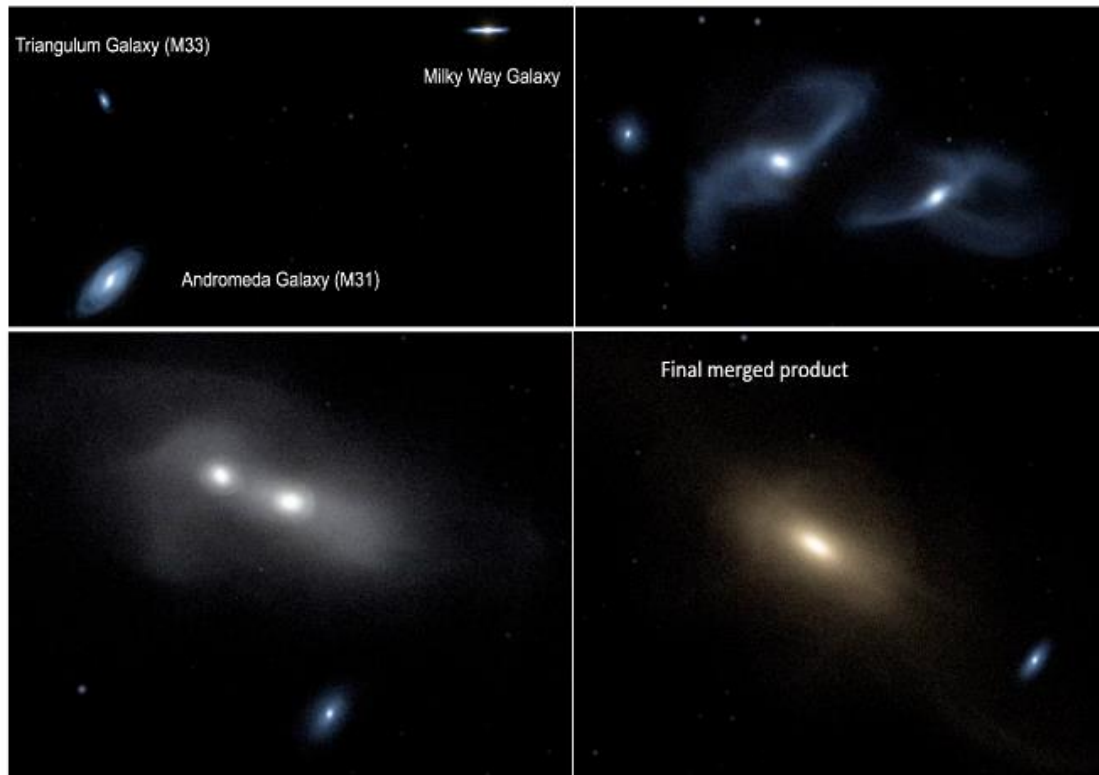
(gas supply cut off, stars form passively)



animations: Aeree Chung

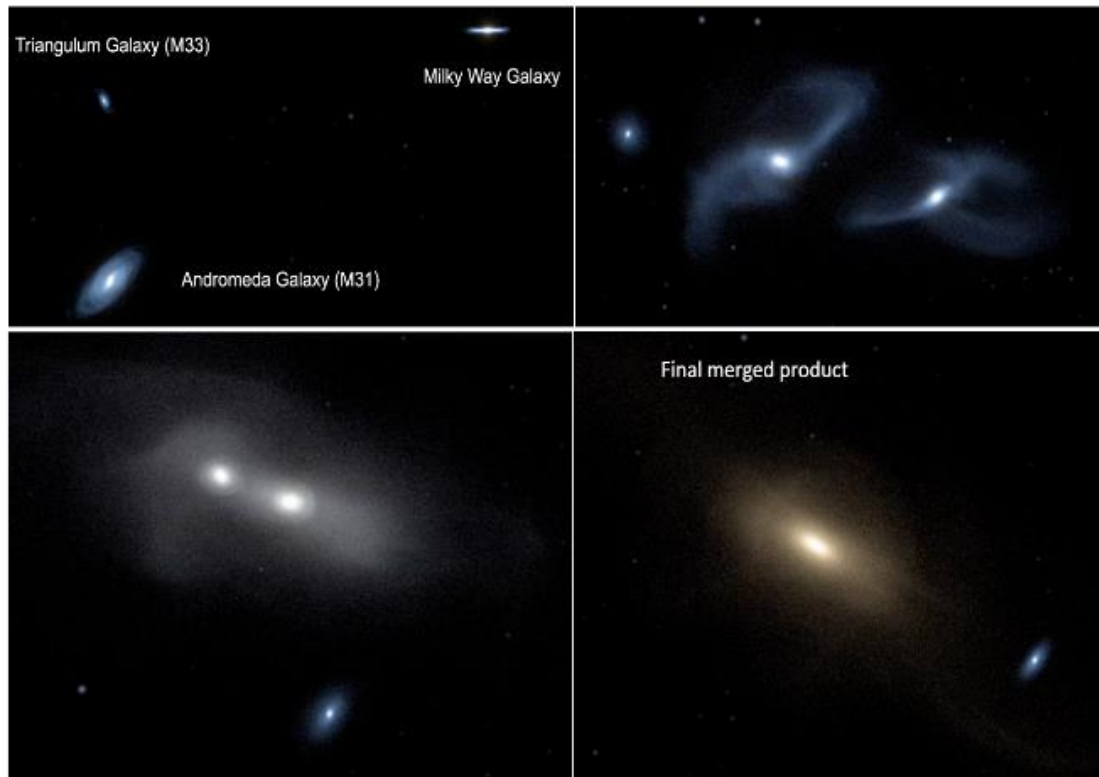
Why it Matters

- Often talk of binary galaxy mergers but what happens to the satellites?

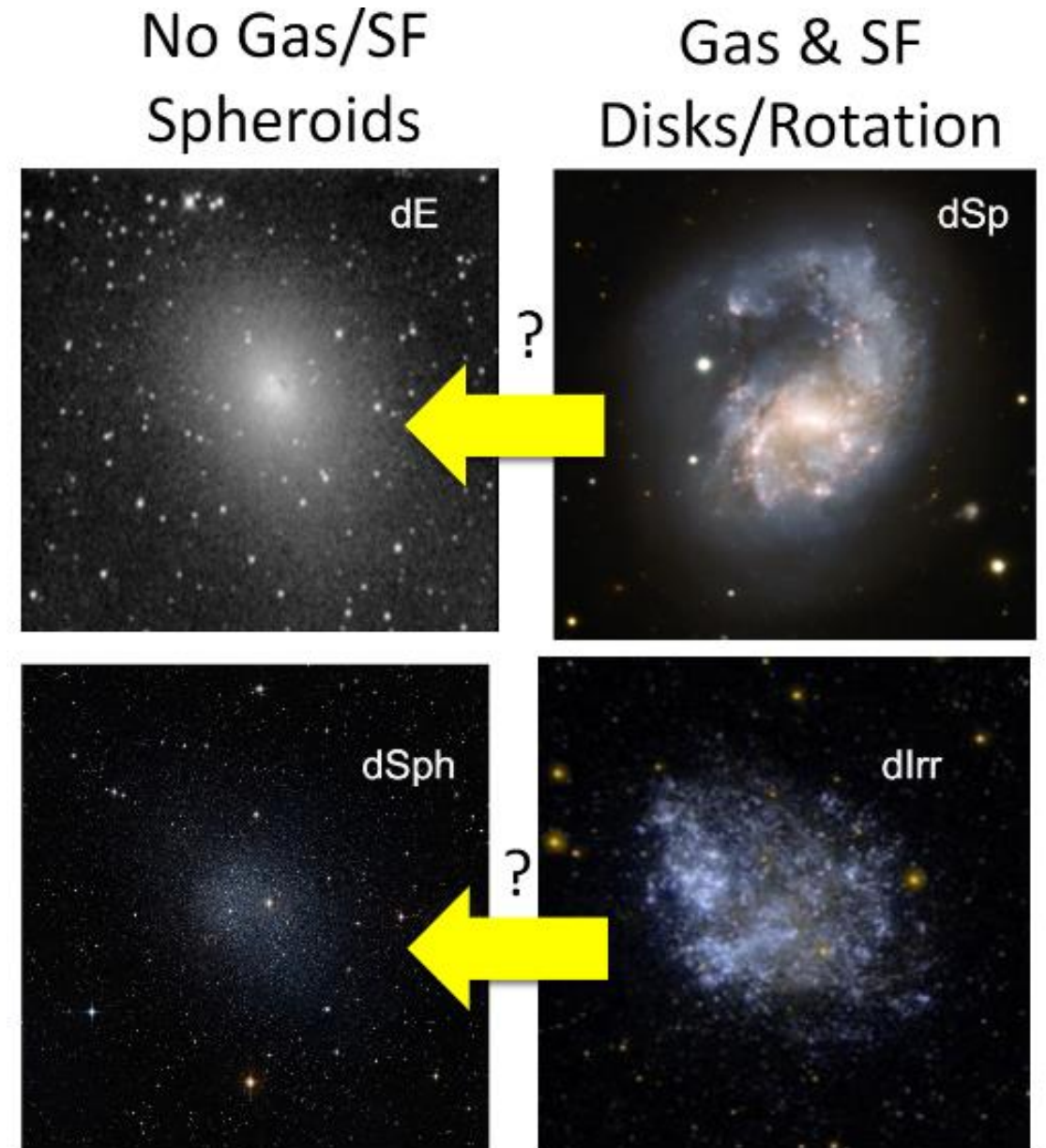


Why it Matters

- Often talk of binary galaxy mergers but what happens to the satellites?
- For the creation of dwarf spheroidal galaxies



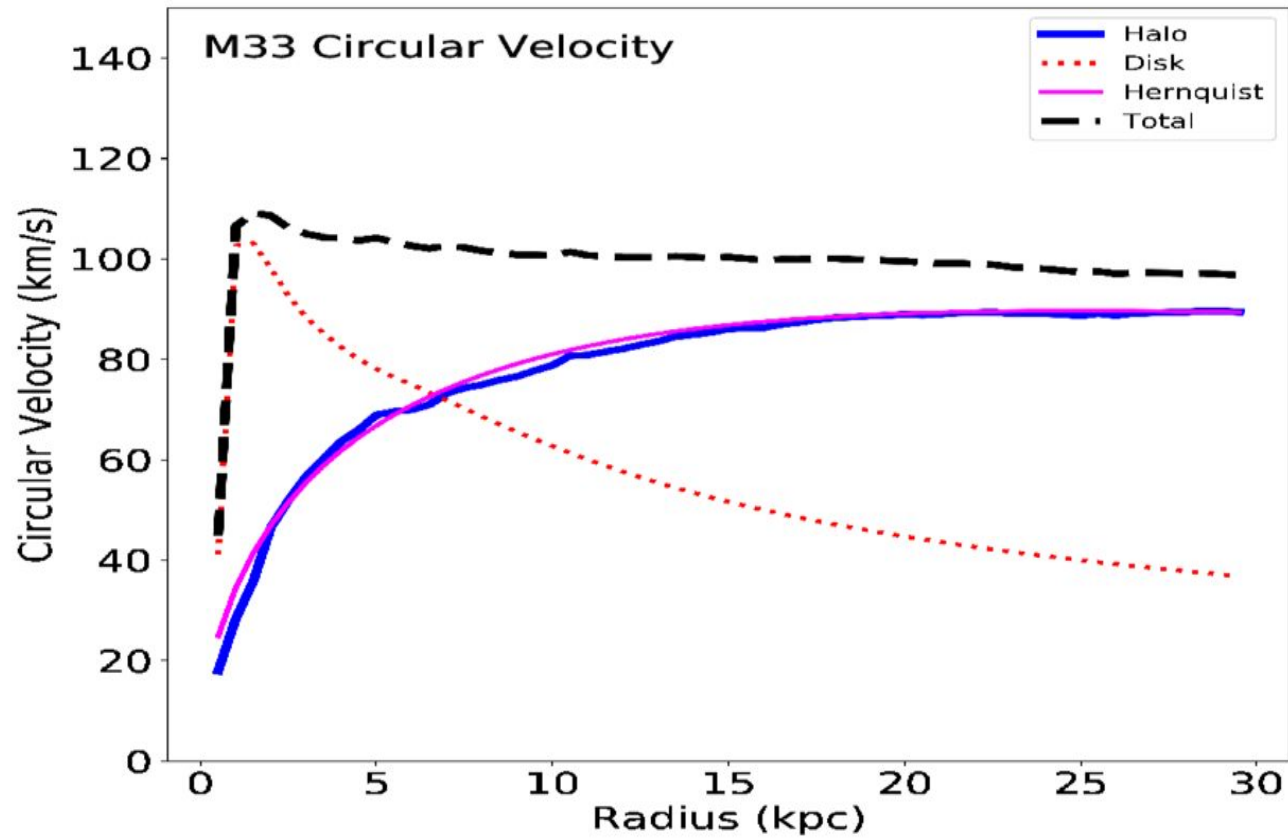
Picture taken from Lecture 13



Picture taken from Lecture 7

M33

- Most massive satellite of M31
- $M \sim 3 \times 10^9 M_{\odot}$
- Low-luminosity flocculent spiral
- SFR: $0.6 M_{\odot}/\text{yr}$



Open Questions

- How does tidal stripping change satellite galaxies?
- From where does the tidal stripping take material?
- Stripping takes from the outside disk, how does this affect the inside?
- With M₃₃'s mass being comparable to the LMC, a dwarf galaxy, will M₃₃ behave closer to a dwarf galaxy?

How does the density profile evolve throughout the simulation?

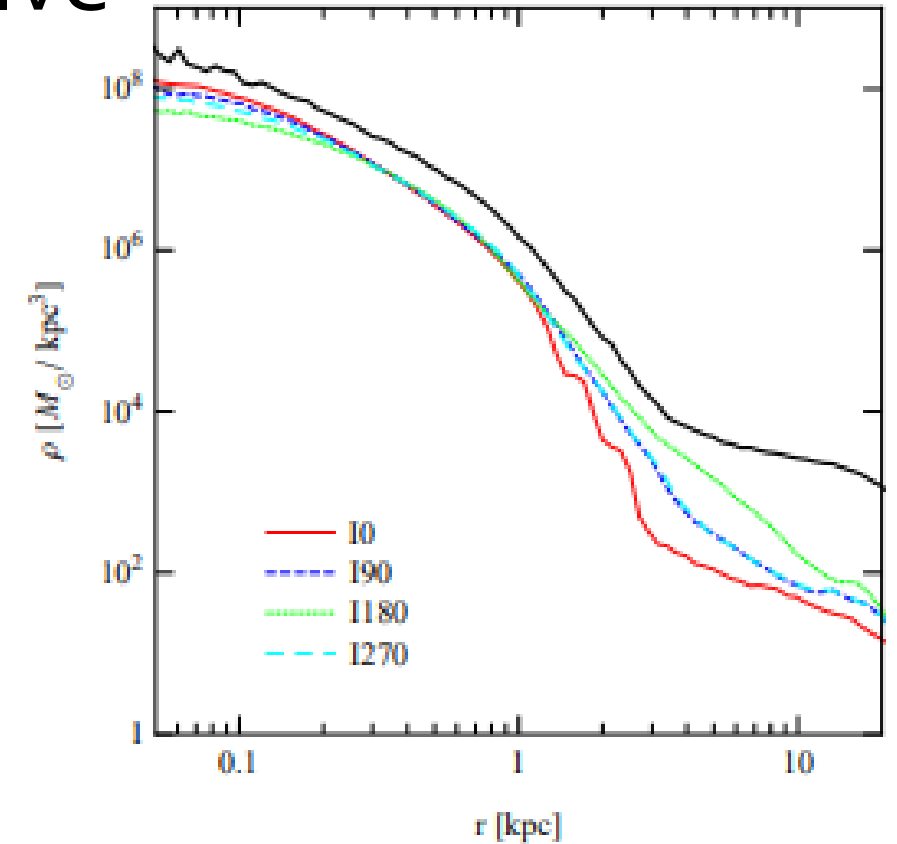
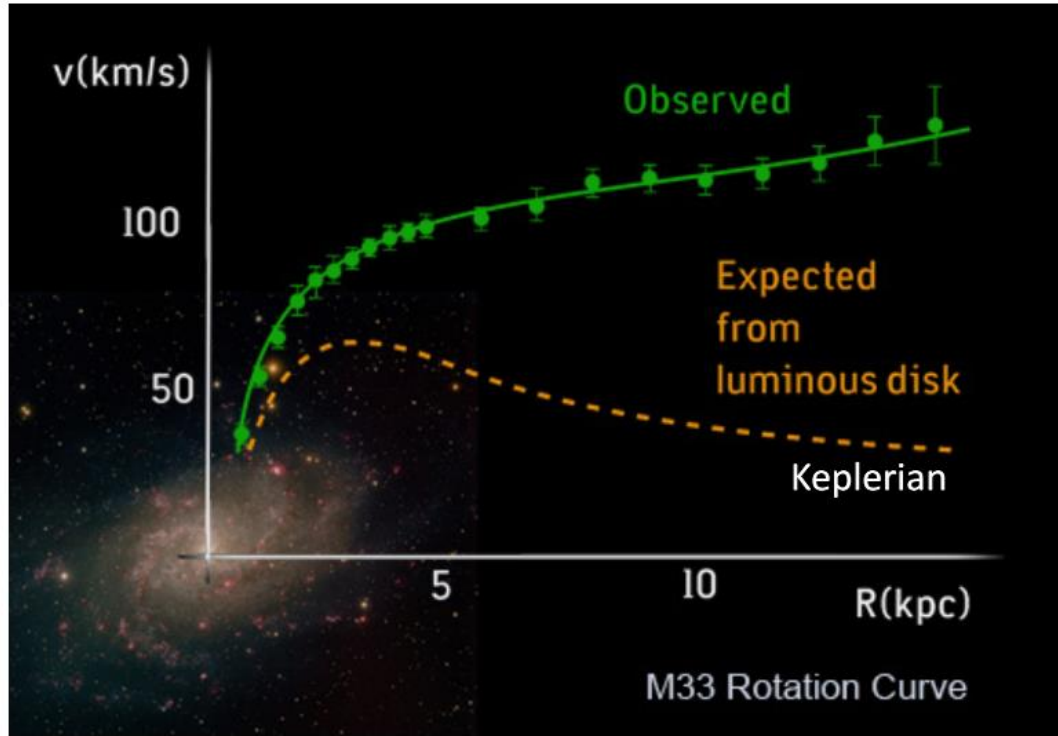


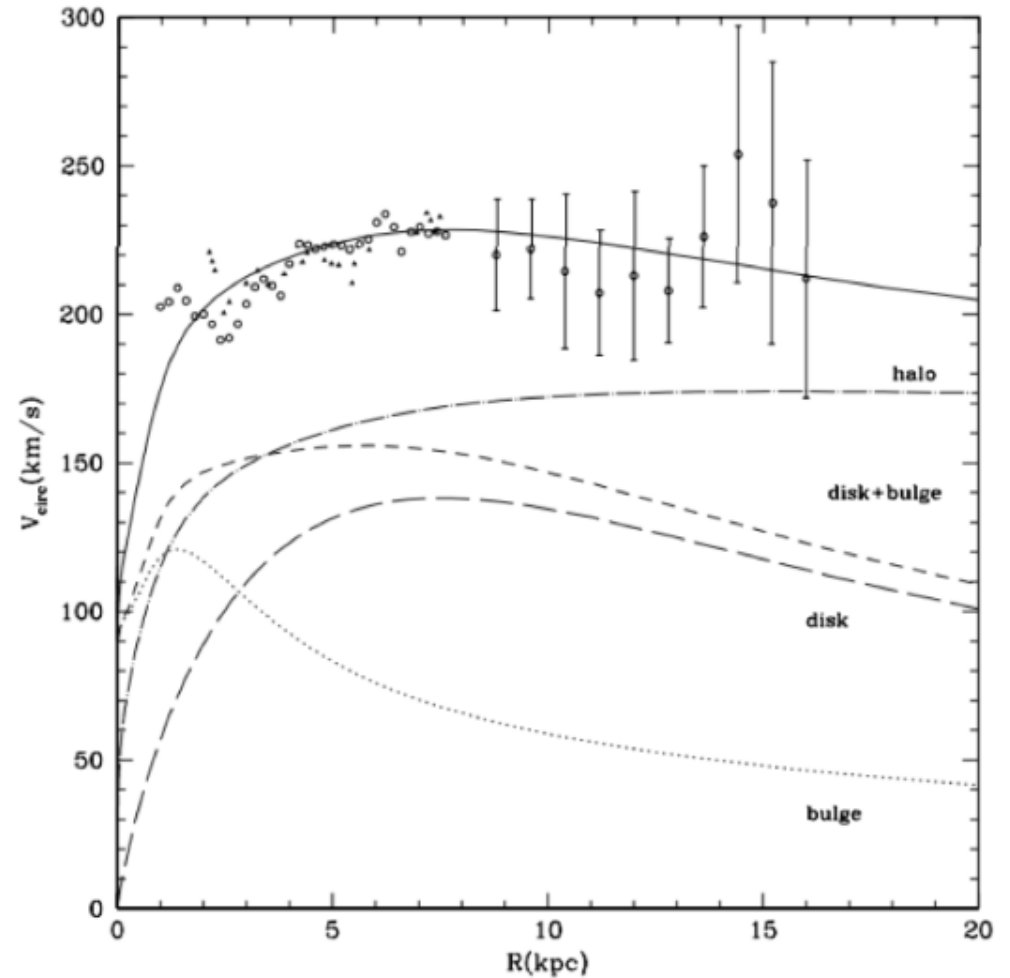
FIG. 6.— Comparison of stellar density profiles of the dwarfs at the fourth apocenter (6.6 Gyr after the start of the simulations, colored lines). For completeness we also show the dark matter profile (black line) which is similar for all simulations.

Profiles from a simulation of a satellite around a MW type galaxy at different orientations by Lokas+2015

How does the stellar rotation curve change with time within this tidal radius?

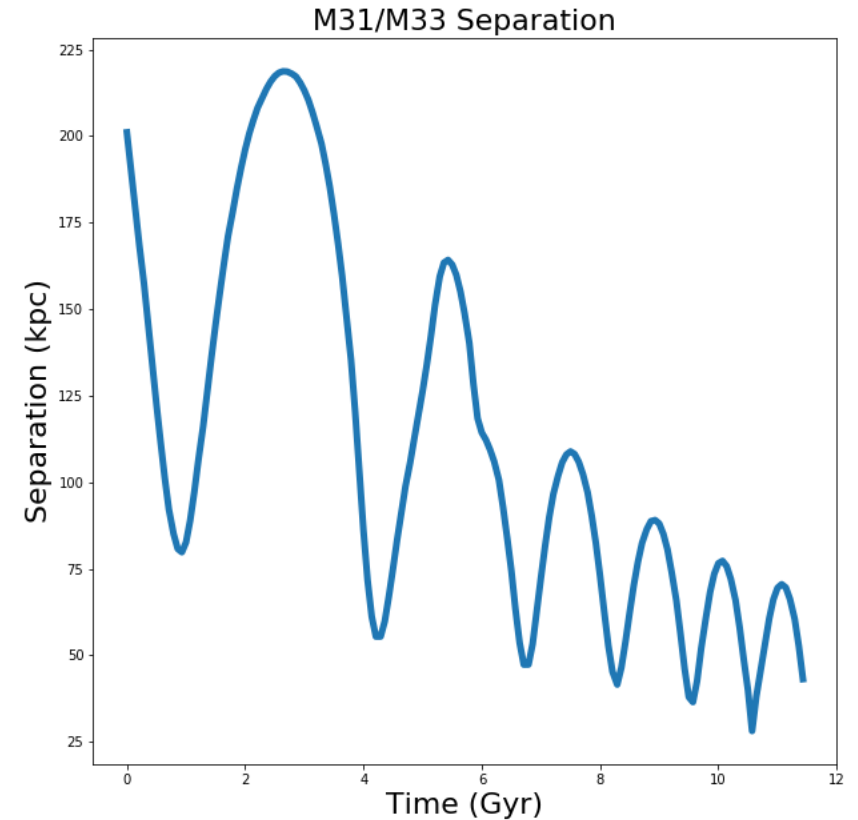


Klypin+2002



Using the simulation data

- Use snapshots 000 (at 0 Gyr), 4534 (at 6.2 Gyr), and 700 (at 10 Gyr)
- Need mass, position, and velocity of disk particles in M33 at snapshots
- Using MassProfile Class can find the mass enclosed within a radius and plot the density profile
- Use position and velocity data to get rotation curve within break radius based on code from Homework 5 and In Class Lab 5



Predictions

- In M₃₃'s orbits around the MW/M₃₁ system it will become more compact
- Motion of stellar particles reflect a dispersion dominated system