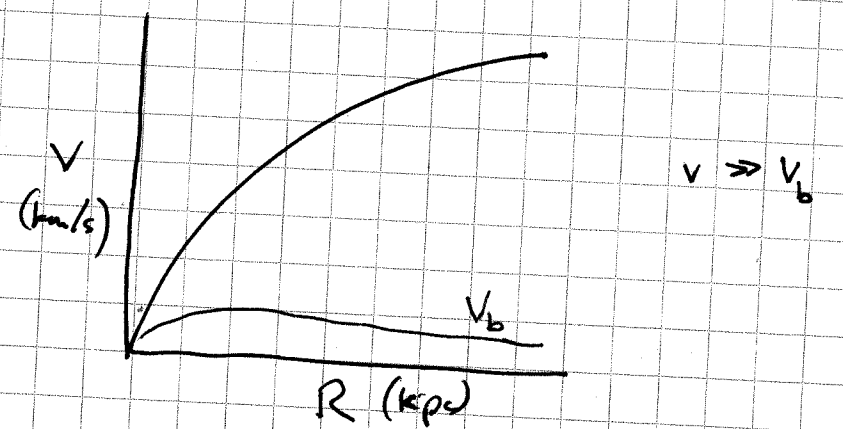
What is the null hypothesis in ΛCDM?

CDM forms dark matter halos whose properties are specified by cosmic parameters: Ω_m, H_0, σ_8 – basically the density of matter at the time of halo formation. Baryons subsequently settle in the dark matter halos to form the observed galaxies.

When the dark matter dominates over the baryons (as in low surface brightness galaxies), the obvious null hypothesis is that the baryons just trace the potential of the dark matter:



The NFW halos predicted by CDM simulations are basically the same at the same mass, so our null hypothesis is that V(R) is [basically] the same for galaxies of the same mass.

This is NOT observed. There is considerable "diversity" in V(R) at fixed mass when R is measured in physical units (e.g., kpc).

Strangely, there is uniformity if R is measured in scale lengths (R_d). V(R/R_d) is similar at fixed mass. The mass "knows" about the light.