Formation and Evolution of Galaxies - Paper Reading 1

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20-09-2023

1 Press-Schechter mass function

Read first **Press & Schechter (1974)**

1. What is described in the Press-Schechter mass distribution?
2. Which is the term responsible for the cut-off? Is there a dependency on z? If so, describe the dependency with z.

2 Navarro-Frenk-White profile

Read first **Navarro et al. (1997) - Bullock et al. (2001)**

3. Write the NFW profile and explain the meaning of every parameter
4. What is the "cusp problem"?
5. What is the trend of the concentration parameter c with z?
6. How do the DM halo (and sub-halo) profiles depend on environment?
7. What is the virial temperature of the Milky Way for a NFW profile? And for a halo of 10^9 $M_\odot$ at $z = 0$?
8. Conventionally, r_{200} is defined to be the radius at which the spherically averaged mass density reached 200 times the critical mass density and r_s is a scale radius. The concentration of a halo, $c = r_{200}/r_s$, is related to the characteristic density. Write the relation between these two parameters.
9. Assuming the Milky Way's concentration parameter is $c = 15$ and the virial radius $r_{vir} = 200$ kpc, compute M_{vir}, v_{max} and r_{max}. Here you need to recall the concepts of M_{vir} and r_{vir}: write their definition and assume $r_{200} = r_{vir}$ in order to compute the three parameters requested.

3 Satellites of the Milky Way

Read first **Strigari et al. (2008) - Moore et al. (1999)**

10. How many satellites of the MW are know? Describe how they have been discovered.
11. What kind of objects are they? (mass, size, morphology, etc.)
12. What is the mass of these satellites estimated by Strigari et al. (2008)? Why is this an important result?
13. Is there any inconsistency between theory and observations regarding the dark matter small scale structures for MW-sized galaxies? If yes, how can they be mitigated?
14. Is there a "missing satellite problem" for galaxy clusters? Explain your answer.

References

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