
Using astronomy to measure dark matter distributions and infer dark matter particle properties
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Interesting Observations

- Some dark matter density profiles are “softer” than the ones predicted by CDM simulations
- The luminosity function of the MW is not rising as steeply at the faint end as the mass function does in CDM. Subhalos have “strange” mass density profiles.
- (Relatively Massive) Dark subhalos have been detected through strong gravitational lensing effect
- In colliding clusters dark matter seems to track stars even though not exactly perhaps

Possible explanations

- Dark matter is self-interacting
  - What cross section?
- Dark matter is warm
  - What is it?
- We do not understand the physics of baryons on these scales
  - What are we missing?

Questions for the audience

- Are people convinced that the observations are showing something interesting?
  - If not, what observations would people like to see?
- What do we need to do to understand their meaning of the observations in terms of DM?
  - More observations? Which ones?
  - Better numerical simulations? What do we need to improve?
- What other information is out there? For example, can cosmic shear provide us some interesting constraint on the power spectrum on very small scales?

The end