This is Article

Christian Poveda Ruiz

Abstract

FIXME: Write abstract

1 Introduction

FIXME: Multidark
FIXME: NFW profile
FIXME: MCMC

2 State of Art

3 What did I do?

FIXME: Which simulation? $m = 1.7 \times 10^{11}\ M_{\odot}$

In order to obtain a mass profile for each halo in funcion of the radius, the center of each halo must be calculated. However the center of mass will not give an accurate position for the center because some haloes are highly irregular, is more convenient to take the gravitational potential for each particle

$$\phi\left(\boldsymbol{r}_n\right) = -\sum_{j \neq i} \frac{1}{\left\|\boldsymbol{r}_n - \boldsymbol{r}_j\right\|}$$

Take $\boldsymbol{r}_0 = \min\left(\phi\left(\boldsymbol{r}_n\right)\right)$ as the center then define new coordinates $\boldsymbol{r}'_n = \boldsymbol{r}_0 - \boldsymbol{r}_n$, this $\boldsymbol{r}_0$ will be in the most relevant region for the dynamics of each halo. Organizing the $\{\boldsymbol{r}'_n\}$ in crescent order, the accumulated mass for each $\boldsymbol{r}'_n$ will be $m_n = nm$.

FIXME: Mass profile of a halo

The last part of the process consists in fitting the NFW mass profile to the m_n data using the Metropolis-Hastings algorithm to sample the Likelihood $\mathcal{L}\left(\rho_0, r_s\right) = \exp\left(-\frac{1}{2}\chi^2\left(\rho_0, r_s\right)\right)$, where $\chi^2\left(\rho_0, r_s\right) = \sum_n \left|m_n - m\left(\boldsymbol{r}'_n, \rho_0, r_s\right)\right|^2$, and take the values of ρ_0 and r_s where the Likelihood is maximum.

4 Results

4.1 Why I'm sure that my results are reasonable

FIXME: I tested it with HaloGenerator

4.2 Results from the simulation

FIXME: Plor with error bars

4.3 What kind of implications (Low resolution simulations, other fitting algorithms)

5 Conclusions