P1: Measurement of Cluster halo density profile and estimation of the Splashback Radius

Background: Dark matter halos are gravitationally bound, virialized systems that form endpoints of structure formation. Galaxy clusters are some of the most promising laboratories to probe the distribution of matter within these bound objects. We will use tracers of matter, namely galaxies to map the potential and measure the DM distribution. In particular we will also measure the halo boundary by estimating the splashback radius from the galaxy distribution. The splashback radius traces the apocenters of the most recently accreted material forming a boundary for the bound region around the center.

Project Goal: Measuring the cluster galaxy cross-correlation function and estimating the errors. Measuring the profilemfor galaxies with different poperties to study their distribution in the massive clusters.

Necessary Concepts: Basic understanding of gravitational dynamics, concepts like correlation function, modelling and parameter estimation. Basic coding in python or C, C++.

Resources:
Intro to cosmology by Barbara Ryden (Cambridge, free version), Review on clusters - https://arxiv.org/pdf/1205.5556.pdf Emcee, Corrfunc,
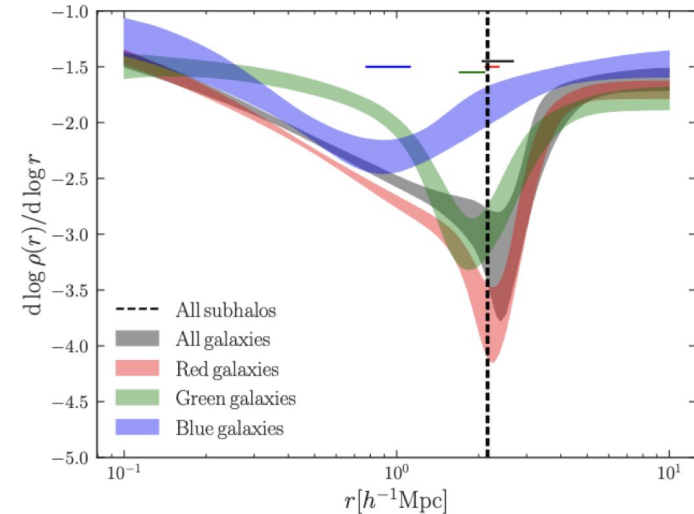
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