Bridging spectroscopic observations of galaxy clusters and filaments to simulations

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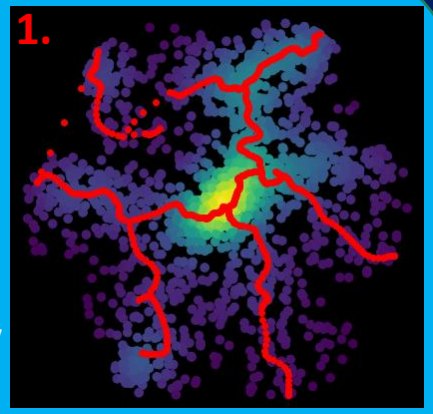
Science goal

With the use of **hydrodynamical** simulations, we aim to produce mock observations for the upcoming **WEAVE** survey to extract **filaments** and derive the properties of galaxies associated with them.

Introduction

The outskirts of galaxy clusters act as a unique laboratory for understanding the **large-scale mass assembly** of the universe [1].

1.



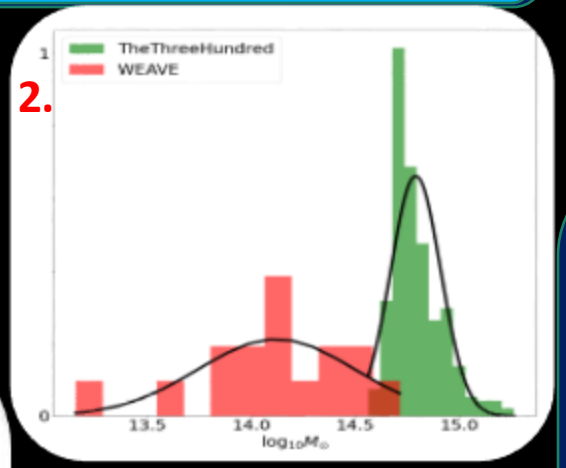
The **WEAVE Wide Field Cluster Survey** maximizes coverage beyond several **Virial radii**. **Figure 1** shows a simulated cluster from **TheThreeHundred** project [2] with filaments traced in red.

We develop mock observational **'Configurations'** by forecasting the **fiber positioning** for WEAVE–matched simulated clusters, extract **filaments** [3] and compare to the idealized version in figure 1

WEAVE

WWFCS: an upcoming spectroscopic survey of ~ 20 clusters using the **WHT**. Each circle on **figure 3** is a **1-degree WEAVE pointing**, overlayed with halo distributions from the simulations.

2.



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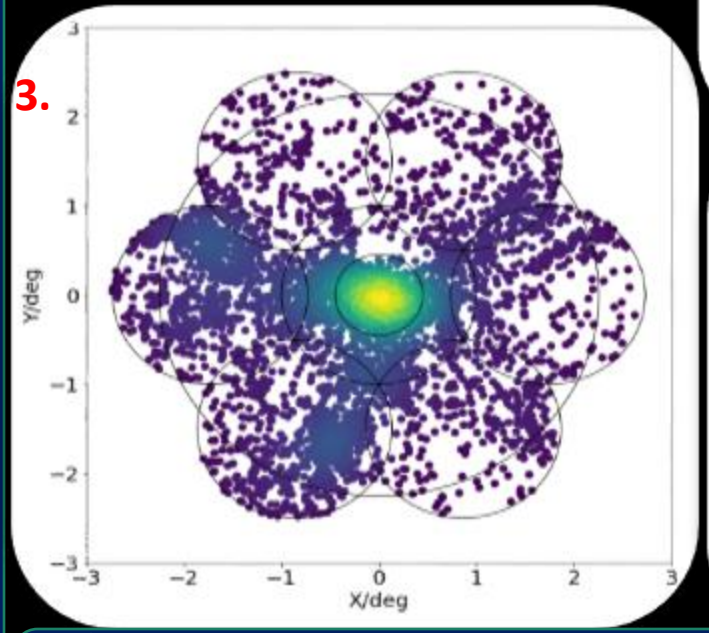

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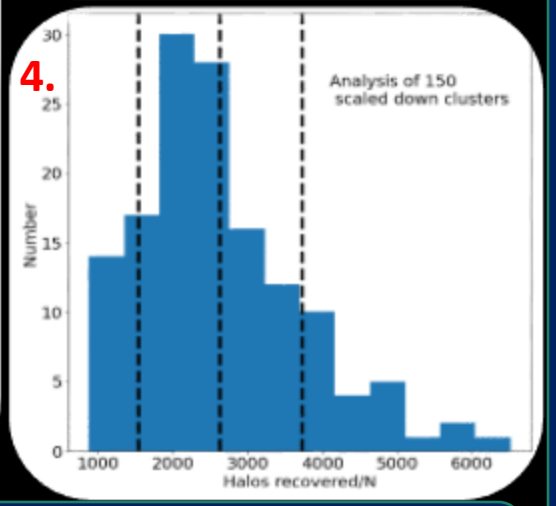

Summary

We scale down clusters (**figure 2**), match 10 simulated clusters per 1 WEAVE cluster and present our results in **figure 4**.

A WEAVE like **'Configuration'** is then carried out which places fibers on target galaxies and determines where we are likely to lose members.

Lastly, we will run a **filament extraction** on this reduced sample which will tell us about the success of the targeting strategy based off the comparison with the filaments detected before configuration.

References

[1] Kuchner U., et al., 2020, MNRAS, 494, 5473 [2] Cui W., et al., 2018, MNRAS, 480, 2898
[3] Sousbie, T, 2011, MNRAS, 414, 384