Finding Observable Environmental Measures of Halo Properties Using Neural Networks

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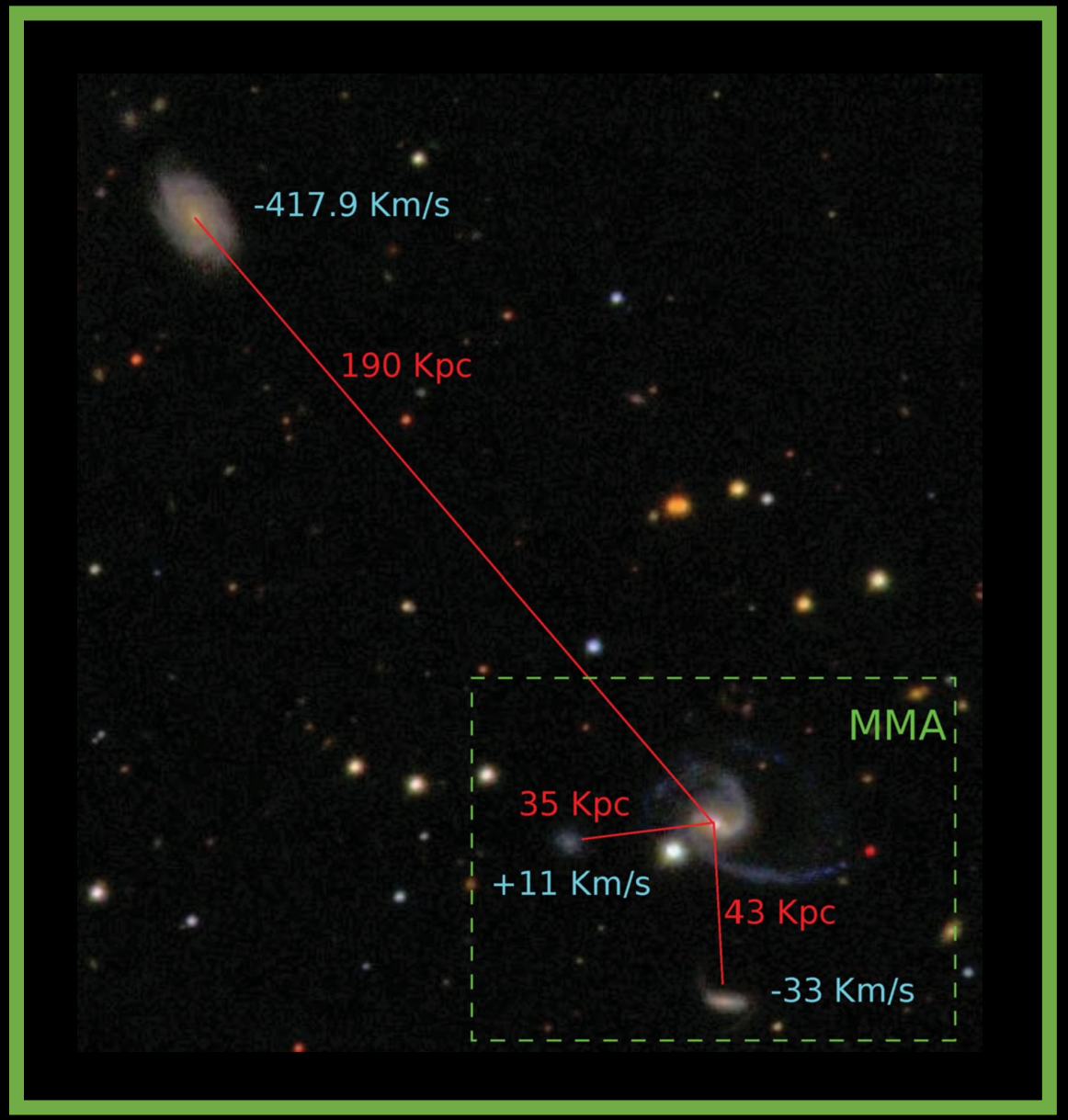
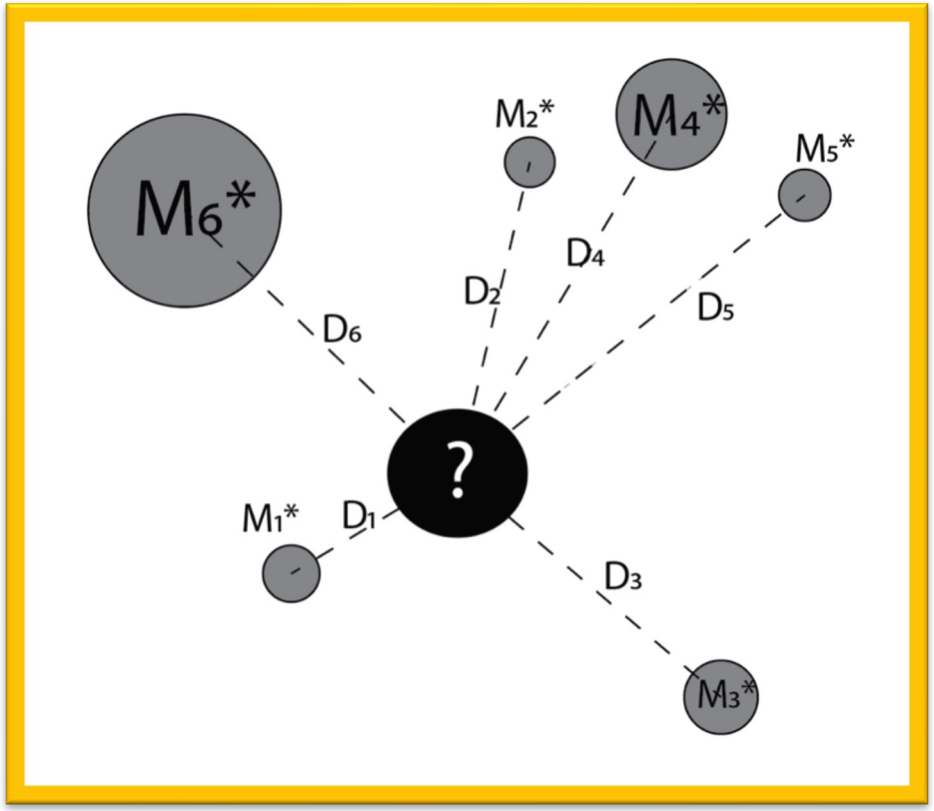


Robotham et al. 2012

$$X_{halo} = f(M_*, Environment)$$

1

Consider what information about the environment is available



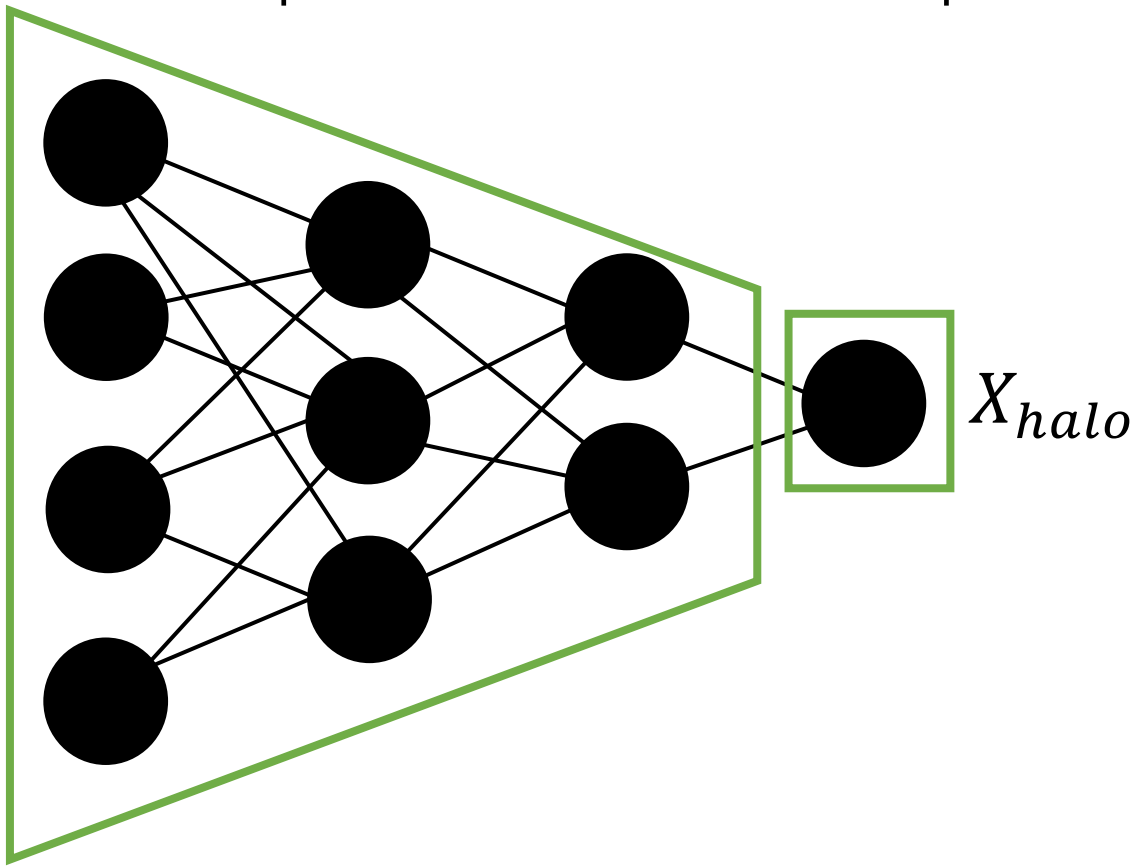
2

Condense that information into an input vector

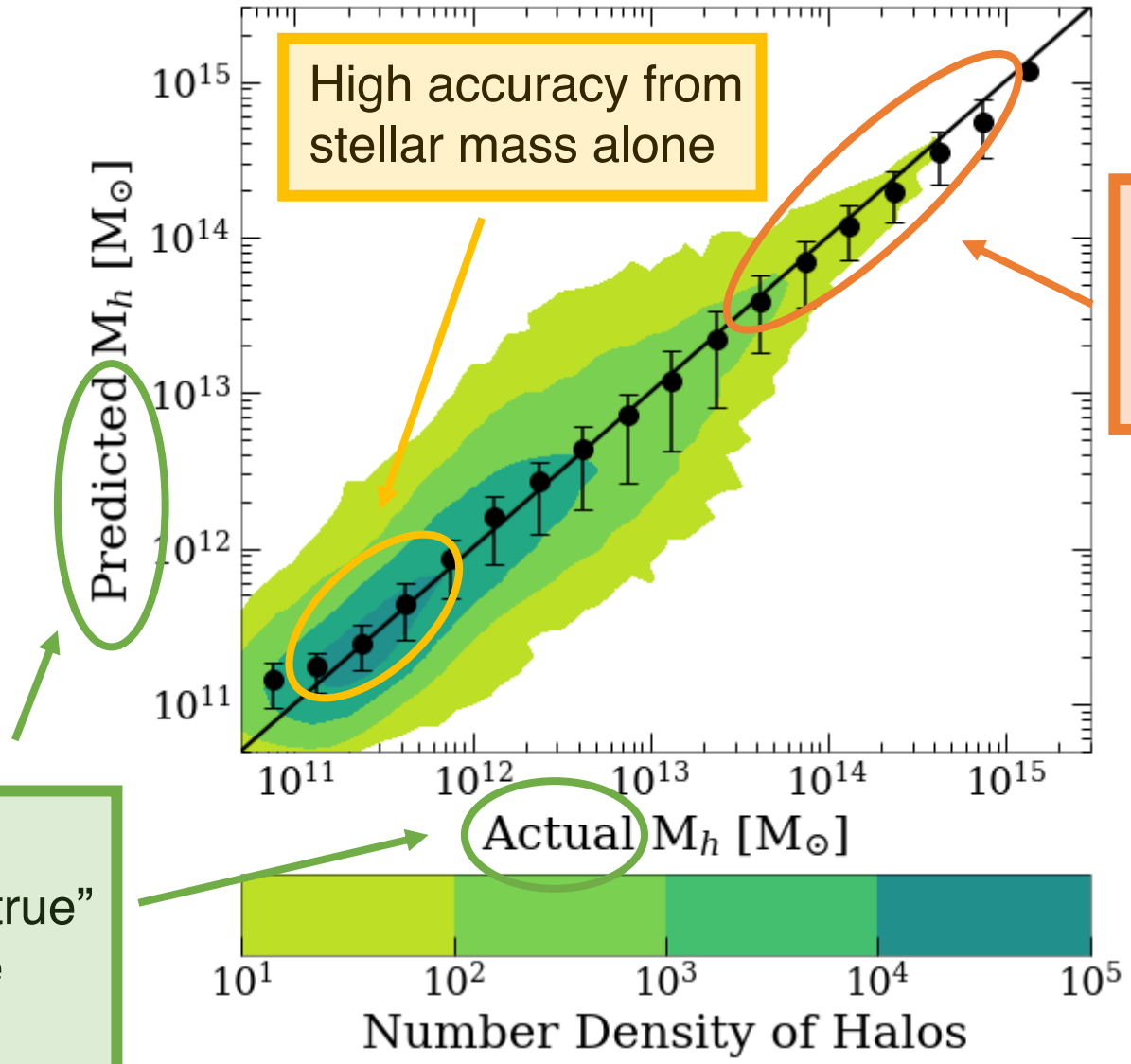
Input Vector

3

Train a neural network to serve as a function from our input vector to our desired output



X_{halo}



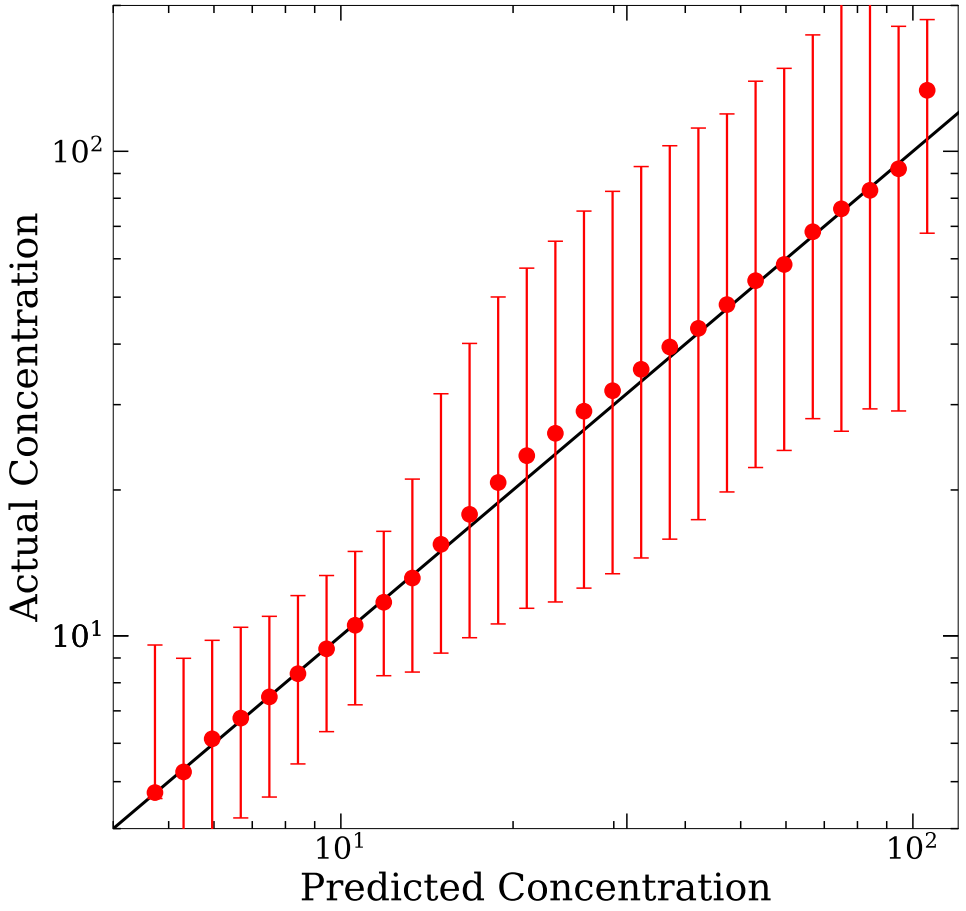
Comparing ML predictions to "true" values from the simulation

*Check out: **Bowden, Behroozi & Hearin 2023** (arxiv:2307.07549)

Halo Concentration (PRELIMINARY)

But what happens when we expand to secondary halo properties?

Lower accuracy (but there is information there!)



Conclusions: A *neural network* allows us to capture information about the *galactic environment* as it pertains to *halo mass and concentration*. A halo catalog for the *GAMA Survey* is in the works!

Density of galaxies in a redshift slice for one survey region