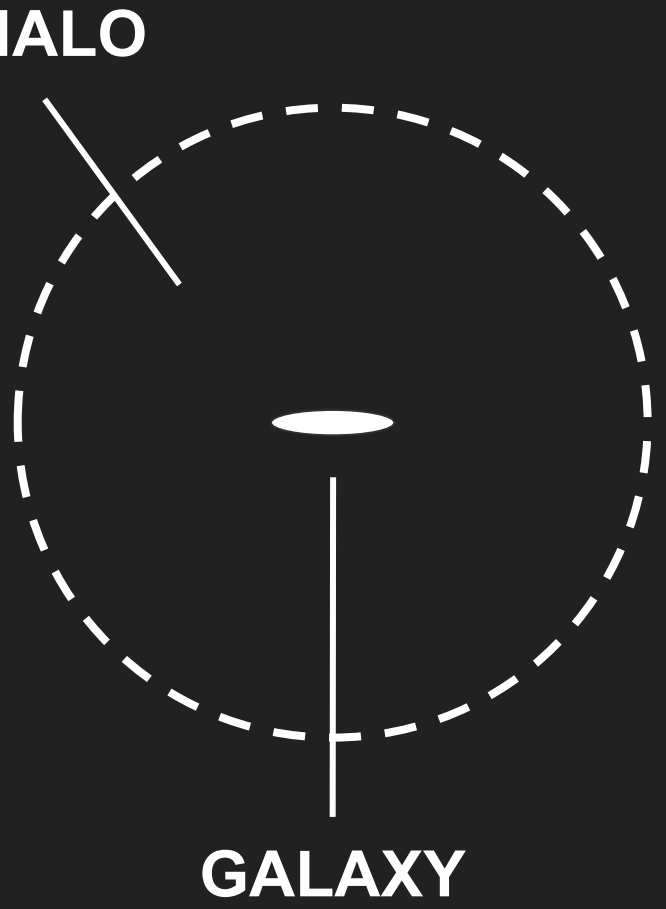
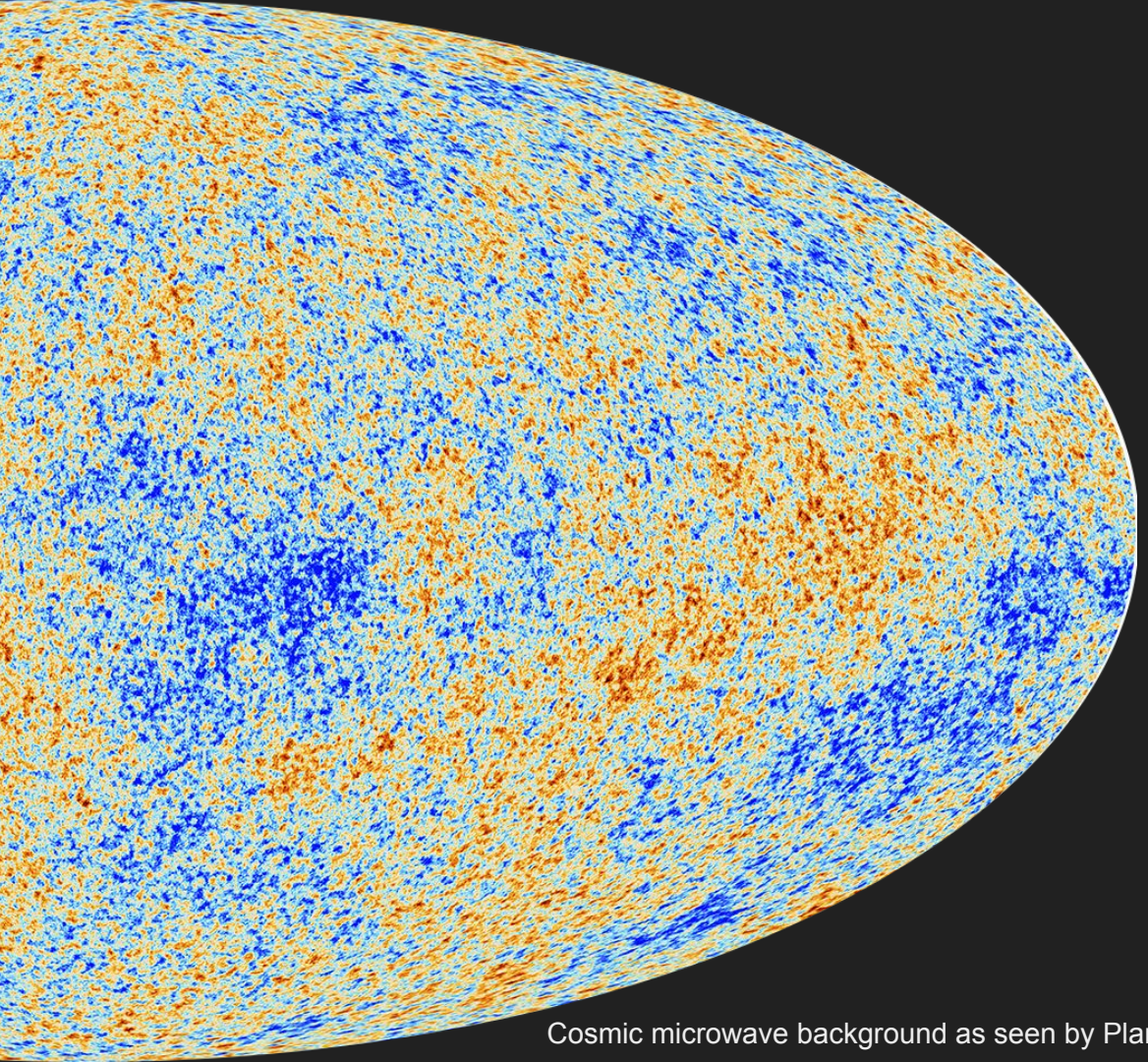
GALAXIES AND THEIR DARK MATTER HALOES AT Z~3

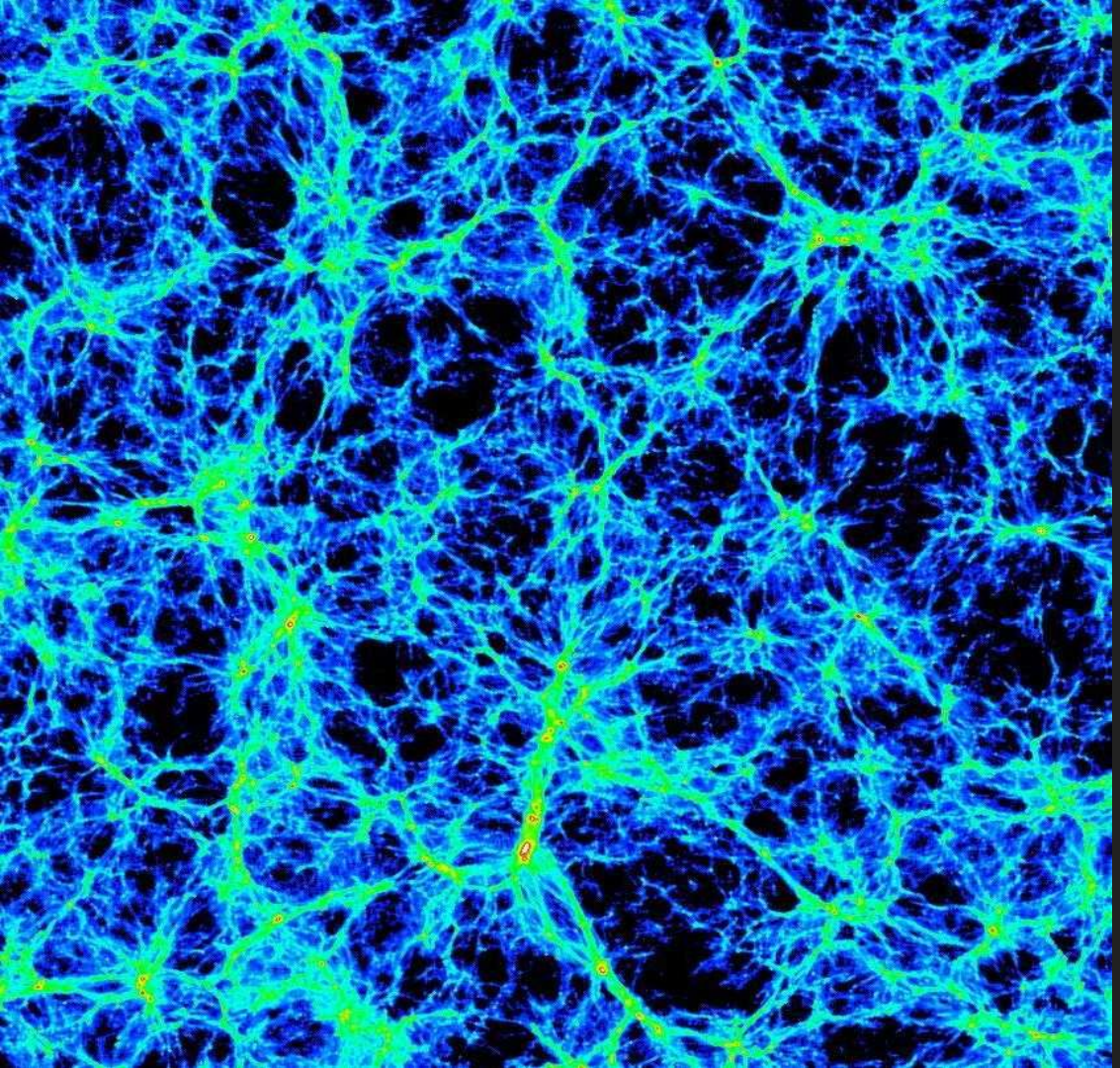


Author: Anna Durkalec anna.durkalec@ncbj.gov.pl Warszawa, 21.05.2019



LOOK IT'S ALMOST UNIFORM!

Cosmic microwave background as seen by Planck

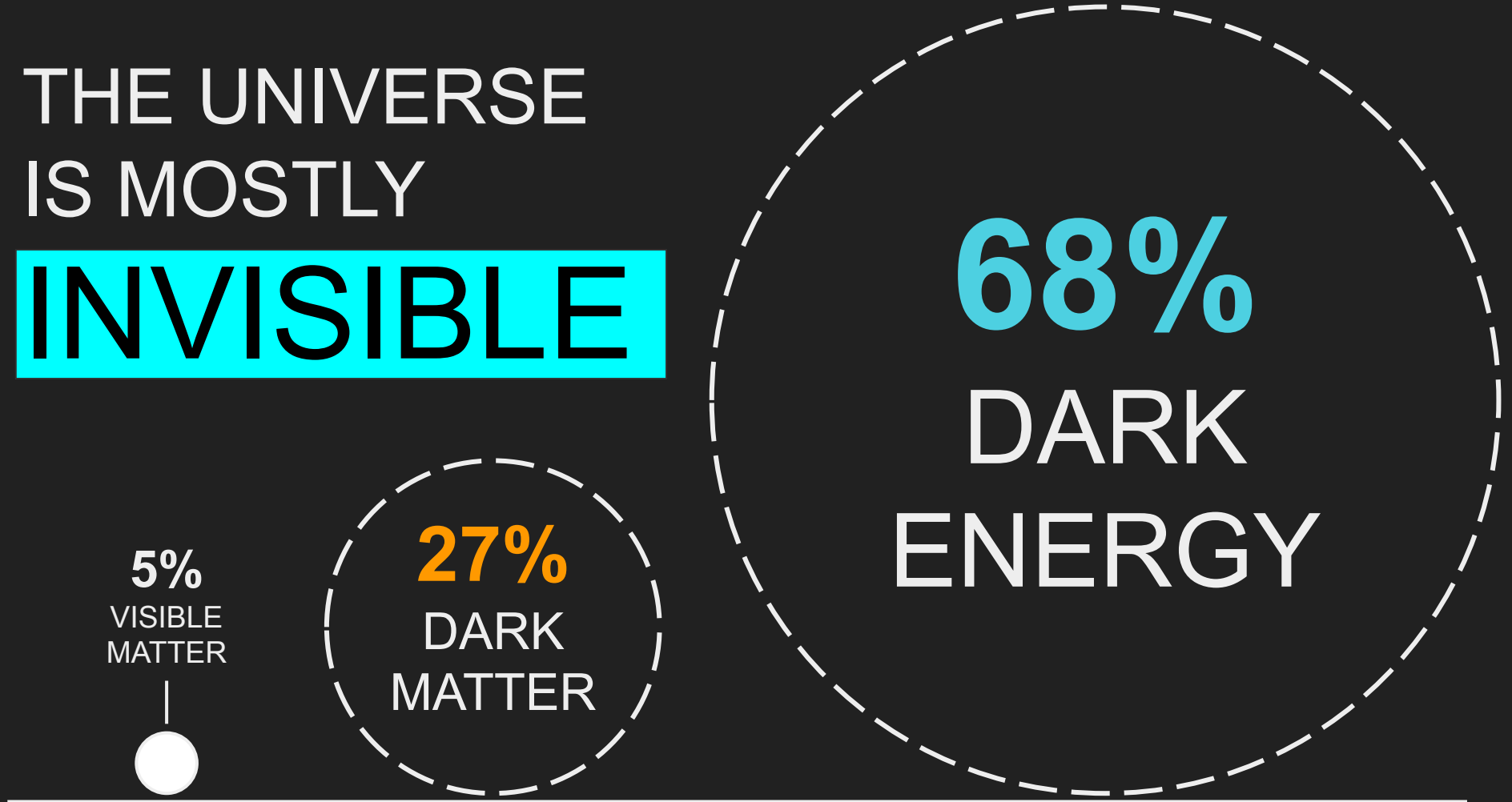


AND NOW
LOOK
AT THESE

STRUCTURES!

Pic credit: Suvendra Dutta

THE UNIVERSE IS MOSTLY INVISIBLE



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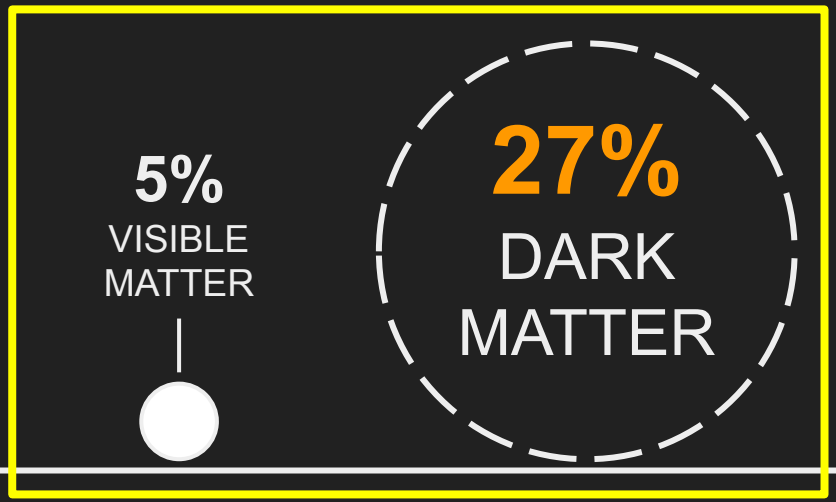


68%
DARK ENERGY

BIAS

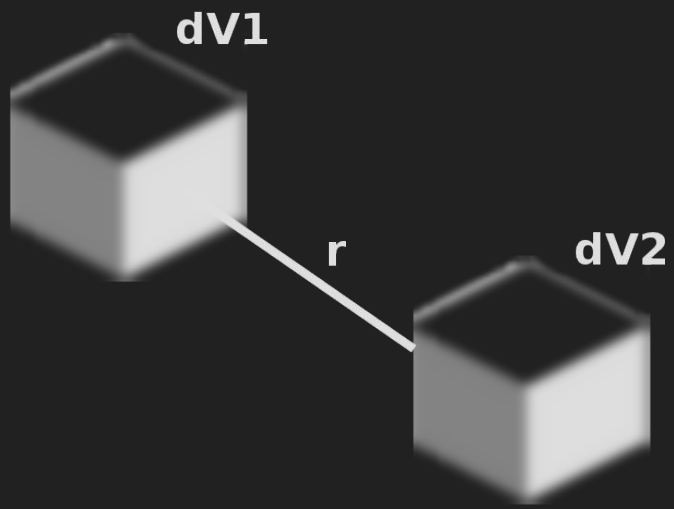
UNDERSTAND THE RELATIONSHIP BETWEEN GALAXIES AND THE UNDERLYING DARK MATTER

AT HIGH REDSHIFT!

AT HIGH REDSHIFT!

(z~3)

GALAXY CORRELATION FUNCTION



Excess number of pairs separated by r over the random distribution

BUT IT HAS REQUIREMENTS

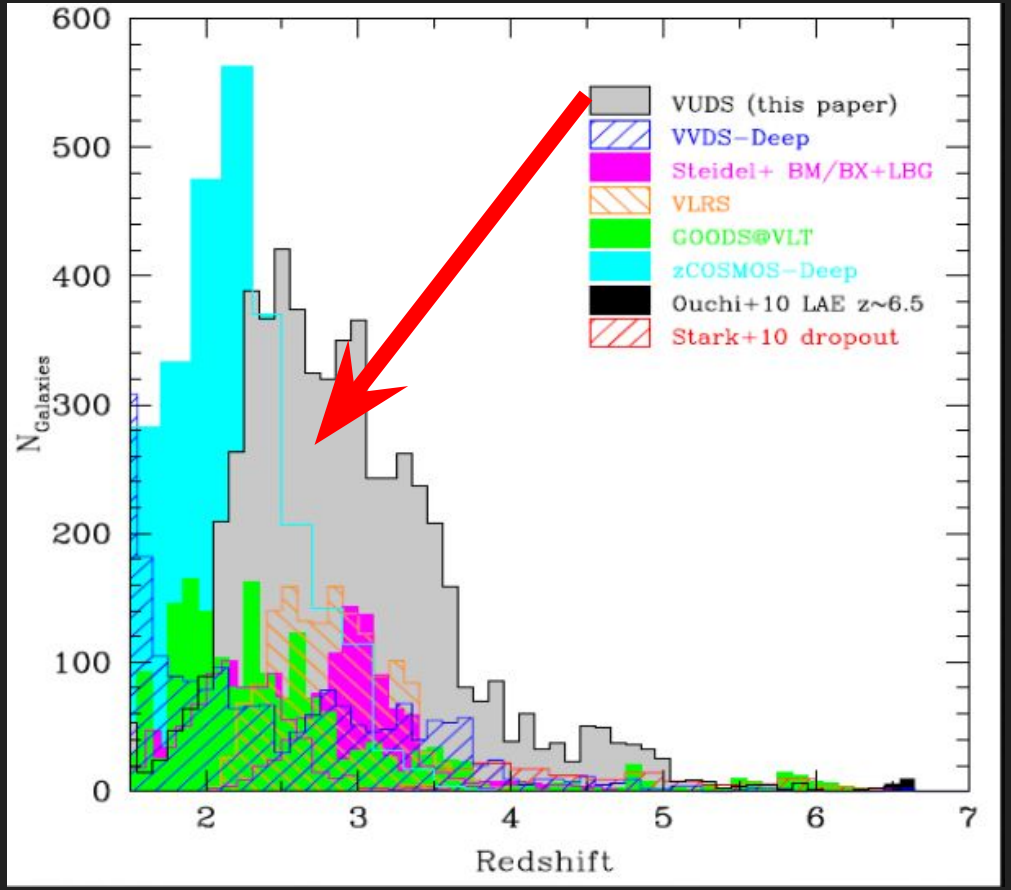
GALAXY SAMPLE

VIMOS ULTRA DEEP

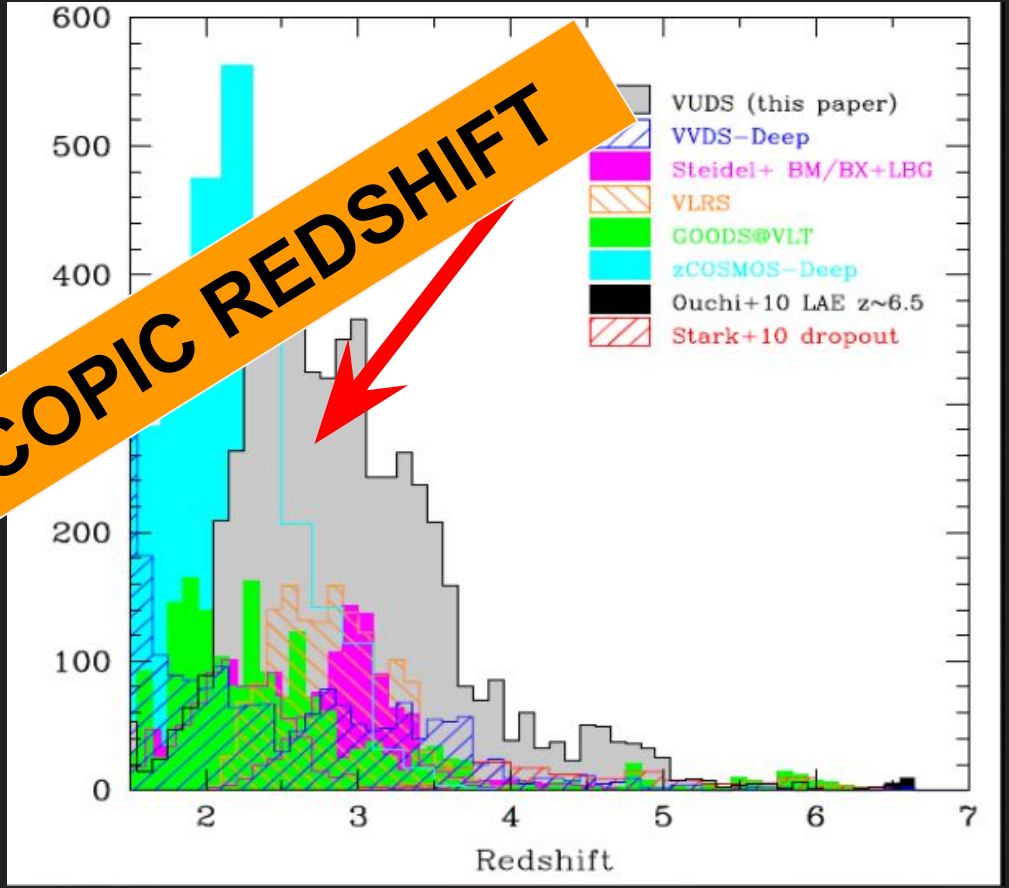
SURVEY (VUDS)

VIMOS ULTRA DEEP SURVEY (VUDS)

VIMOS ULTRA DEEP SURVEY (VUDS)



VIMOS ULTRA
DEEP SURVEY
(VUDS)

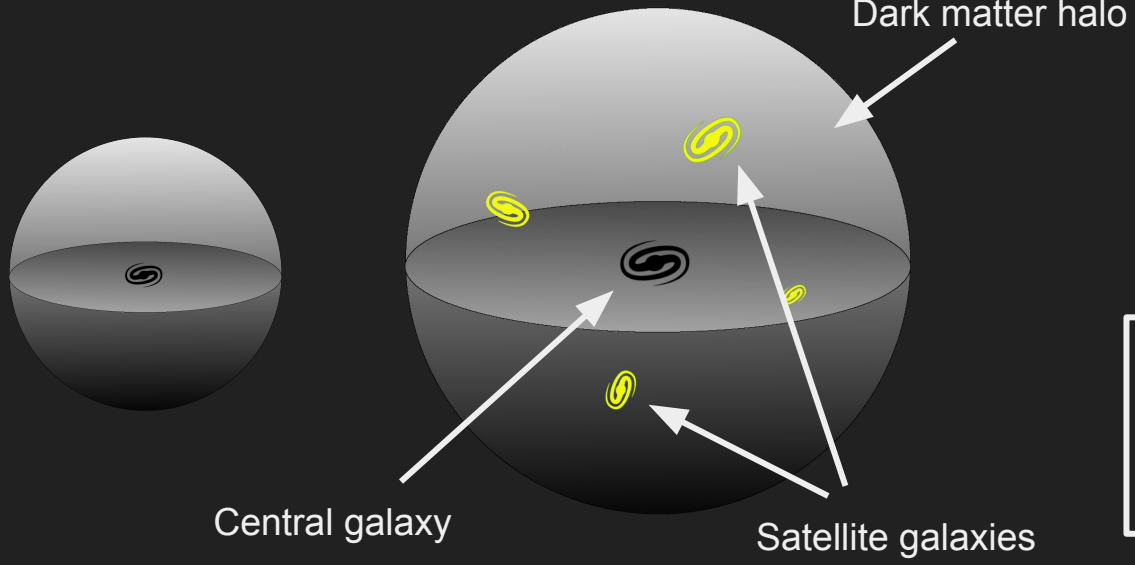


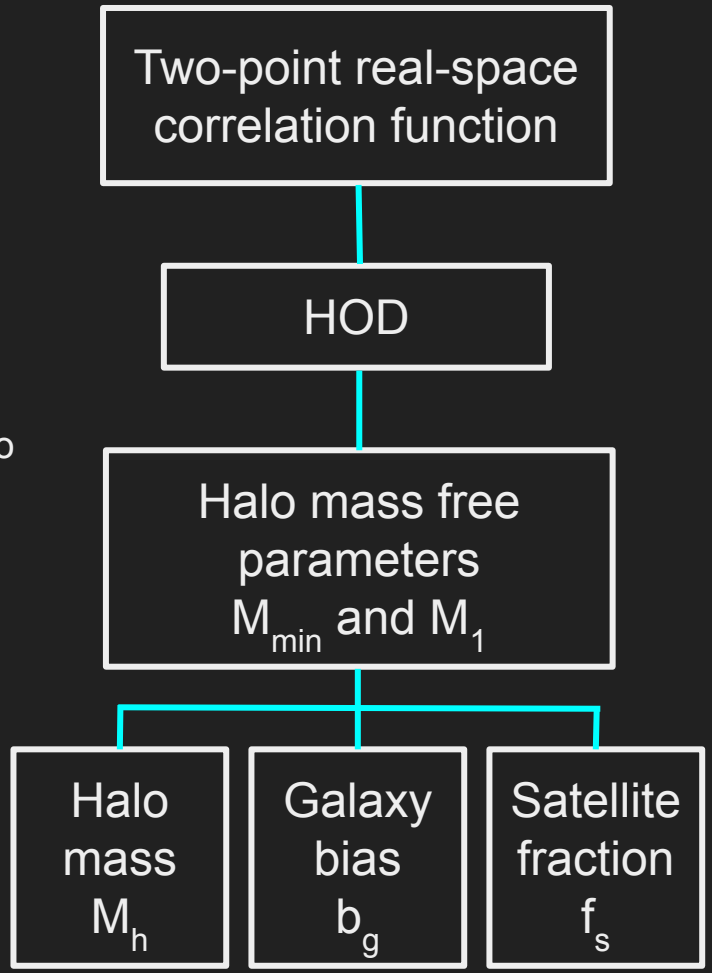
HALO OCCUPATION DISTRIBUTION MODELLING (HOD)

THE HOD FRAMEWORK

Assumptions:

1. Galaxies reside in dark matter halos.
2. Number of galaxies inside the halo is the function of the mass of the halo.





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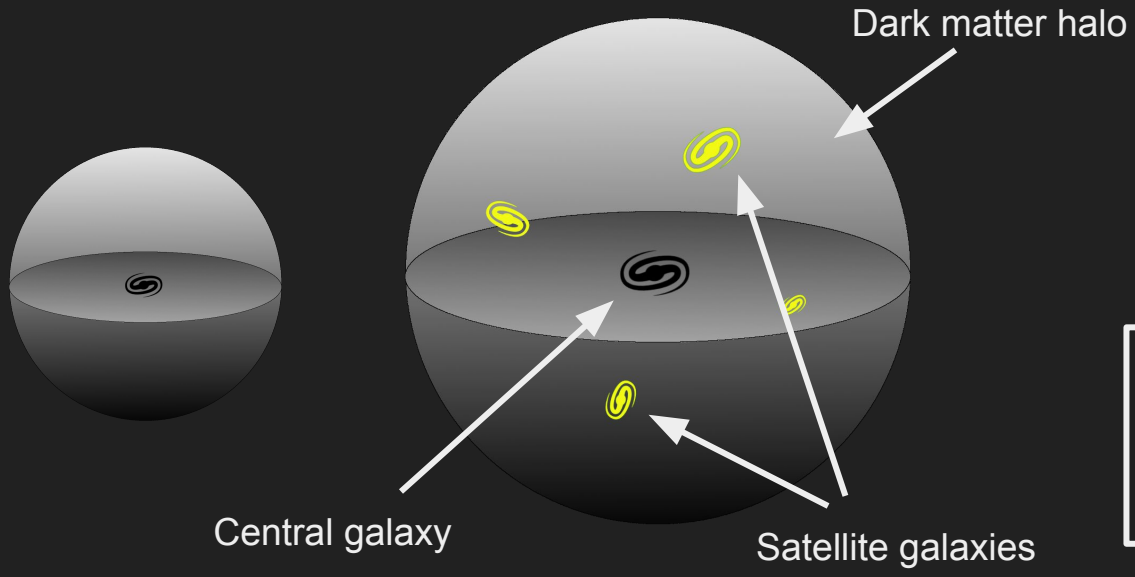

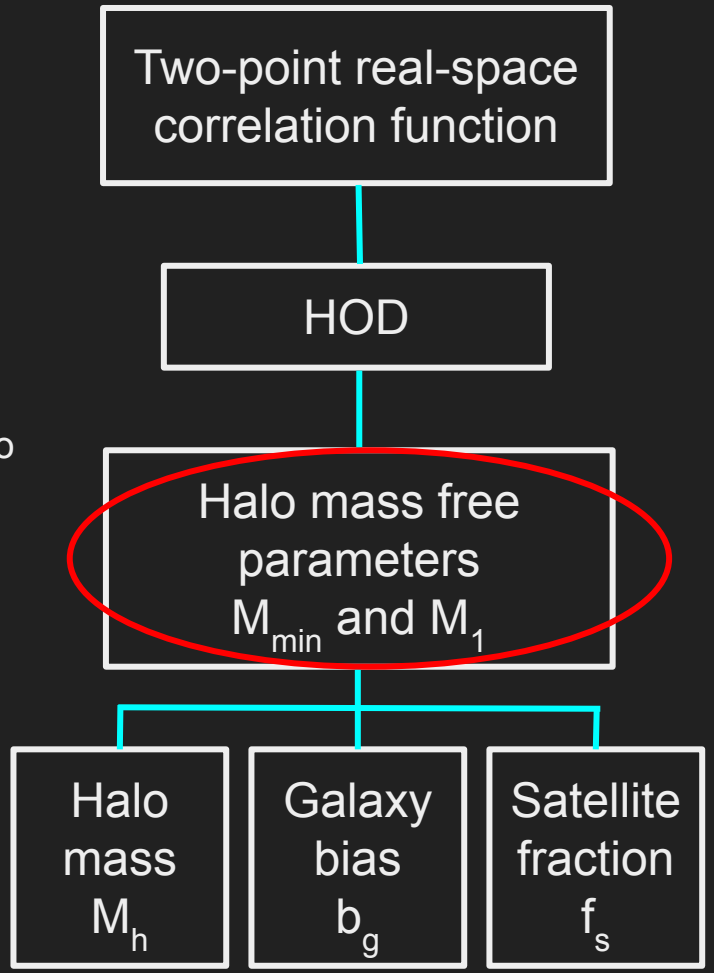

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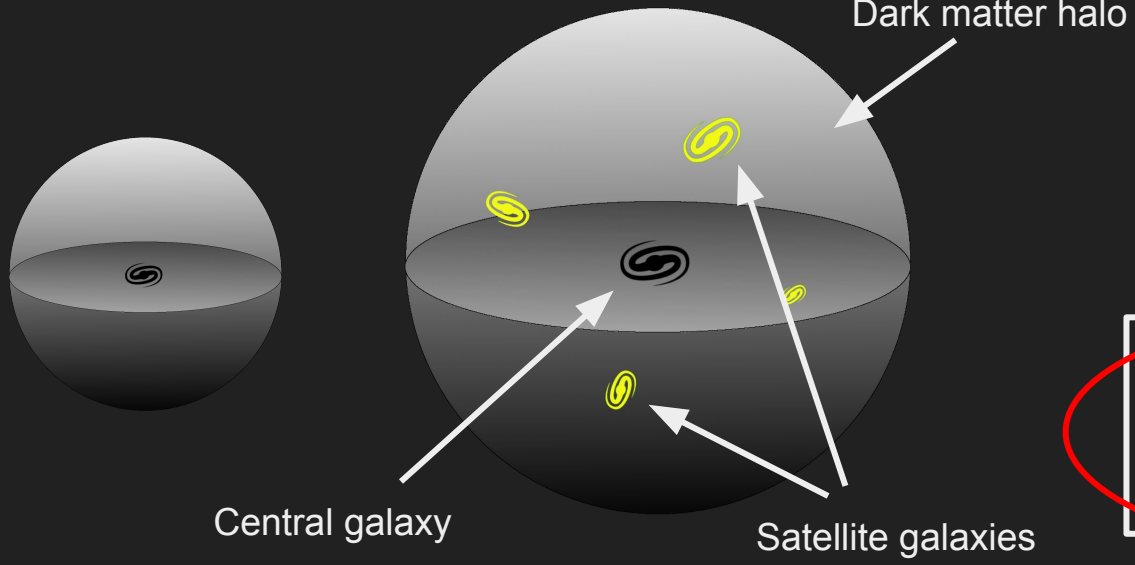
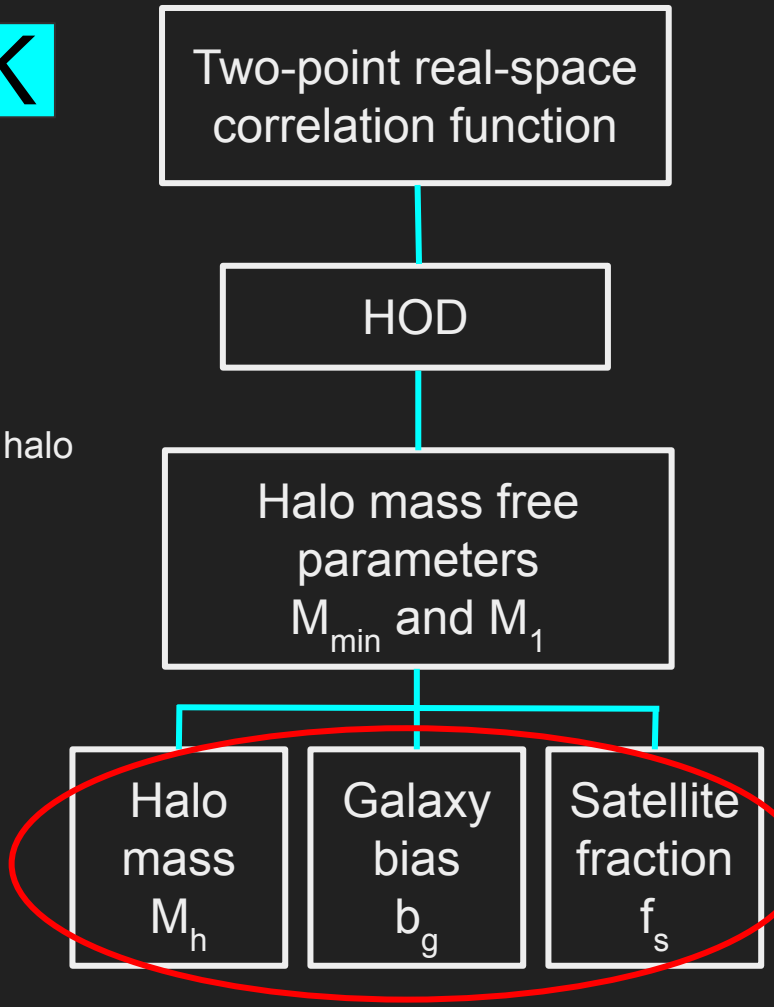
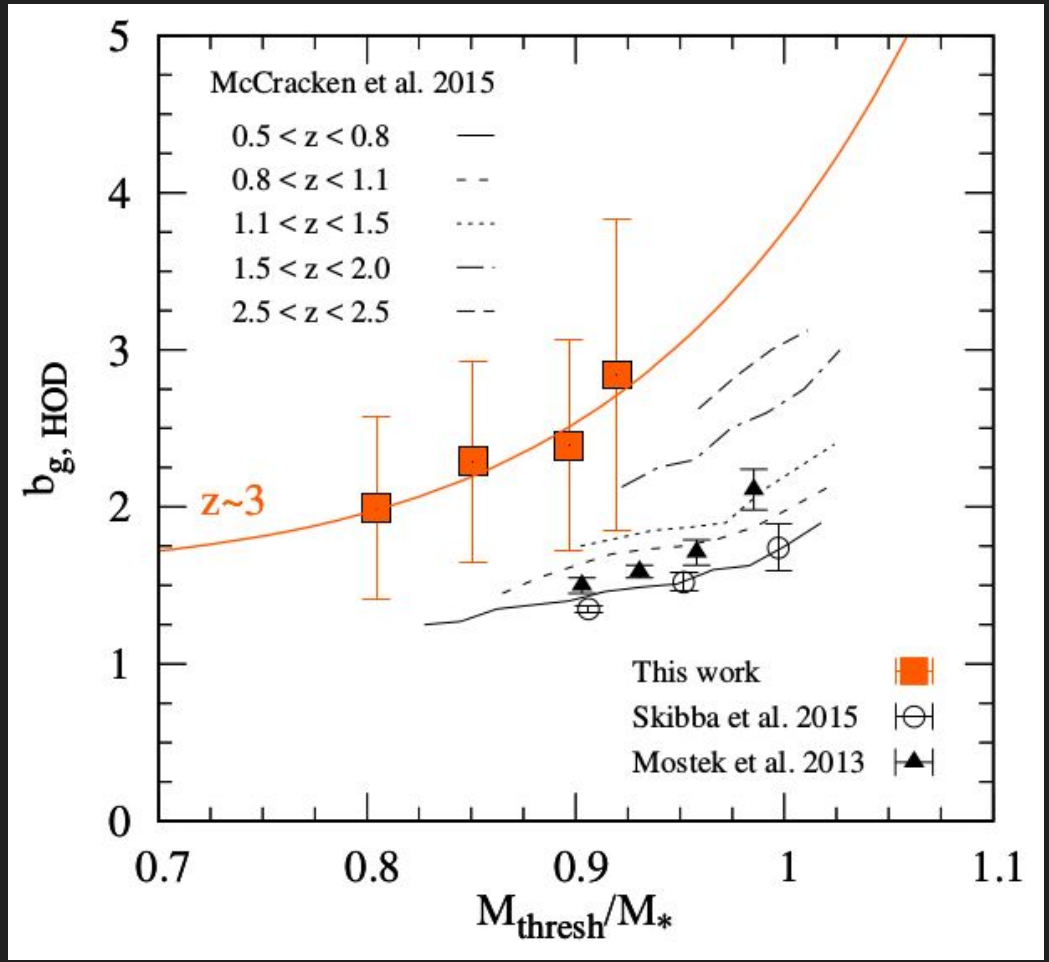




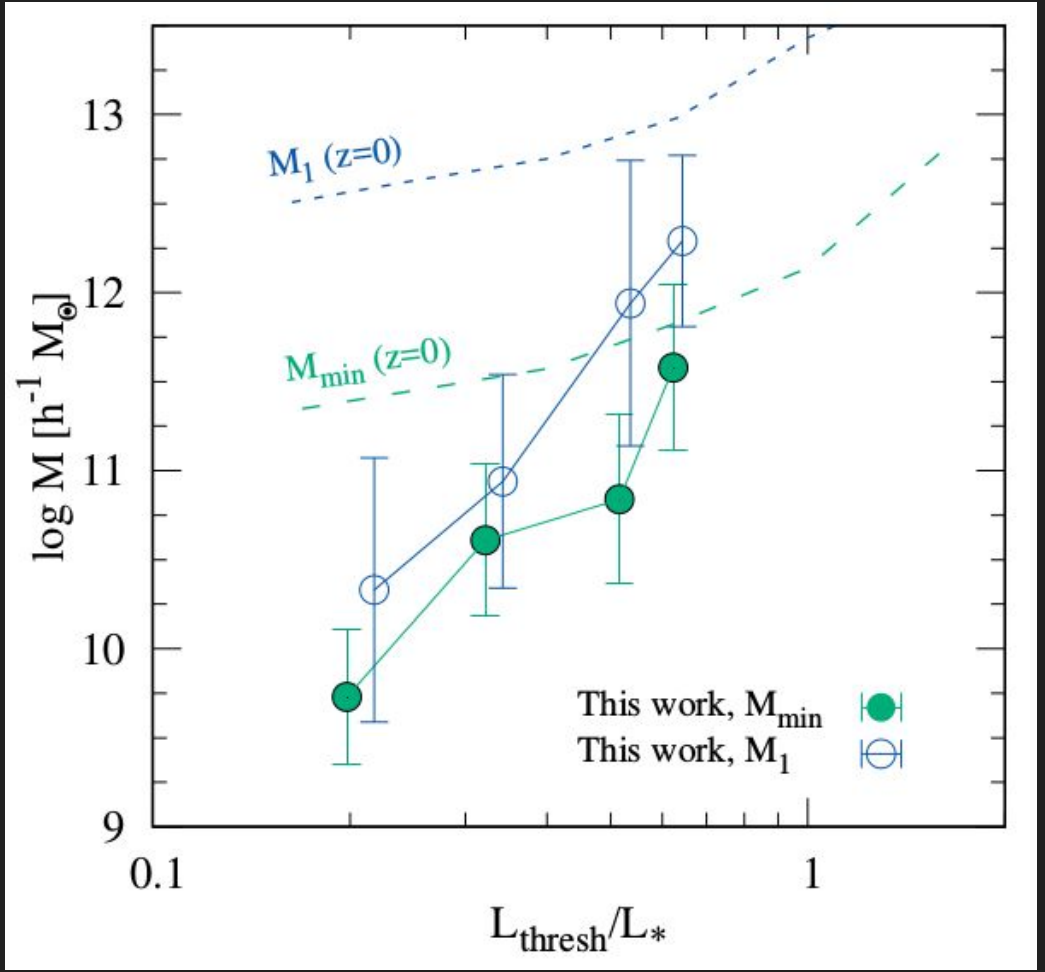
LARGE SCALE GALAXY BIAS

Redshift AND luminosity and stellar mass dependence



Durkalec et al. 2018, A&A 612A, 42D

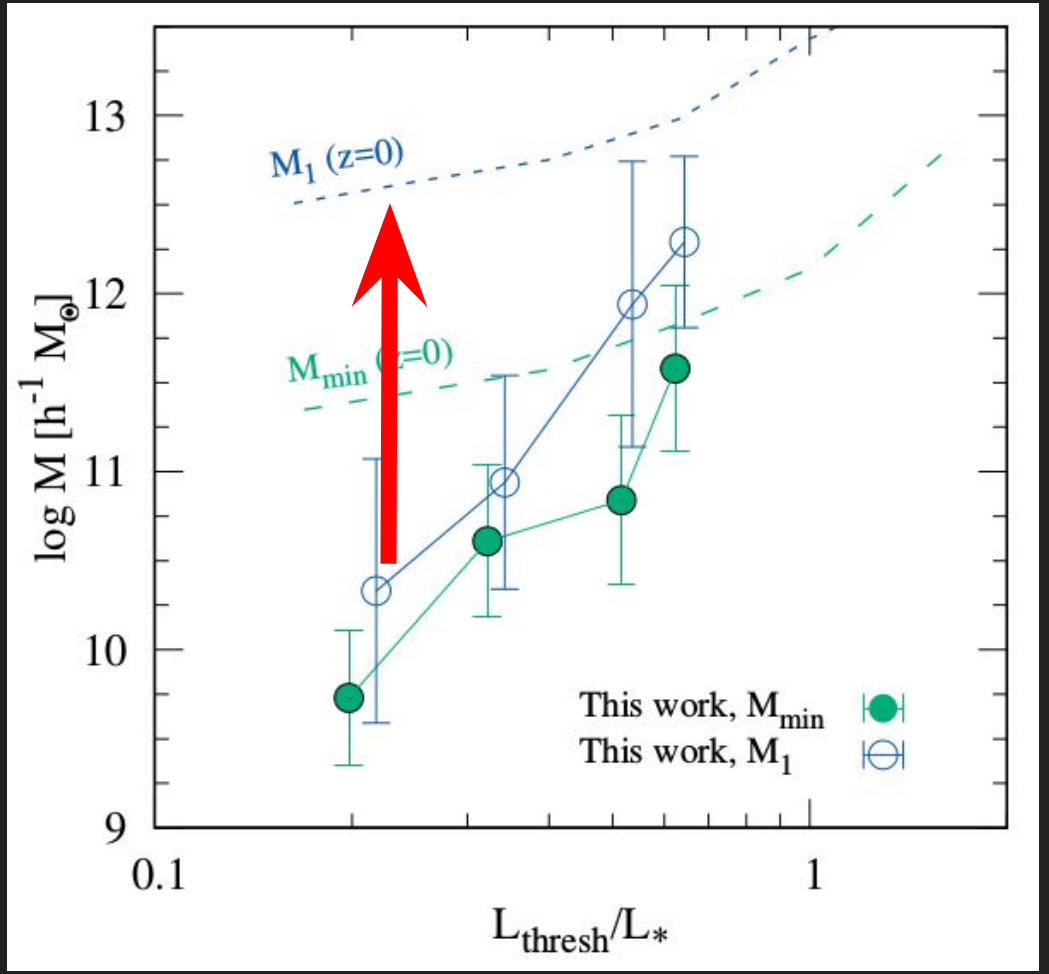
DARK MATTER
HALO MASSES



Durkalec et al. 2018, A&A 612A, 42D

DARK MATTER
HALO MASSES

Build up of dark matter haloes masses with cosmic time

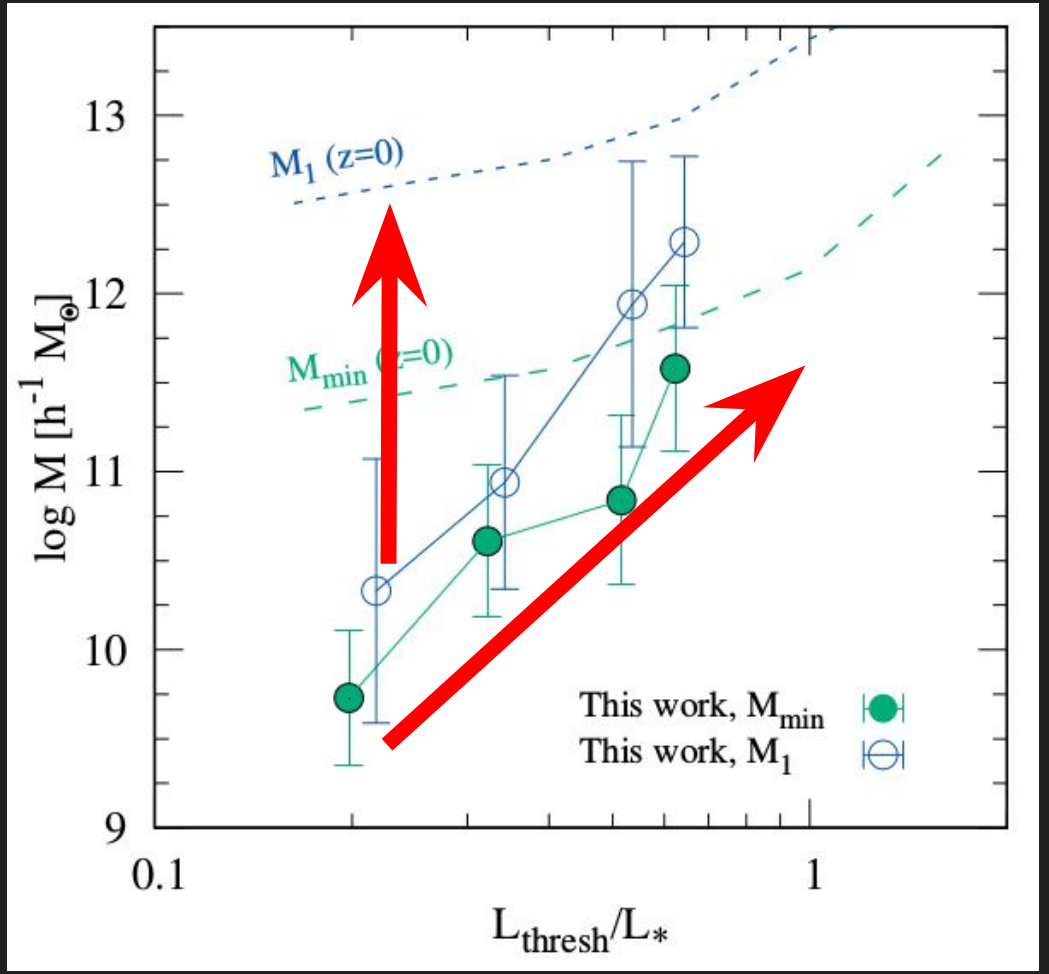


Durkalec et al. 2018, A&A 612A, 42D

DARK MATTER
HALO MASSES

Build up of dark matter haloes masses with cosmic time

Growth with rising luminosity and stellar mass of galaxy population



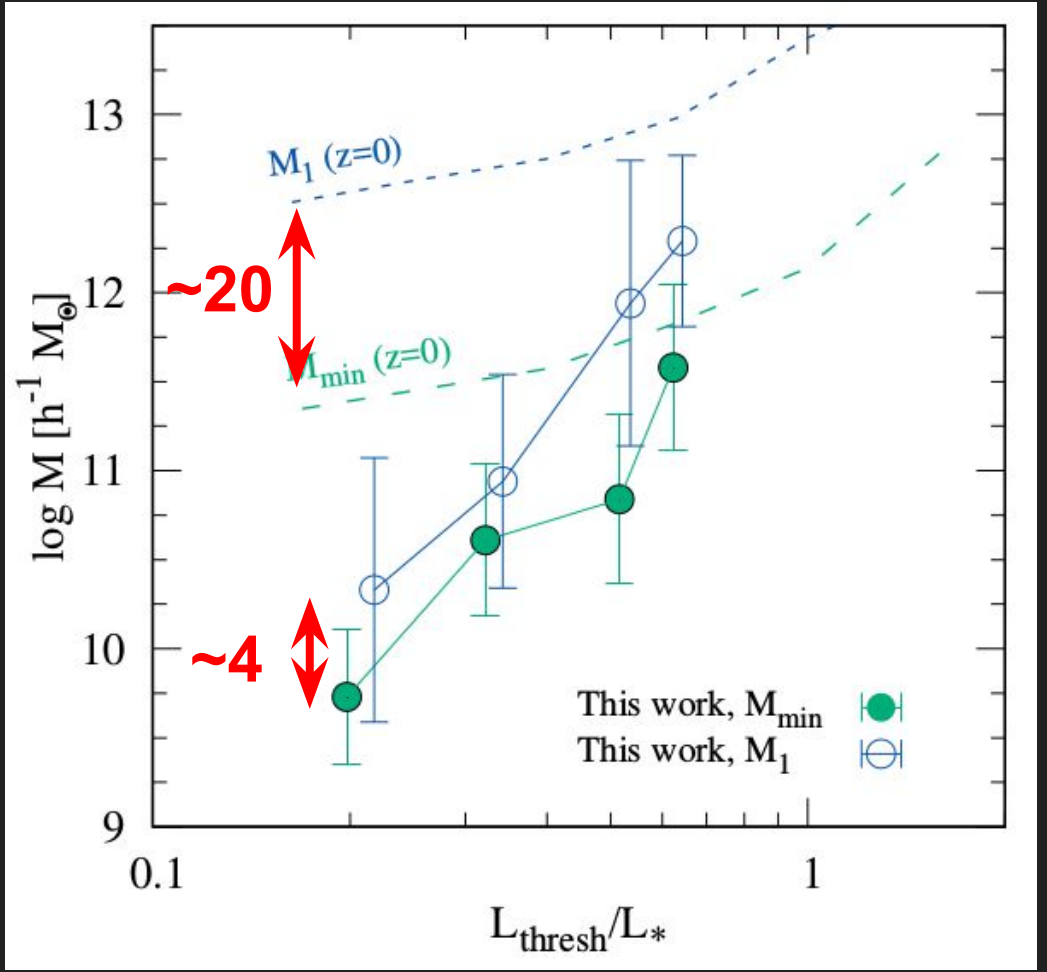
Durkalec et al. 2018, A&A 612A, 42D

DARK MATTER
HALO MASSES

Build up of dark matter haloes masses with cosmic time

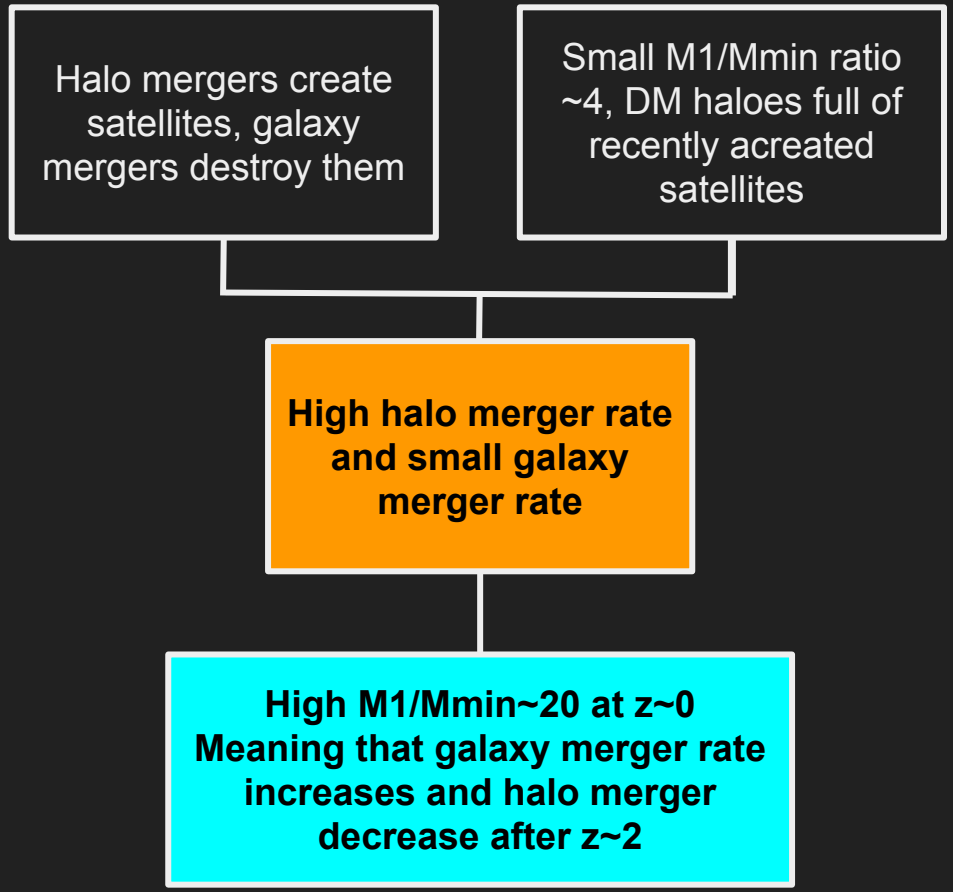
Growth with rising luminosity and stellar mass of galaxy population

M_1/M_{min} ratio

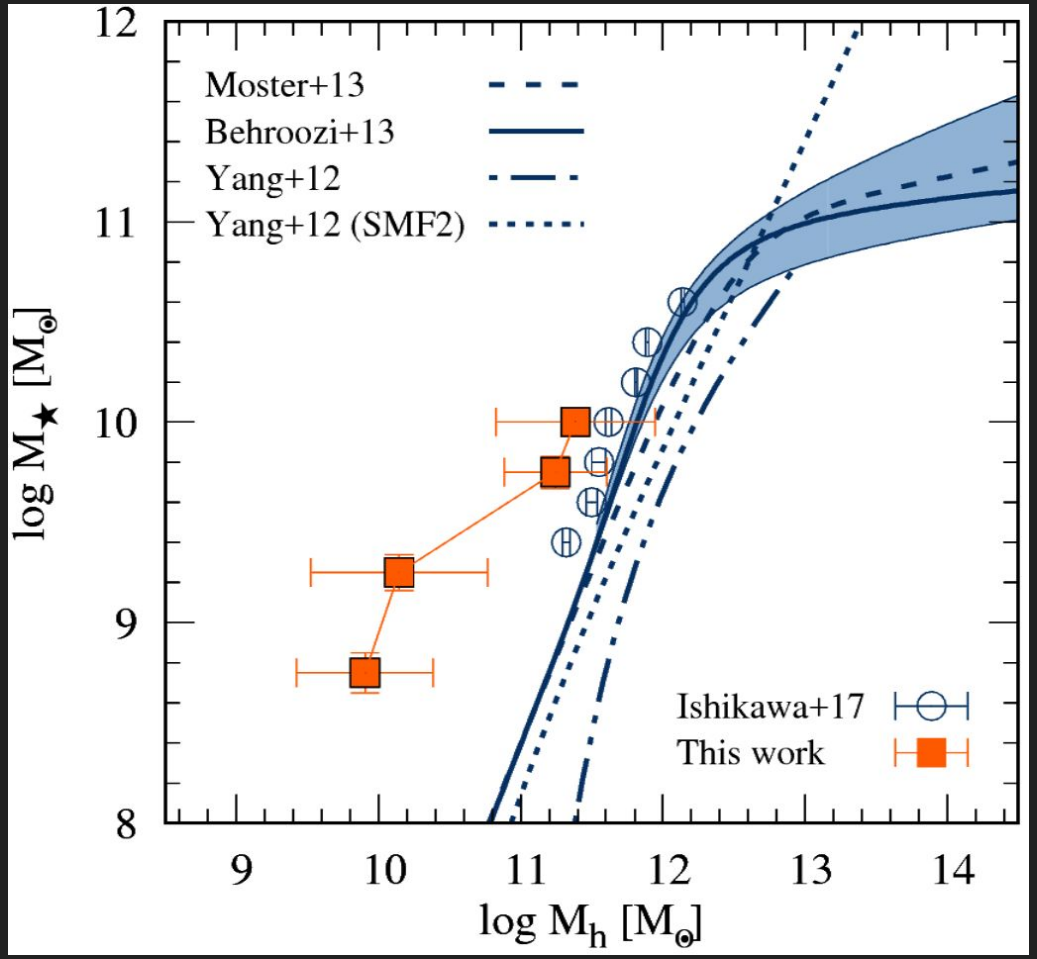


Durkalec et al. 2018, A&A 612A, 42D

WHAT DOES SMALL M_1/M_{min} RATIO MEAN?

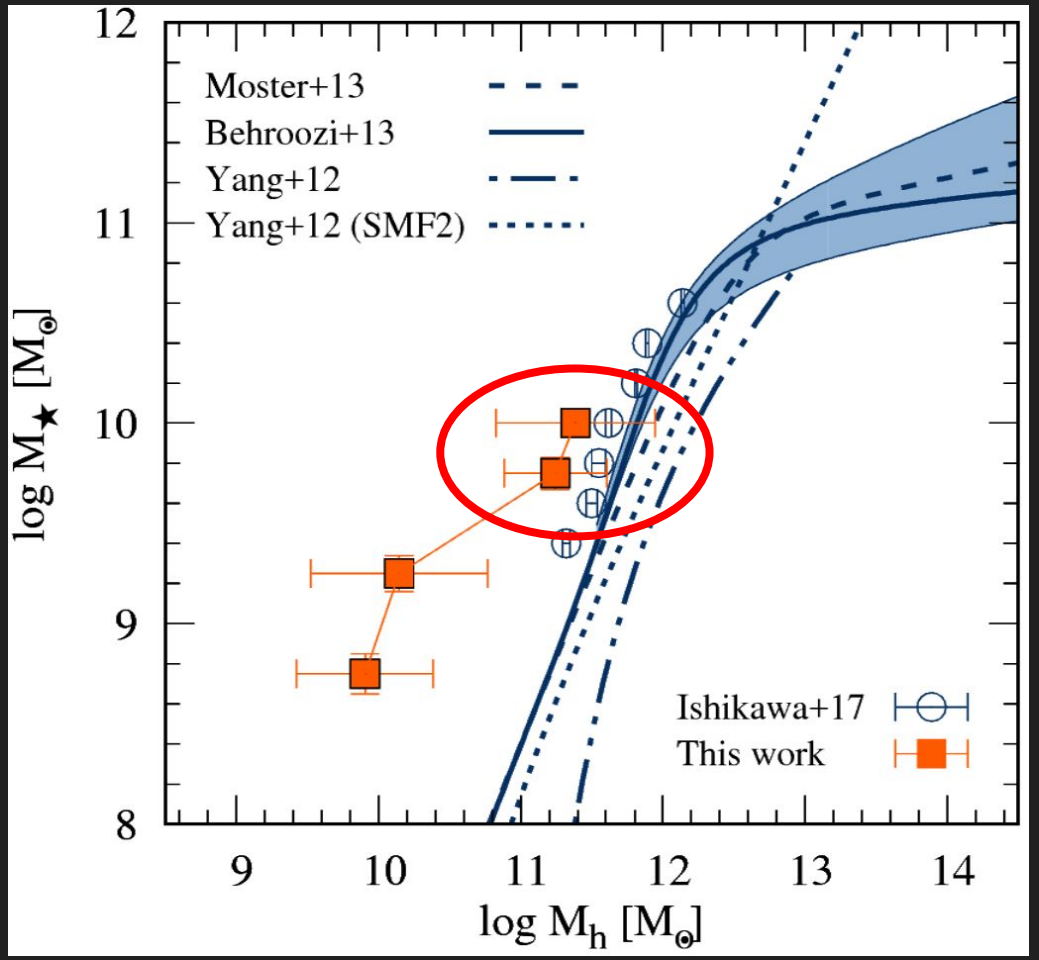


STELLAR TO HALO MASS RATIO



Durkalec et al. 2018, A&A 612A, 42D

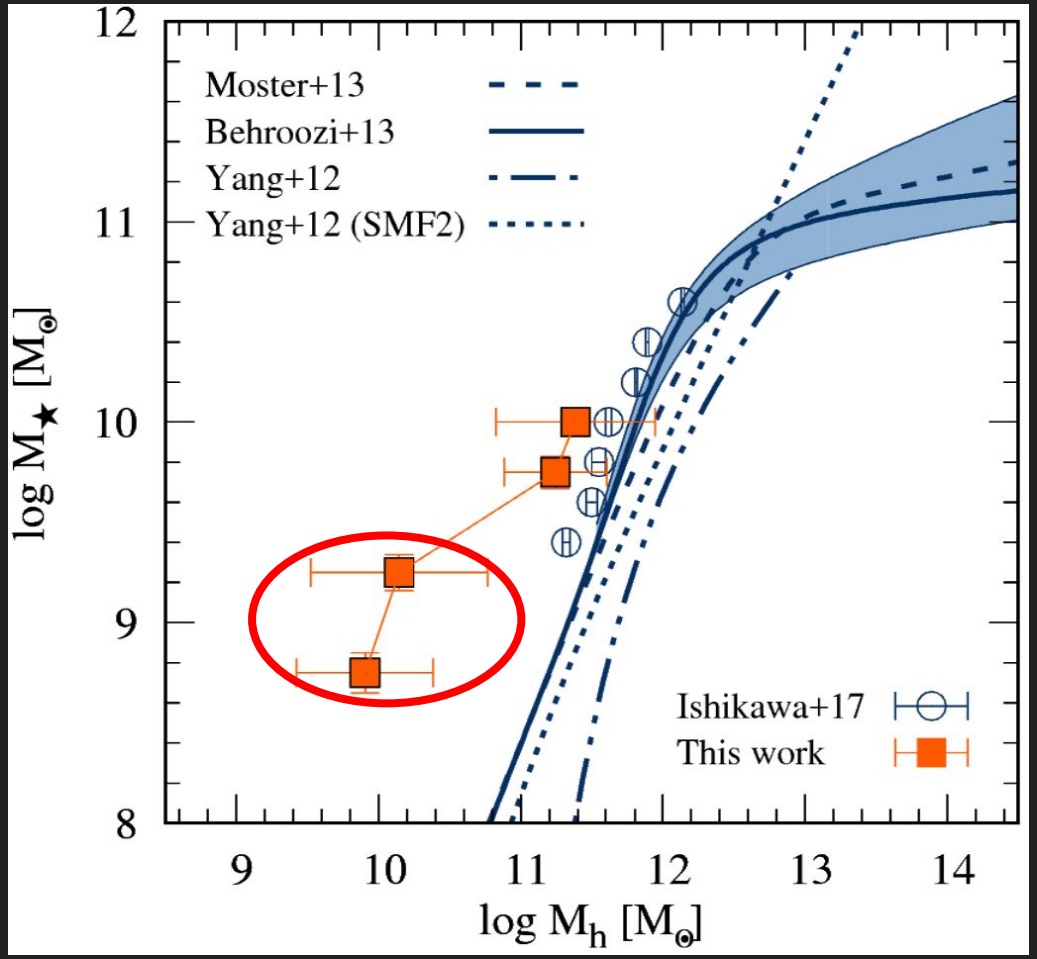
STELLAR TO HALO MASS RATIO



Durkalec et al. 2018, A&A 612A, 42D

STELLAR TO HALO MASS RATIO

Dark matter halos less massive than expected

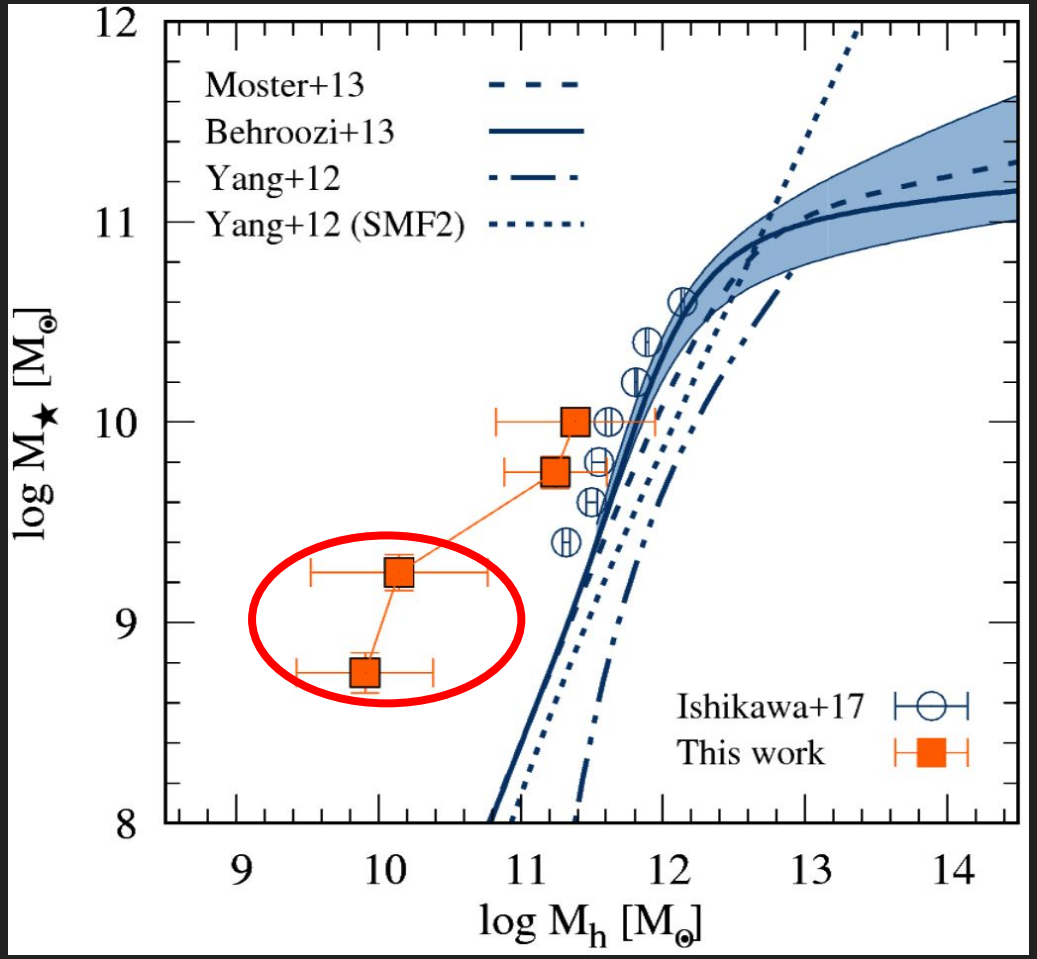


Durkalec et al. 2018, A&A 612A, 42D

STELLAR TO HALO MASS RATIO

Dark matter halos less massive than expected

Feedback?
Dark (empty) halos?

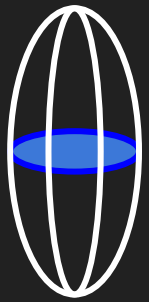


Durkalec et al. 2018, A&A 612A, 42D

THANK YOU!

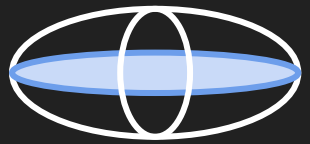
Special thanks to:
Olivier Le Fevre (LAM)
Agnieszka Pollo (NCBJ)
and the VUDS team

Interested? There is more! Check out
Durkalec et al. 2015, A&A, 583A, 128D
Durkalec et al. 2018, A&A, 612A, 42D

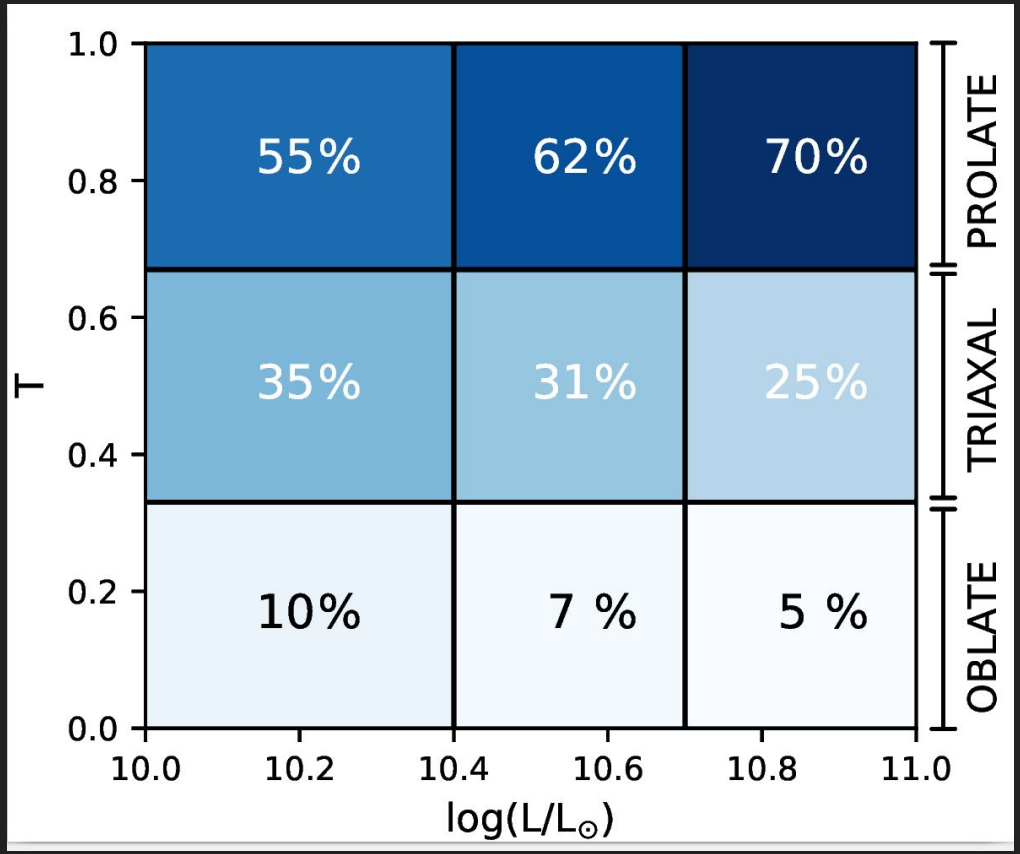


PROLATE

SPHERICAL

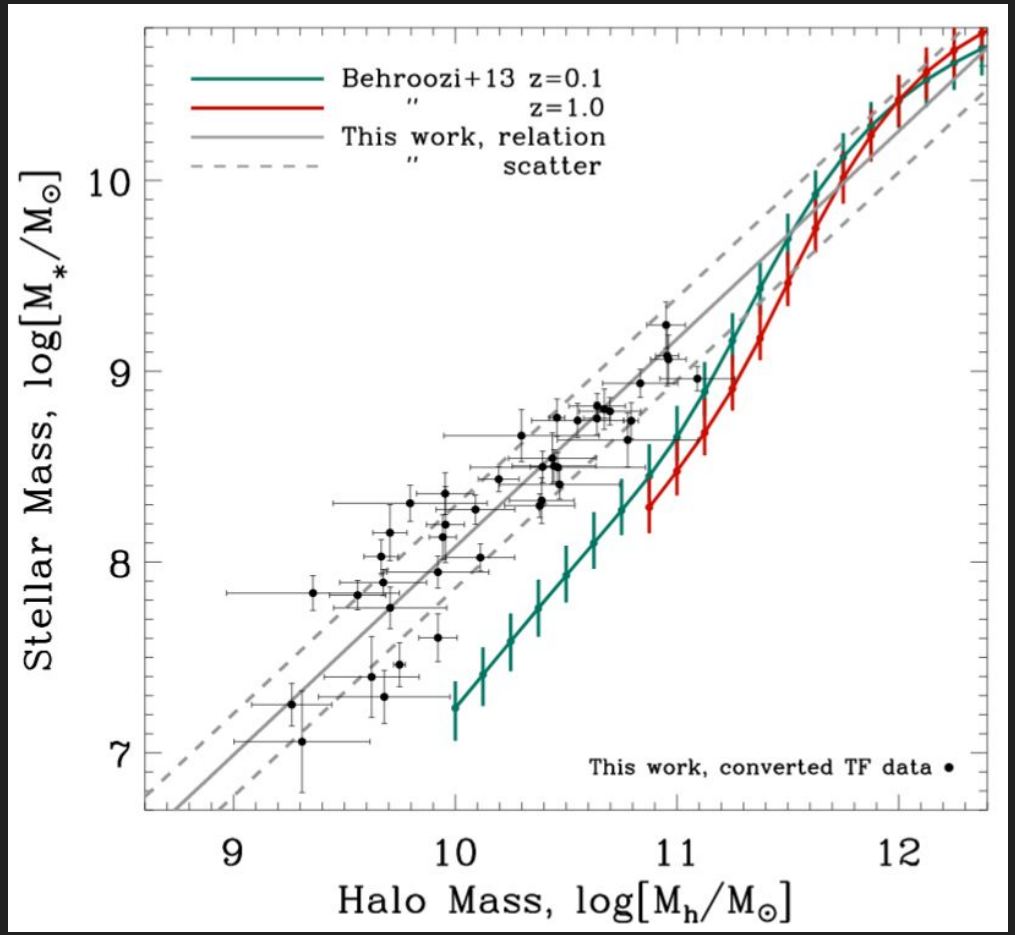


OBLATE



BolshoiP simulations

Figure from Górecki et al. 2019
(in preparation)



Miller et al. 2014, ApJ, 782, 115M