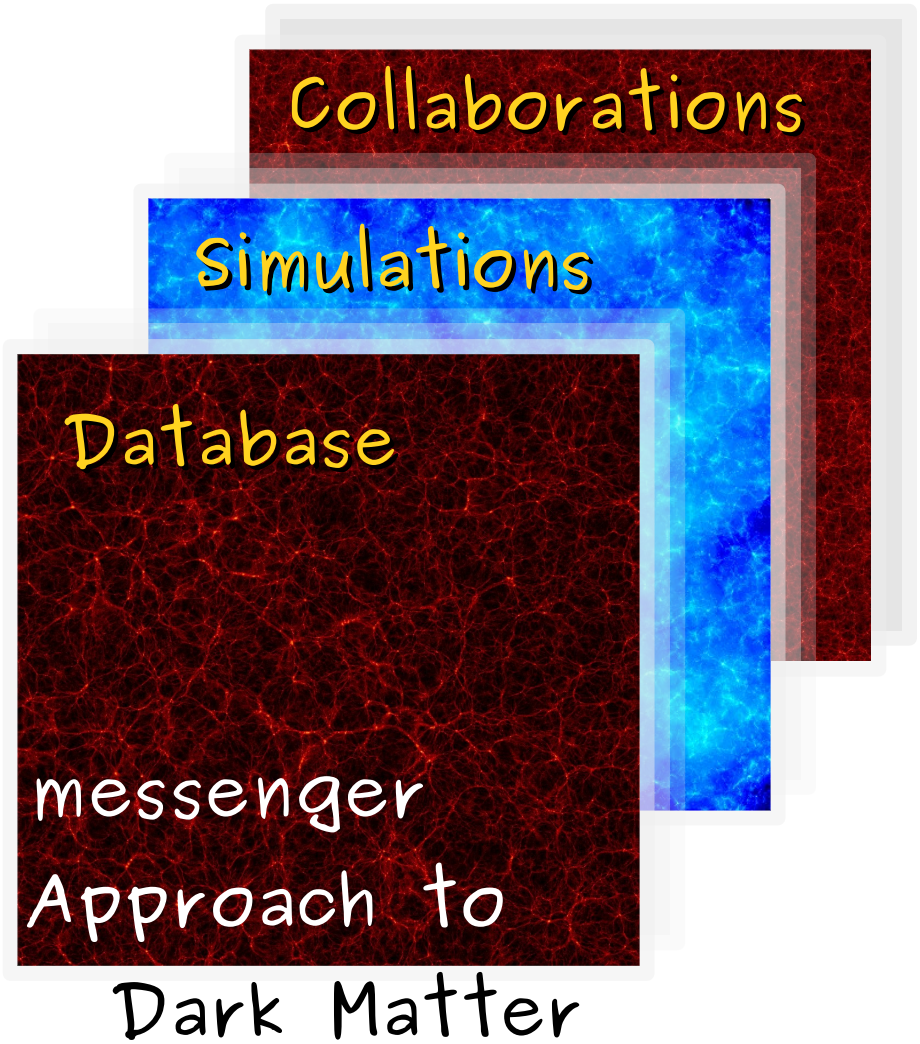


The MultiDark Universes

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Data release &
Clustering of
CMASS galaxies



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Aims to Paper I

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▶ Purpose:

- ▶ Present the data base
- ▶ Show reliability of MultiDark SAMs (MuSAMs)
- ▶ Show examples what can be done with MuSAMs

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▶ Tests and Check-ups:

- ▶ Sanity check regarding basic properties (SMF, SFRF etc.) → **DONE**
- ▶ Present a science case e.g. BOSS-CMASS selection → **ALMOST DONE**
- ▶ Clustering studies → ... ?

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The MultiDark SAMs

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MDPL2
1 Gpc/h box size
Planck+13 cosmology
ROCKSTAR Halo Finders
'consistent (merger) trees'

3840³ particles
force resolution: 13 kpc/h – 5 kpc/h
mass resolution: 1.51x10⁹ Msun/h
125 redshift snapshots

Basic/Baryonic
properties

Halo
properties

Magnitudes/
Luminosities

- **Galacticus** (Benson 2012)
- **SAG** (Gargiulo et al. 2015)
- **SAGE** (Croton et al. 2016)

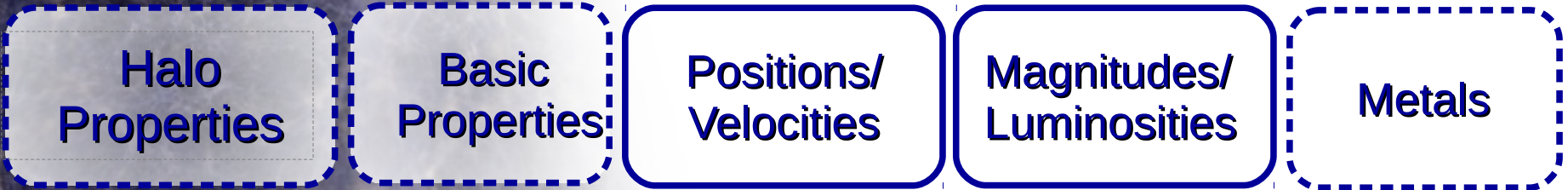
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... and more to come ...!

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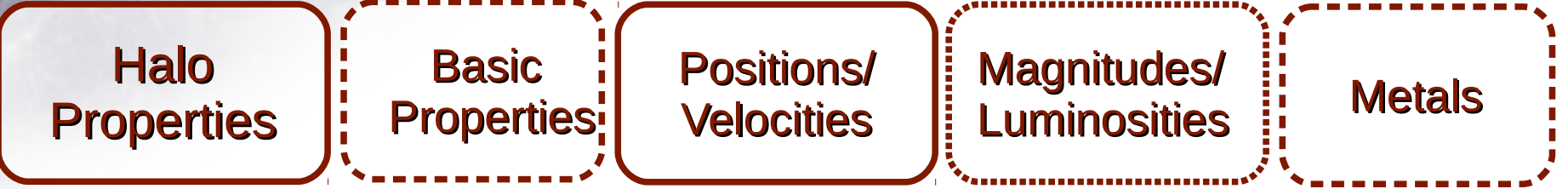
Galacticus



SAG



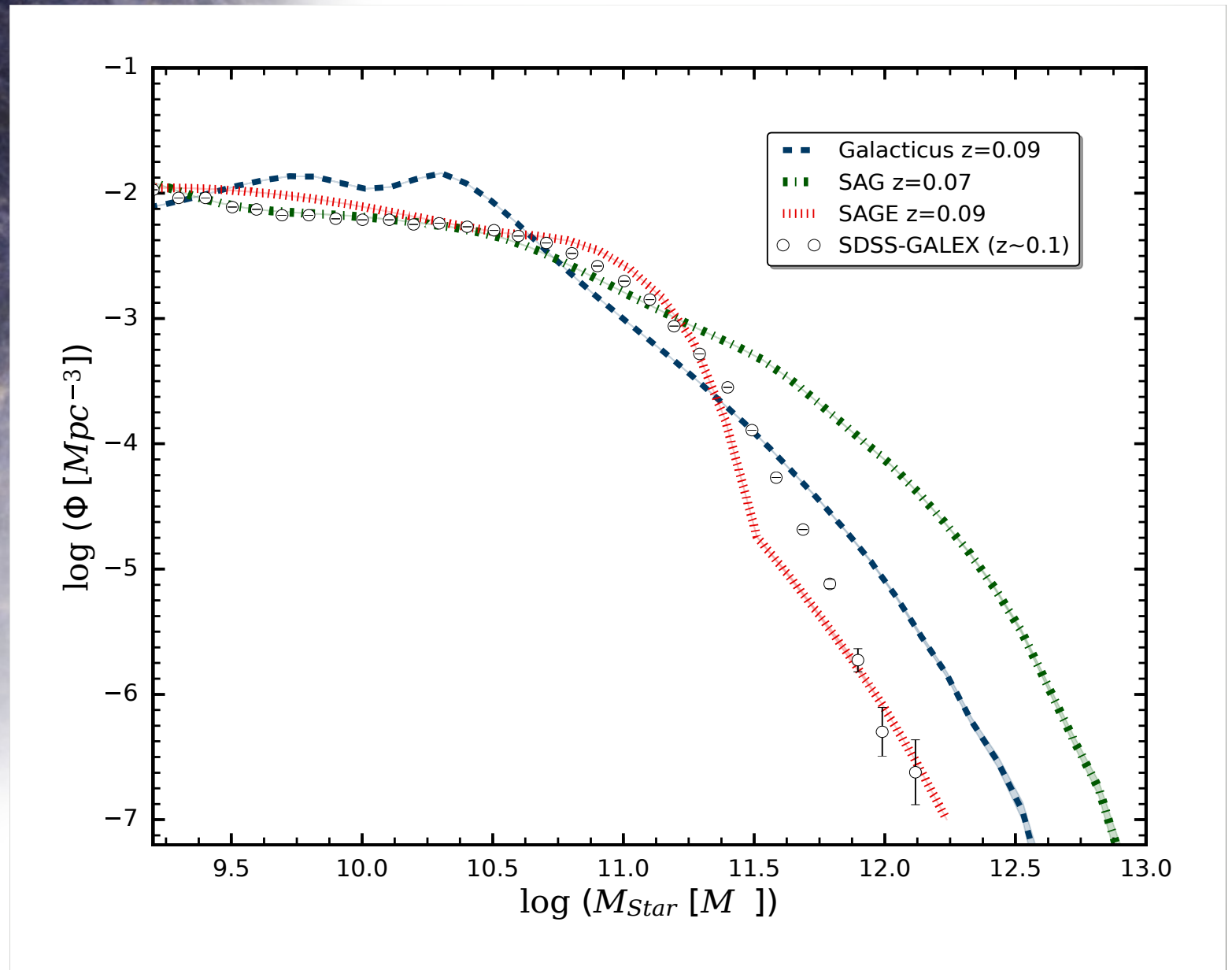
SAGE



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Stellar Mass Function $z \sim 0.1$

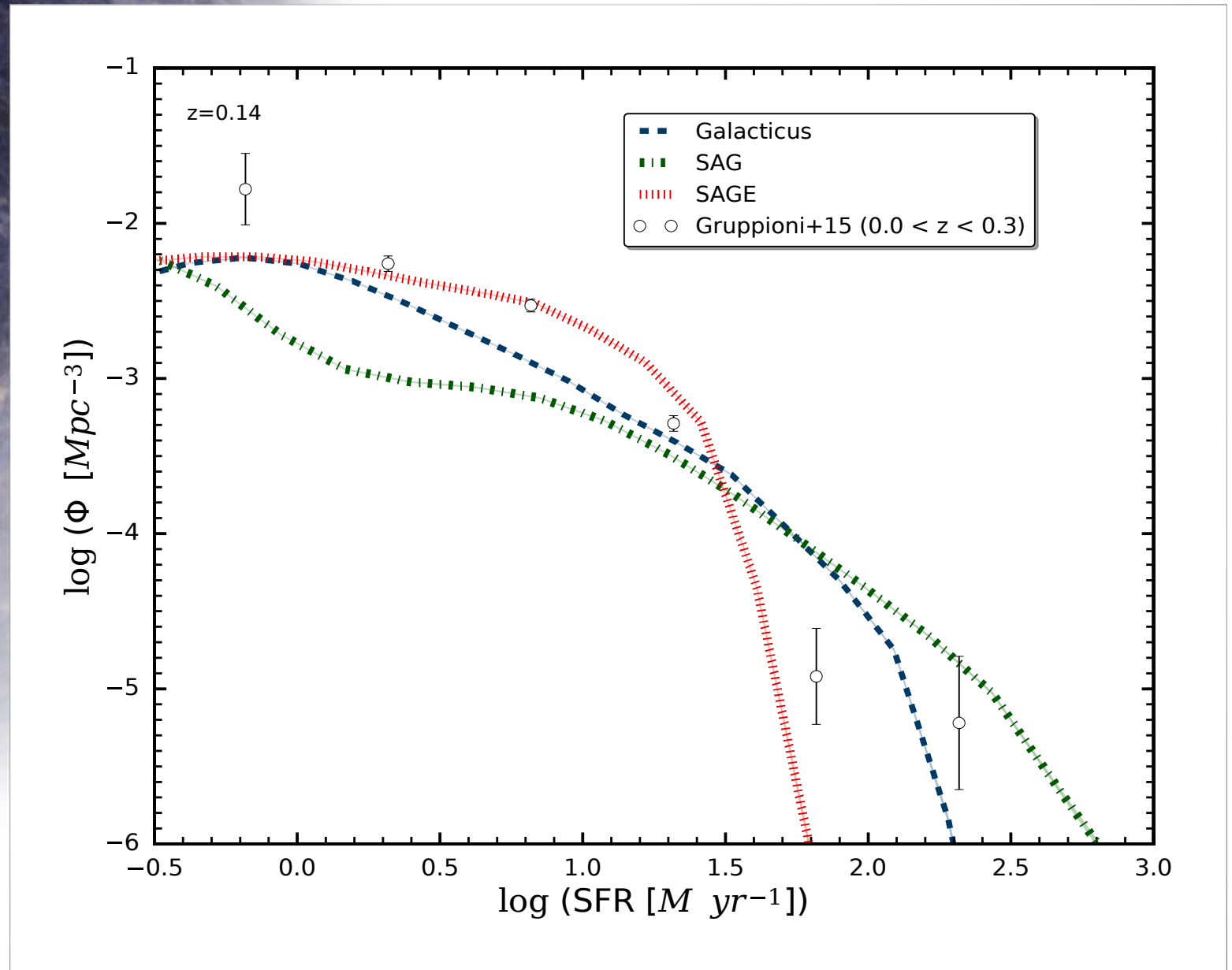


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Star Formation Rate Function $z=0.14$

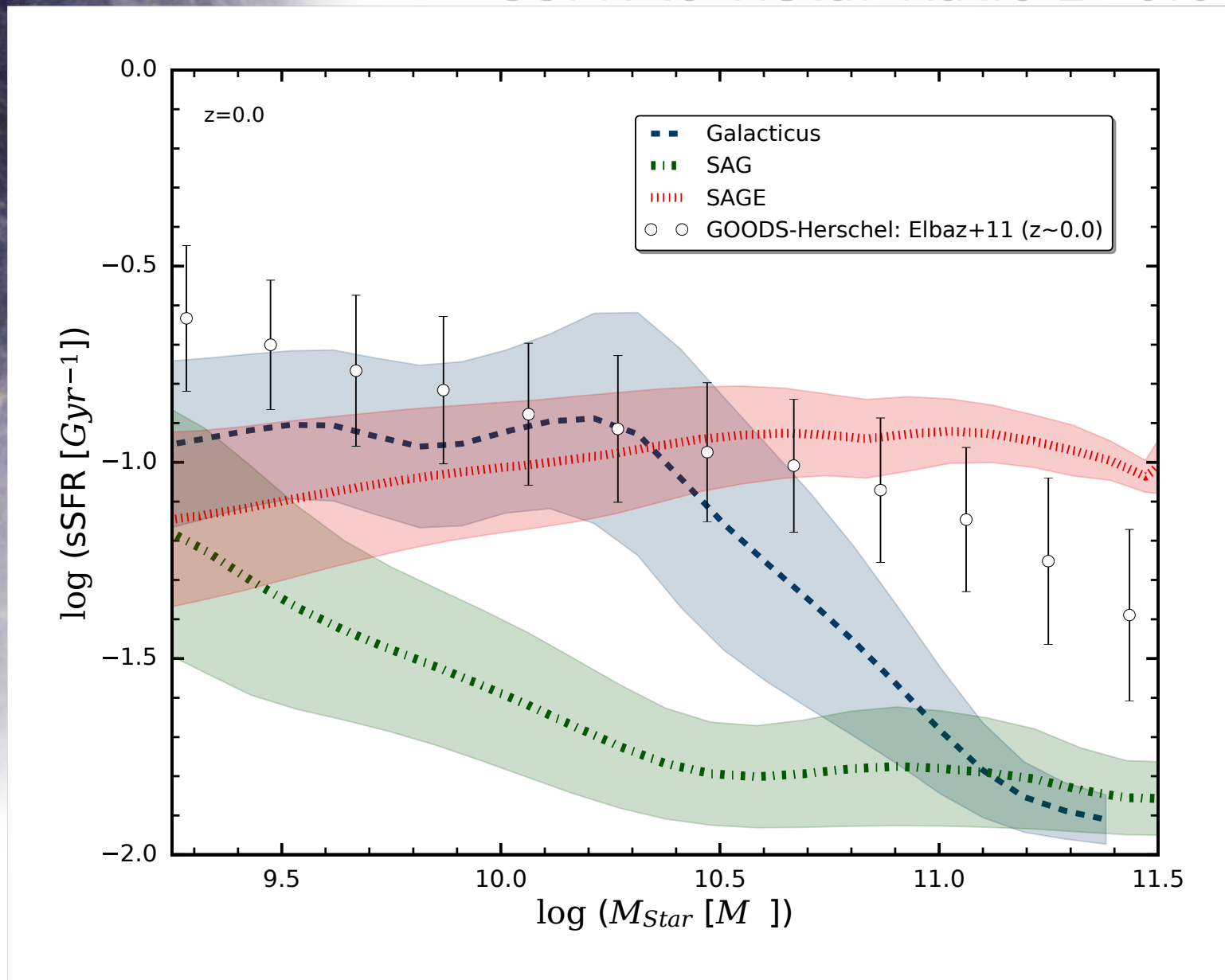


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SSFR-to-Mstar Ratio z=0.0



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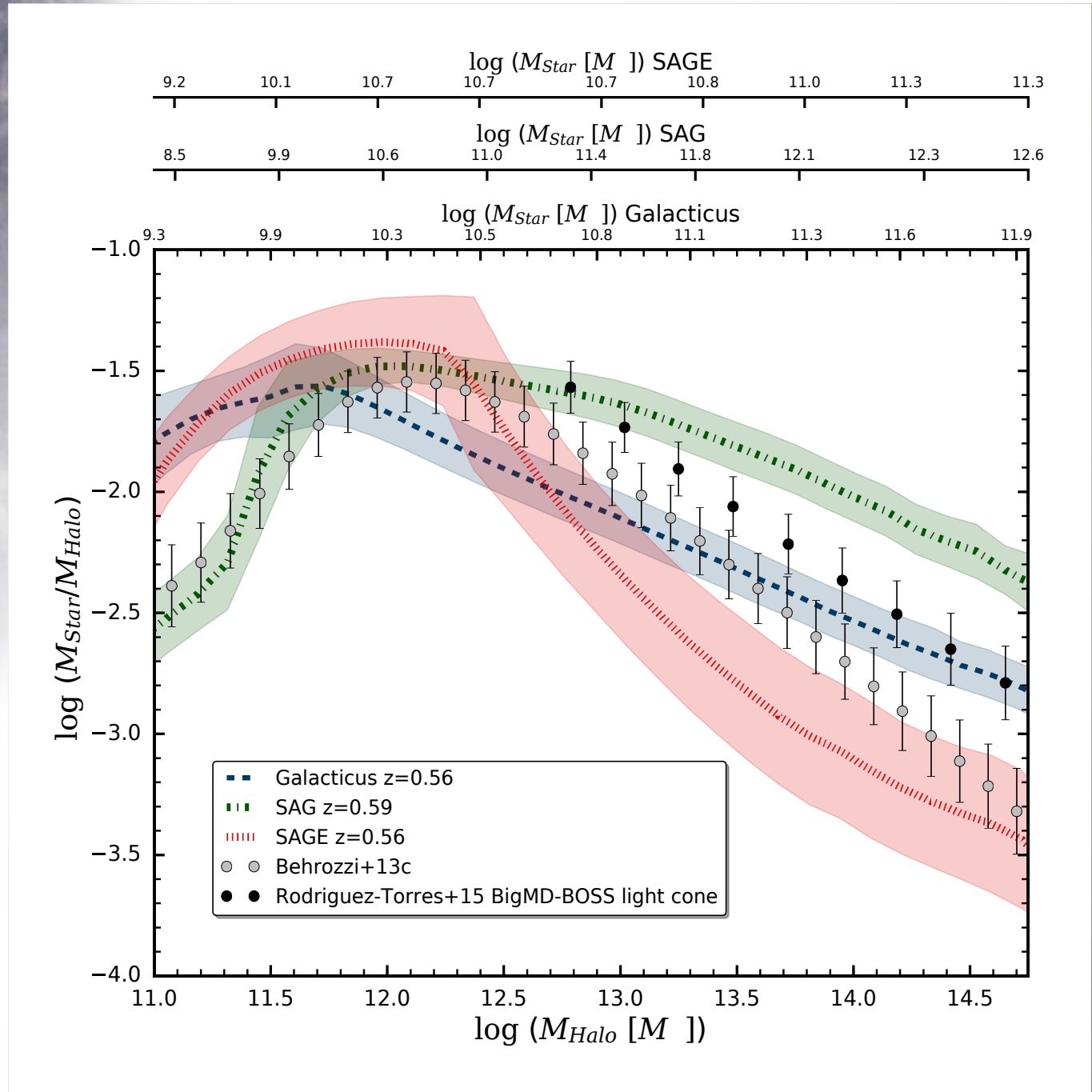
Goes SAMs =)

Mstar-to-Mhalo Ratio vs. Mhalo $z \sim 0.55$

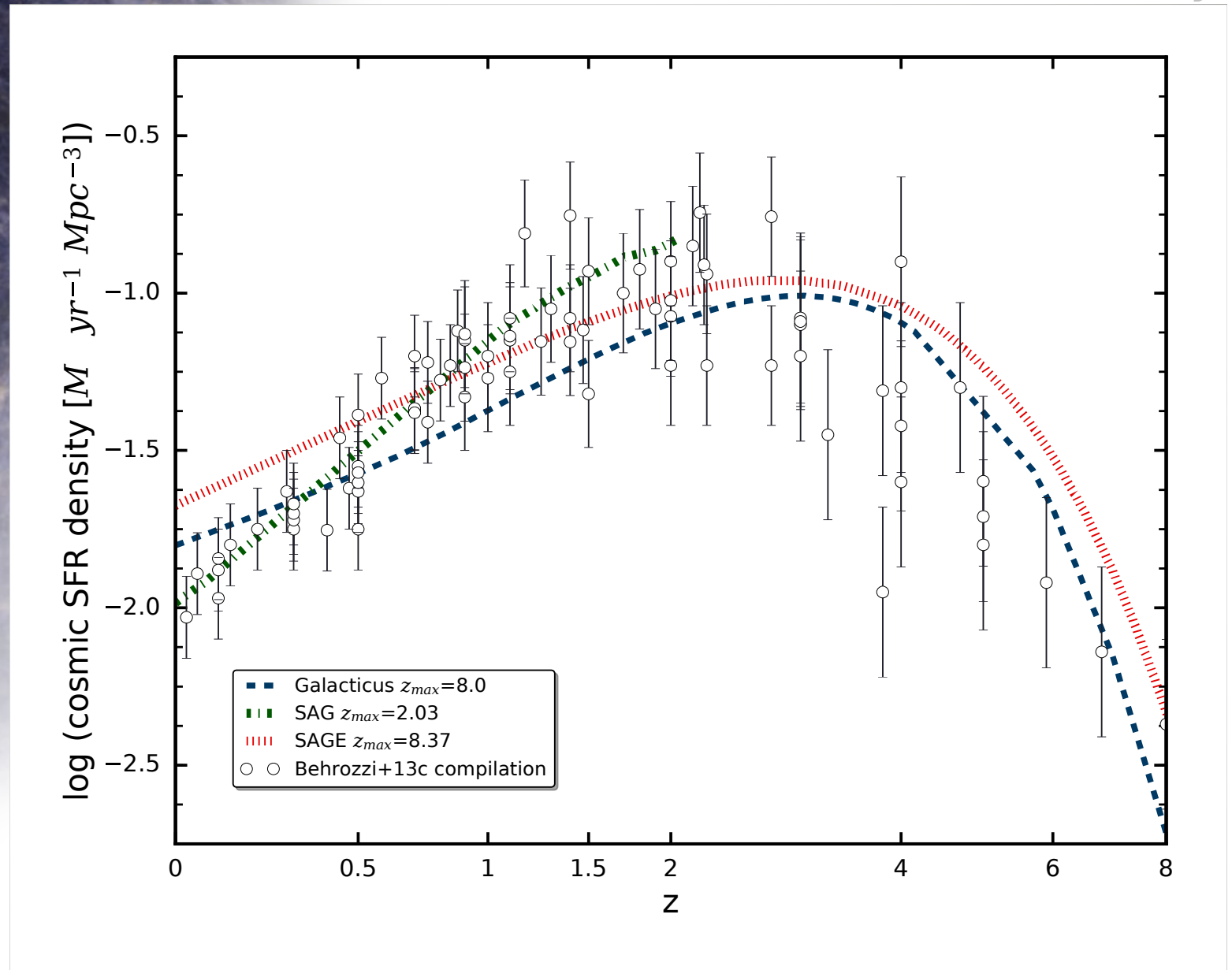
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Cosmic Star Formation Rate Density



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Treating Luminosities/Magnitudes

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Galacticus

SAG

SAGE

Flux Densities_{SDSS}

Absolute
Magnitudes_{SDSS}



- ✓ Apply redshift boost
 $-2.5 \cdot \log_{10}(z+1)$
- ✓ SDSS magnitude corrections

- ✓ K-correction
- ✓ SDSS magnitude corrections

mAB_{SDSS}

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Selecting the BOSS-CMASS Sample

CMASS:

- ▶ Combination of colour/magnitude cuts
- ▶ selecting the most massive and red galaxies
- ▶ corresponds to a constant mass over the redshift range $0.45 < z < 0.7$ (Anderson et al. (2012), Maraston et al. (2009))
- ▶ Rich probe for cosmology

$$d_{\perp} > 0.55$$

$$m_{AB_i} < 19.86 + 1.6(d_{\perp} - 0.8)$$

$$17.5 < m_{AB_i} < 19.9$$

$$m_{AB_r} - m_{AB_i} < 2$$

where

$$d_{\perp} = (m_{AB_r} - m_{AB_i}) - (m_{AB_g} - m_{AB_r})/8.0$$

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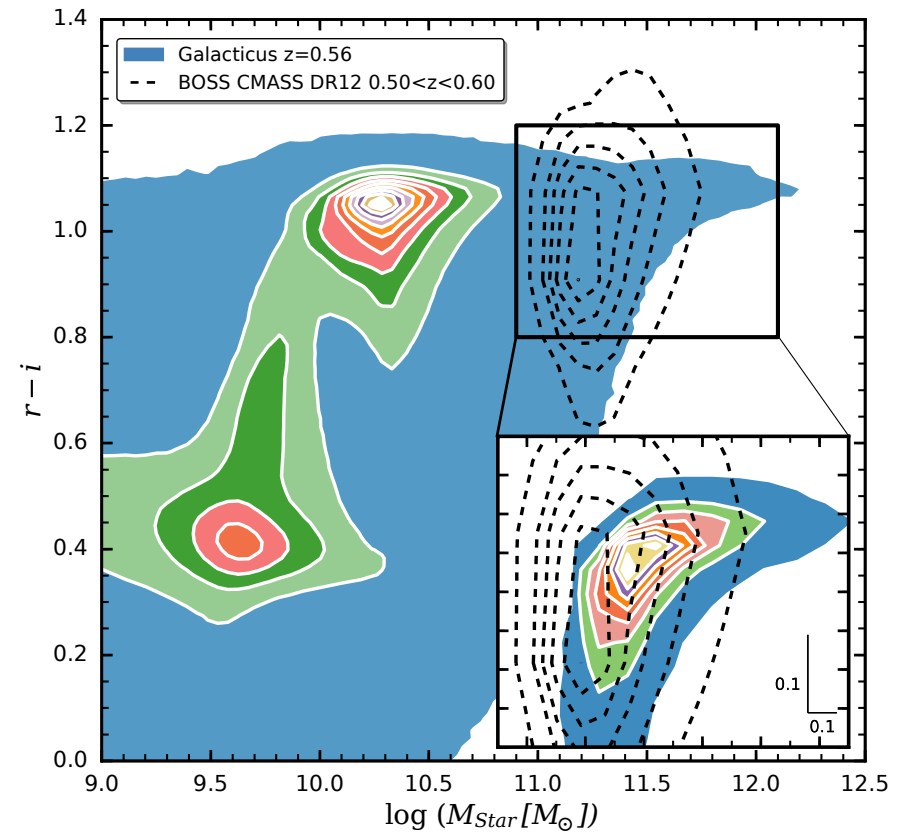
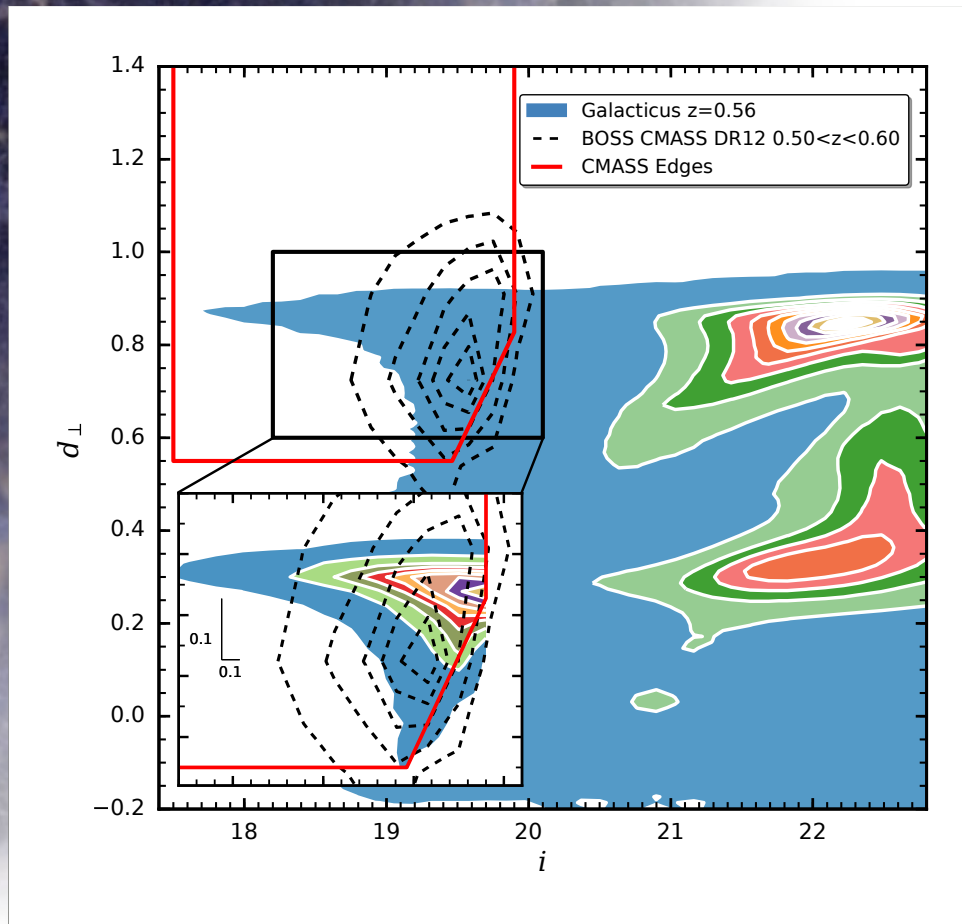
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Preliminary results from **Galacticus**

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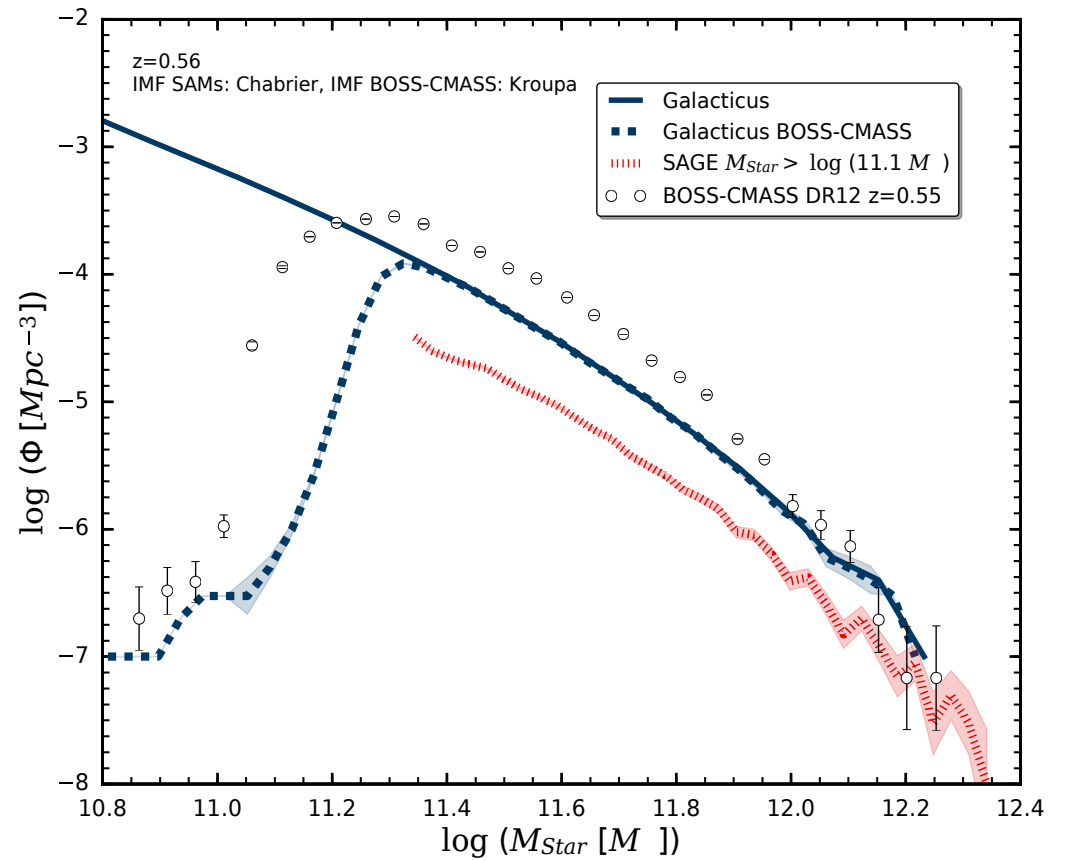
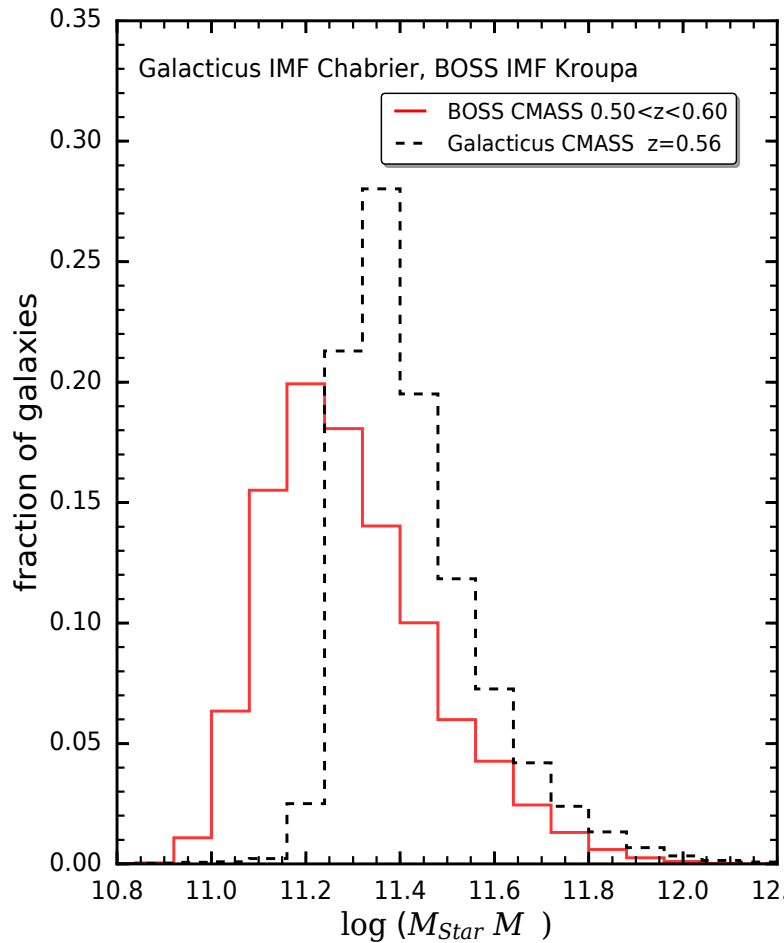
The results are in good agreement as those from Maraston et al. (2013).

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Preliminary results from **Galacticus**

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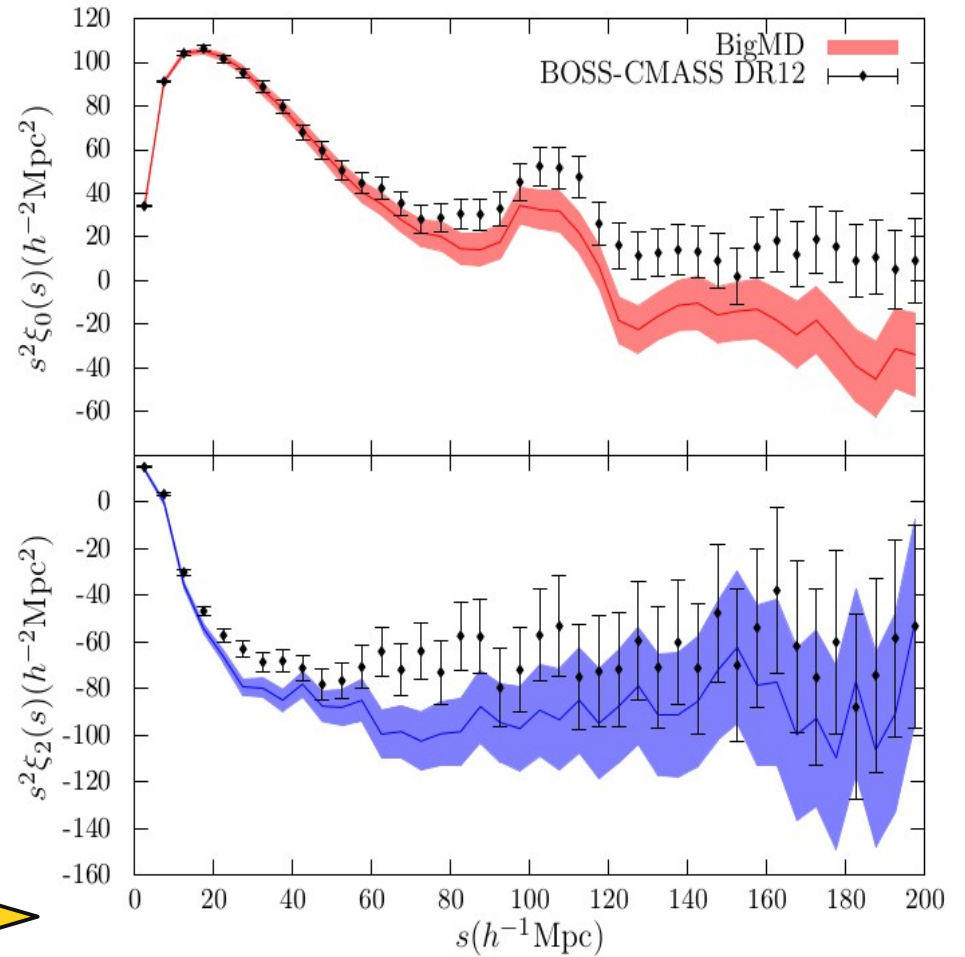
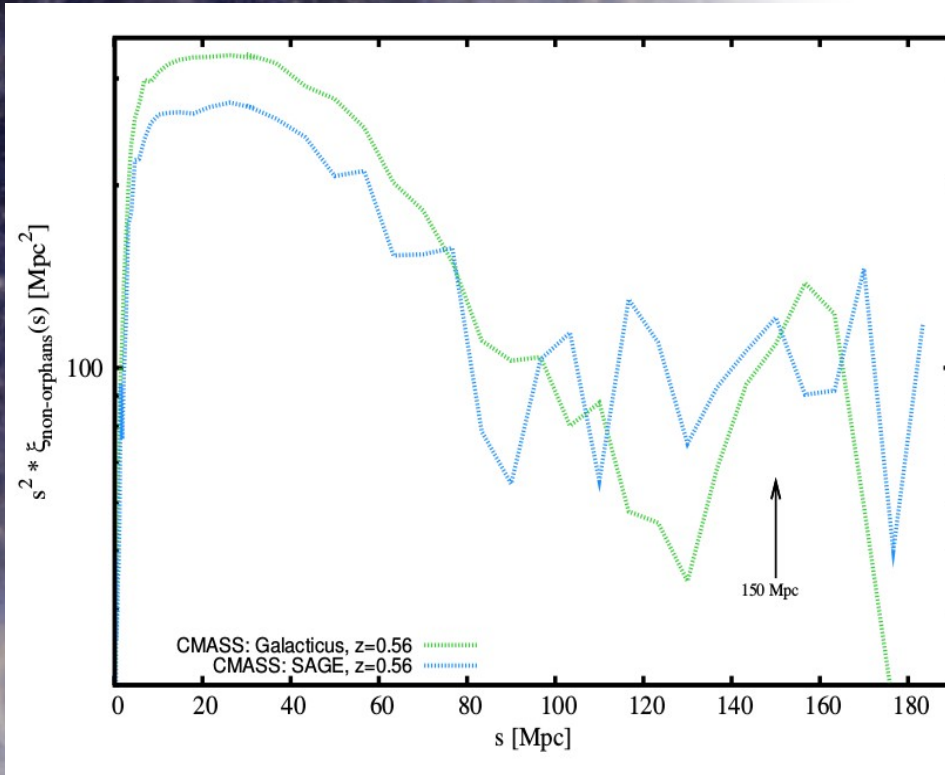


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Preliminary results from **Galacticus**

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Rodriguez-Torres et al. (2016)

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What is to do?

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- ▶ Get the data still missing → **in Progress**
- ▶ IMFs corrections → **in Progress (Doris)**
- ▶ Orphan positions? → **need to be discussed**
- ▶ Release date of the data base? → **need to be discussed**
- ▶ Agree what more science to put in Paper I?
- ▶ Make suggestion and putting people in charge of future projects.
- ▶ Paper? Paper? Paper?
- ▶ What about the future MuSAMs? Calibration?

MultiDark

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