Galaxy properties in and around cosmic filament environments

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Table of contents
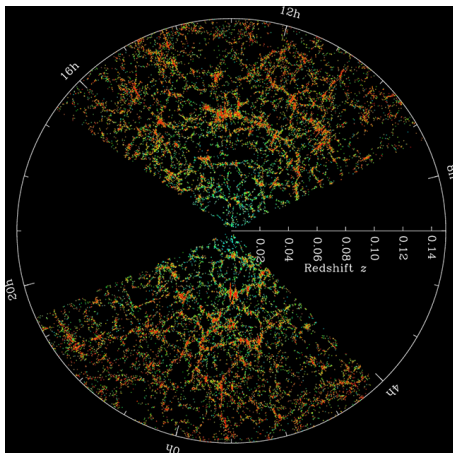
Background

(credit: SDSS)

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Filaments effect galaxies, i.e.

- alignment (Tempel et al., 2015),
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No large scale studies yet. Small samples.
Filament catalogue by Tempel et al. (2014) gives a large sample to work with.

Data

- ▶ SDSS DR10 galaxies.

Introduction	Data and methods	Results	Discussion/Conclusion
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- ▶ Morphology indicators from Galaxy Zoo (Lintott et al. 2008) and Huertas-Company et al. (2011)
- ▶ Filaments are found using an object point process with interactions.
- ▶ Cylindrical elements forming connected chains are placed on the 3D galaxy distibution tracing the most likely filament locations. (Described in detail in Tempel et al. (2014))

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- ▶ In this presentation given with candlesticks: bars 1-sigma, lines 2-sigma.

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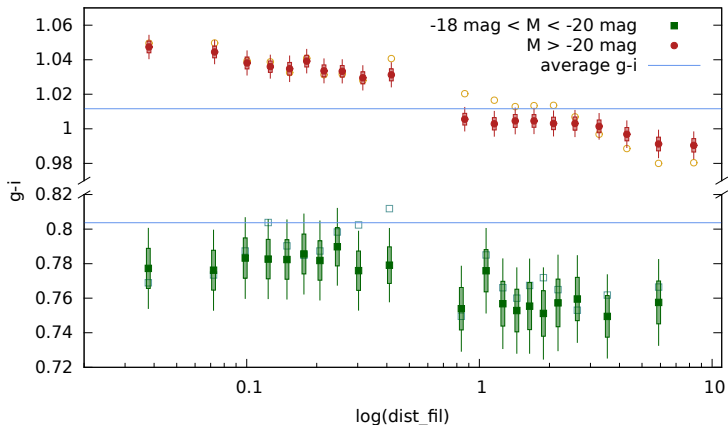
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- ▶ We want to separate the effects filaments have for galaxies.
- ▶ In order to remove the effects of mass and environment the data is weighed.
- ▶ In each bin the 2D mass-density probability map is compared to the total sample map.
- ▶ Each galaxy gets a weight value based on the difference between the maps.
- ▶ When looking at averaged data, the galaxies contributions have weights.
- ▶ The result is that variations in the density and mass distributions are reduced.
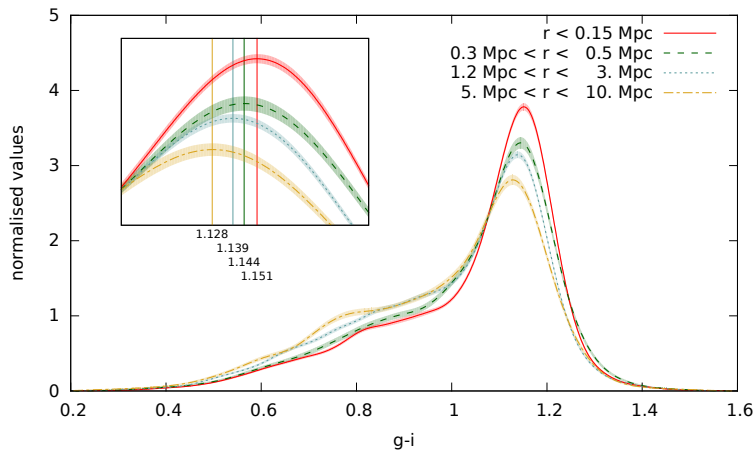
Weighing
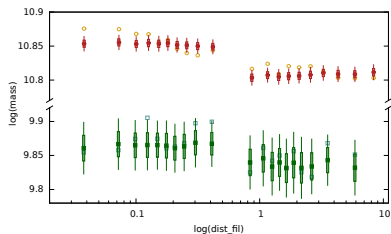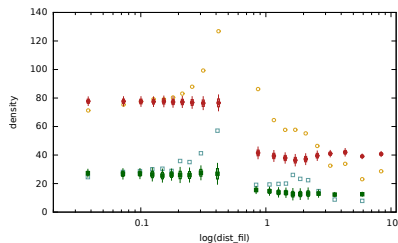
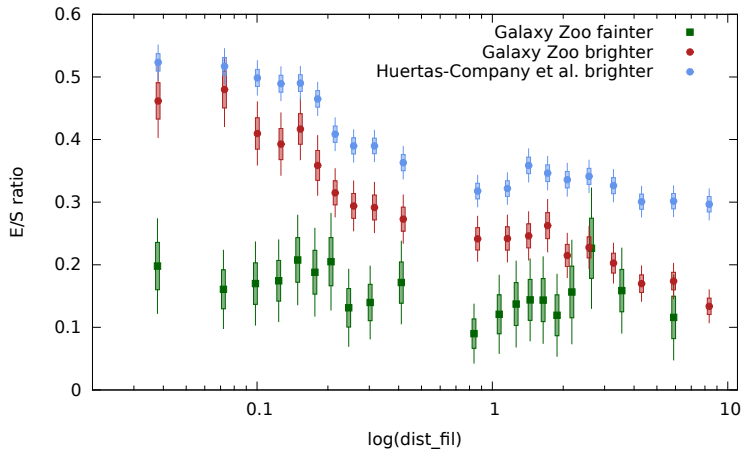Red brighter sample, green fainter.

Average g-i colors

g-i distributions

Elliptical/Spiral ratios

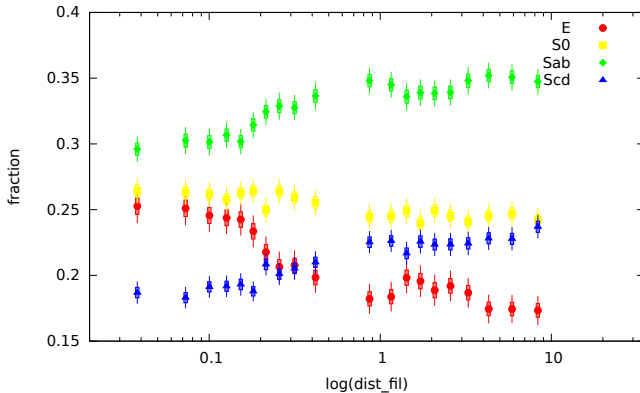Introduction | Data and methods | Results | Discussion/Conclusion
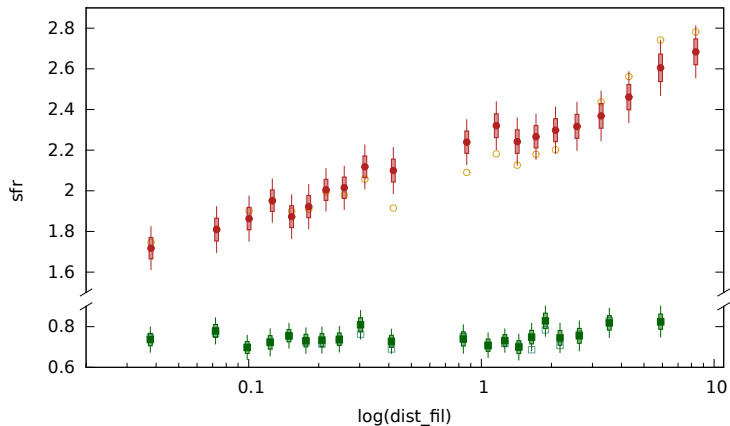oooo | ooooo●o | ooo
Morphological fractions

Morphological fractions

Fractions of morphological types from Huertas-Company et al. (2011). Only the brighter sample.

Introduction	Data and methods	**Results**	Discussion/Conclusion
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SFR

Star formation rate

Results

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► Could be tested with high resolution simulations.

► Fainter sample inconclusive.
  Whether this is because of larger errors in the smaller sample
  or indicator for physical processes requires further testing.

Future Work

- ▶ Look at different morphologies in more detail.
- ▶ More parameters to analyse.
- ▶ Expand to other catalogs.
- ▶ Compare with simulations.

References

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