Star-forming properties of galaxies in Abell 2744

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Motivation

- It is well established that the star-forming properties of galaxies falling into a cluster are transformed as a result of environmental stresses
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Dressler et al. 1980
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Whitmore et al. 1993
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Balogh et al. 1999

\(z \sim 0.3\)
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How do the properties of galaxies change as a function of environment?

Baldry et al. 2006
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Ram-pressure stripping

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  - Ram-pressure stripping
  - Galaxy harrassment

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- Ram-pressure stripping
- Galaxy harassment
- Strangulation
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- Tidal interaction with the cluster potential
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- Ram-pressure stripping
- Galaxy harrassment
- Strangulation
- Tidal interaction with the cluster potential
- Galaxy-galaxy interactions
Two Significant Environments

1. Extreme environment caused by the major merger
2. More “relaxed” environment in the filamentary areas of the cluster

Springel et al. 2005
Two Significant Environments

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Are galaxies “pre-processed” in the filaments before falling into cluster core?

Springel et al. 2005
Abell 2744

Owers et al. 2011
Flaming, bright galaxies along the filaments

- Pilot study by Braglia et al. 2007
- MOS with VLT-VIMOS at low resolution and BVR photometry to detect the presence of substructure
- Identified 134 spectroscopically-confirmed cluster members (total of 194 with NED redshifts)
- Find two large-scale filaments with an overabundance in the blue galaxy population
Flaming, bright galaxies along the filaments

We can now do better than this, with two important improvements...
Large-scale filamentary structure
Methods
Galaxy Classification

emission-line cluster members

100 SF members
50 NSF members
221 ALG members
Fraction Analysis

Abell 2744

Eckert et al. 2015
Results

Fraction of Star-forming Galaxies in A2744

- In Filaments
- Outside Filaments
- Field fraction

$r/R_{200}$

$F_{SF}$
Future Work

- Include H-alpha equivalent widths as a probe of sSFR
- Classify absorption-line galaxies to include E+A galaxies
- Incorporate GMOS data in combination with strong- and weak-lensing data to search for sub structure
Conclusions

- We do not see evidence for “flaming bright galaxies” along the filaments of Abell 2744, as reported by Braglia et al. 2007

- In future it would be better to get deeper spectroscopy to see the impact on fainter galaxies, to confirm this result