"Galaxy transformation in the SuperGroup environment of Abell 1882"

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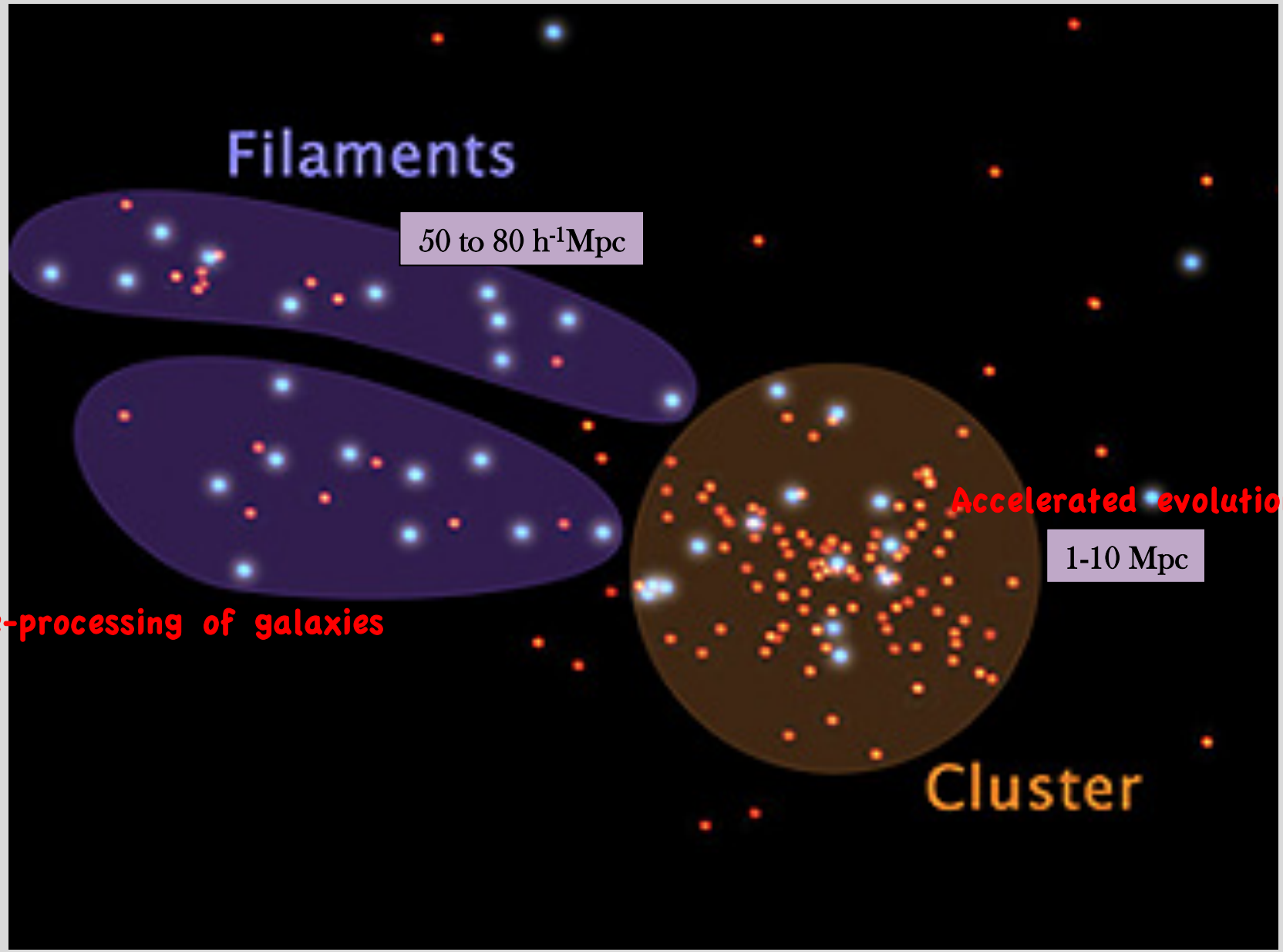
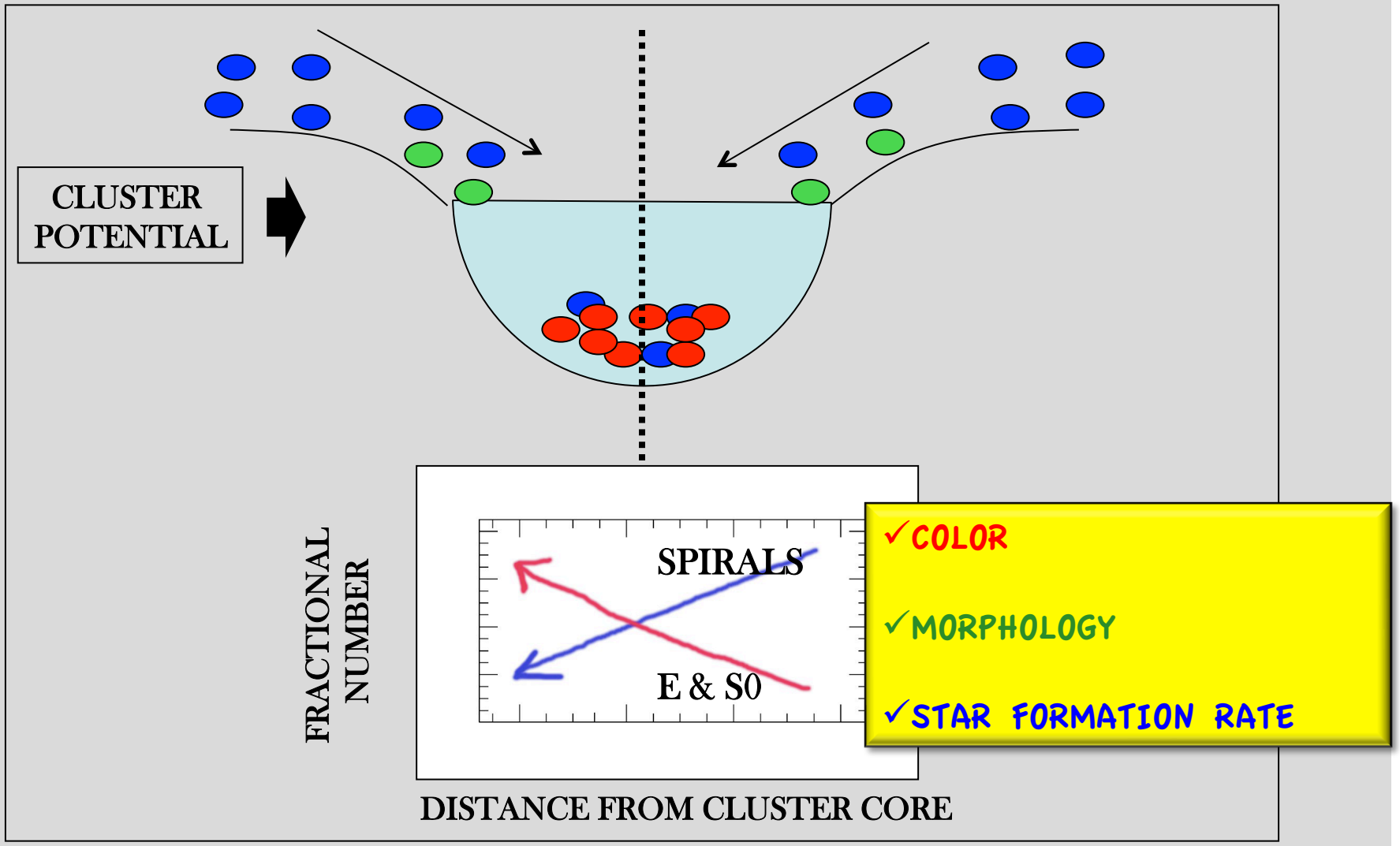
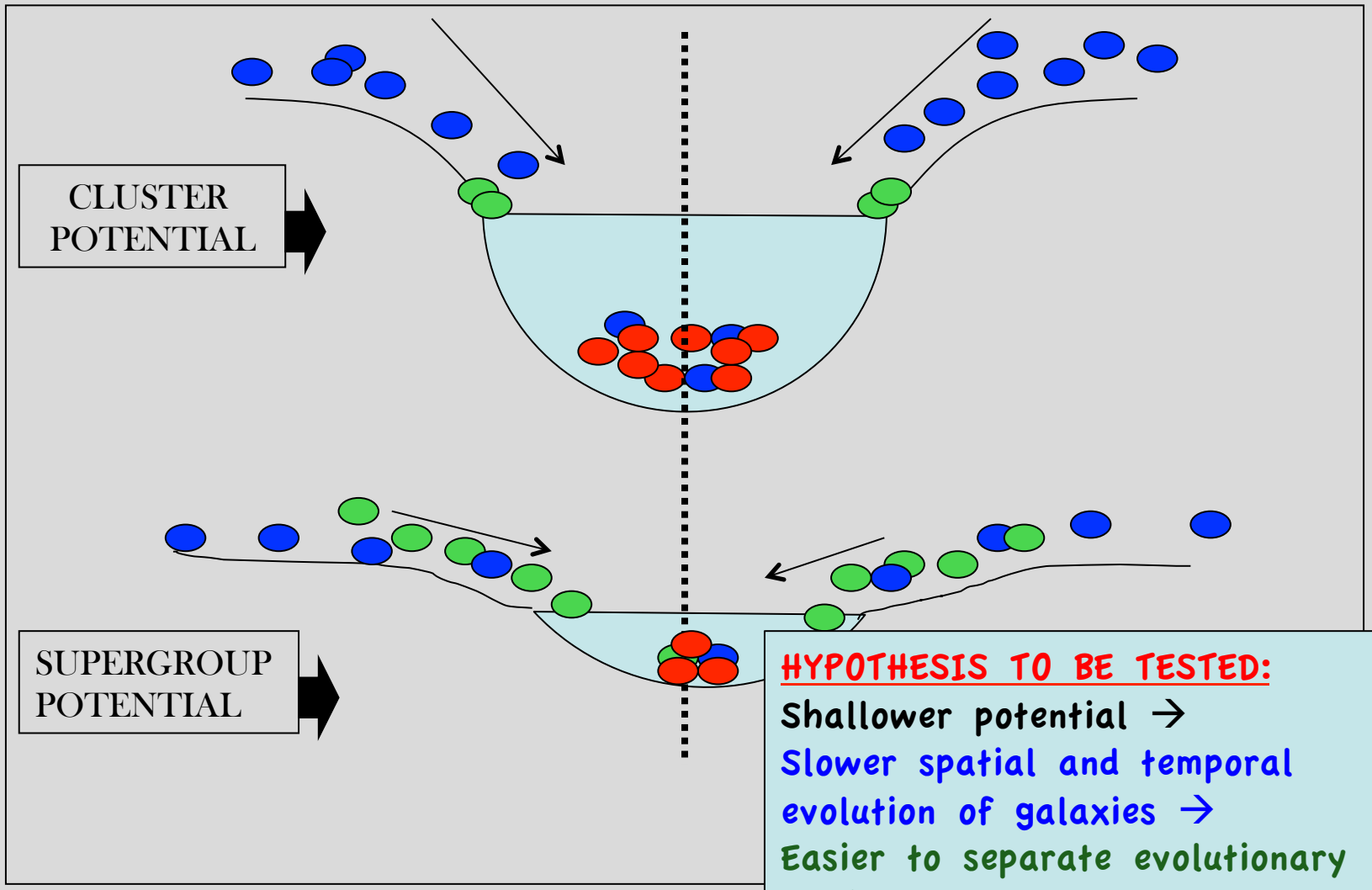
Evolution Of Galaxies in SuperCluster Environment



Evolution Of Galaxies in Cluster Environment



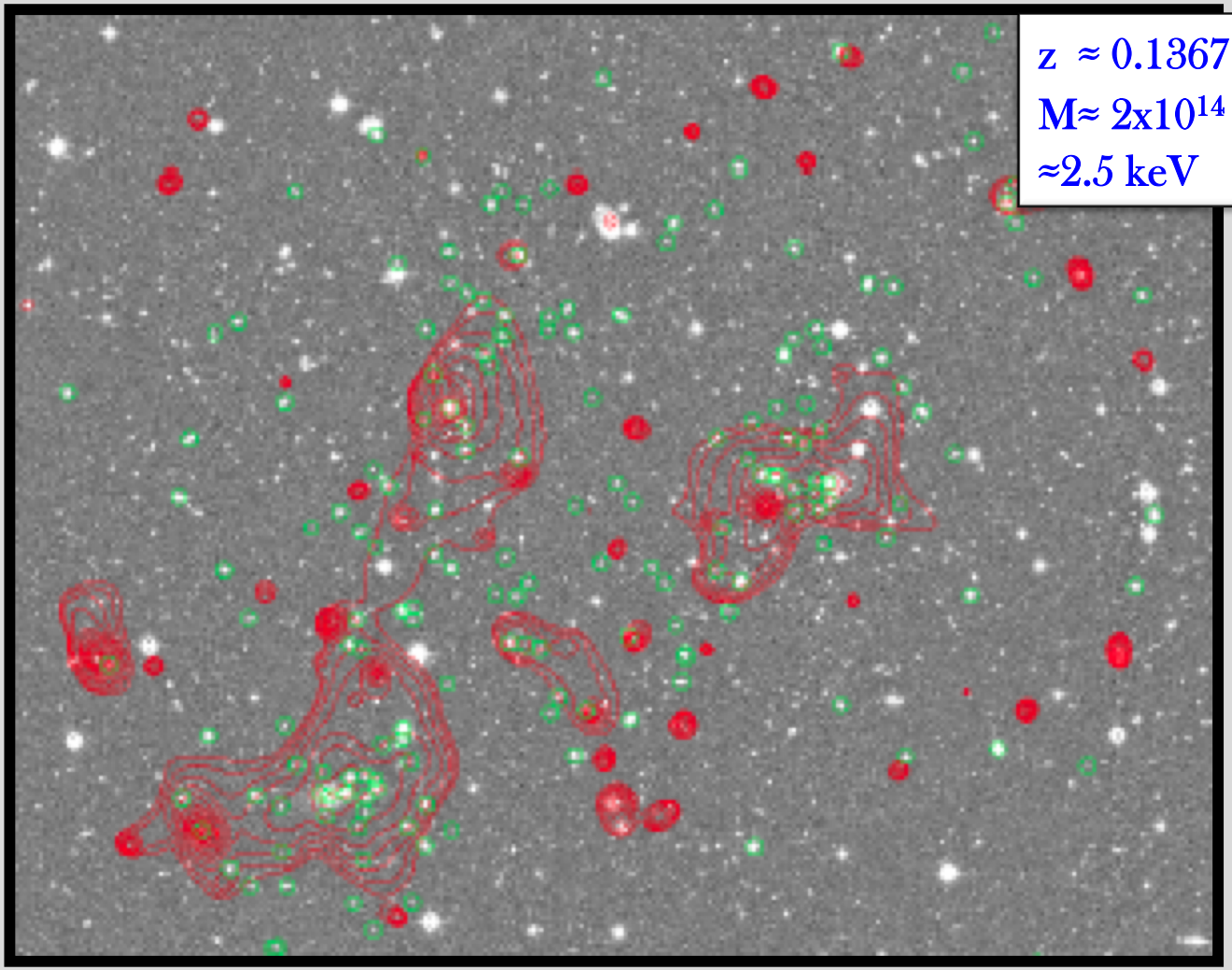
Evolution: Comparison Of Galaxy Evolution In Cluster and SuperGroup Environments



HYPOTHESIS TO BE TESTED:

Shallower potential →
Slower spatial and temporal evolution of galaxies →
Easier to separate evolutionary mechanisms

SuperGroup Abell 1882:



z ≈ 0.1367;
M≈ 2×10^{14} solar masses
≈2.5 keV

The central 27' x 20' (4x3 Mpc) region of A1882 in a CFHT MegaCam g-band image overlaid with the red contours representing the adaptively smoothed XMM data. Green circles represent part of 279 spectroscopic member galaxies of Abell 1882.

SuperGroup Abell 1882:

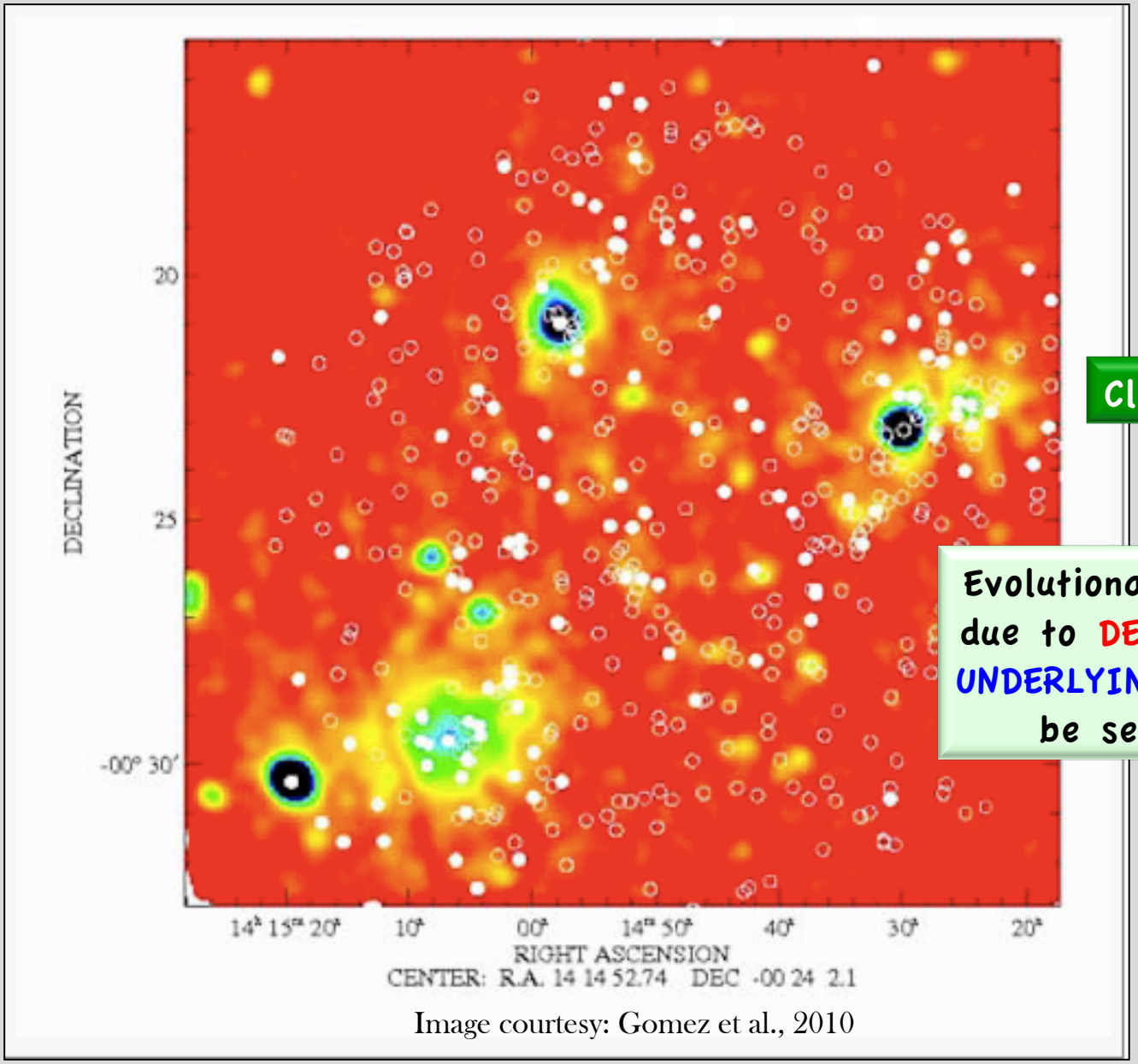
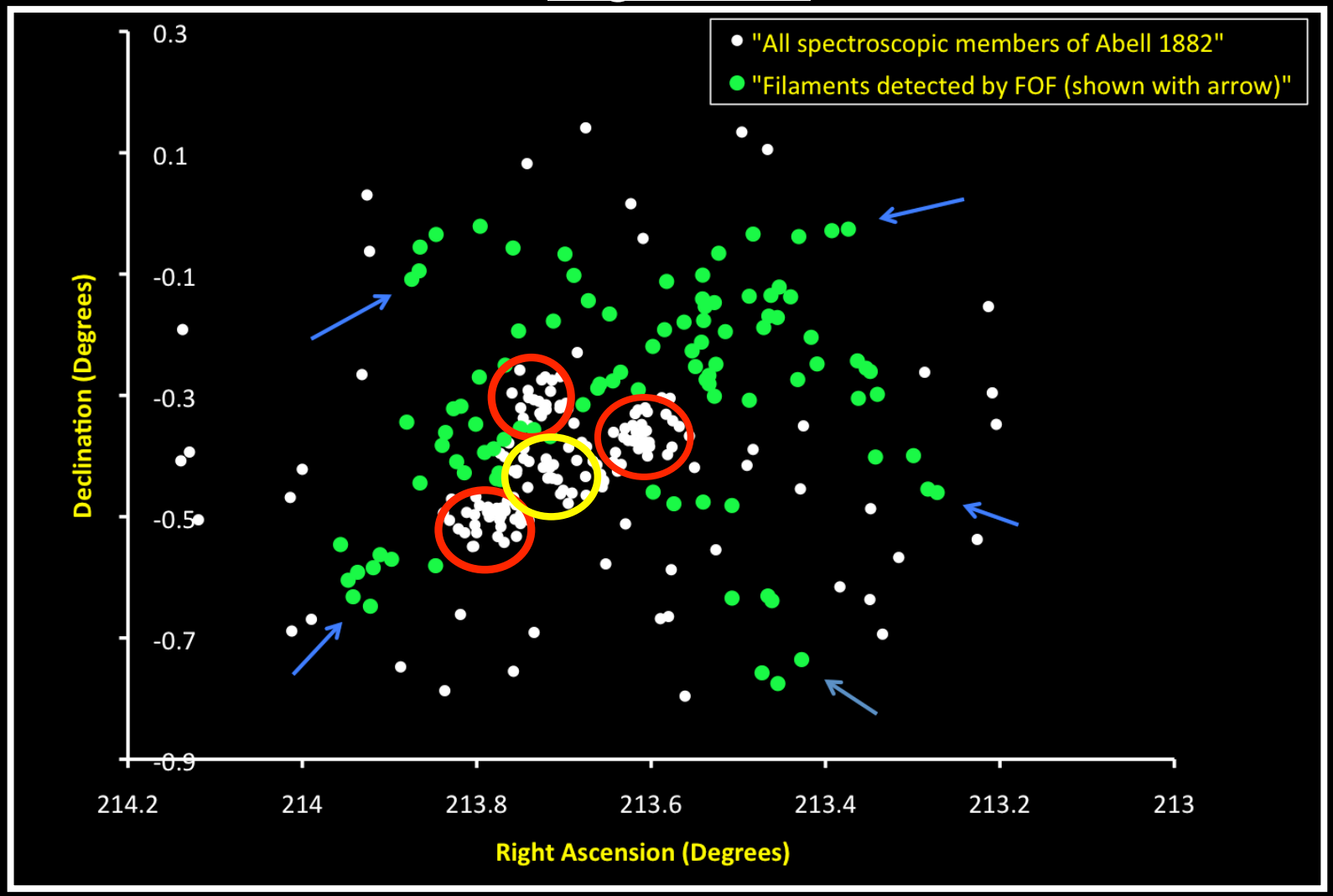


Image courtesy: Gomez et al., 2010

Clumpy:

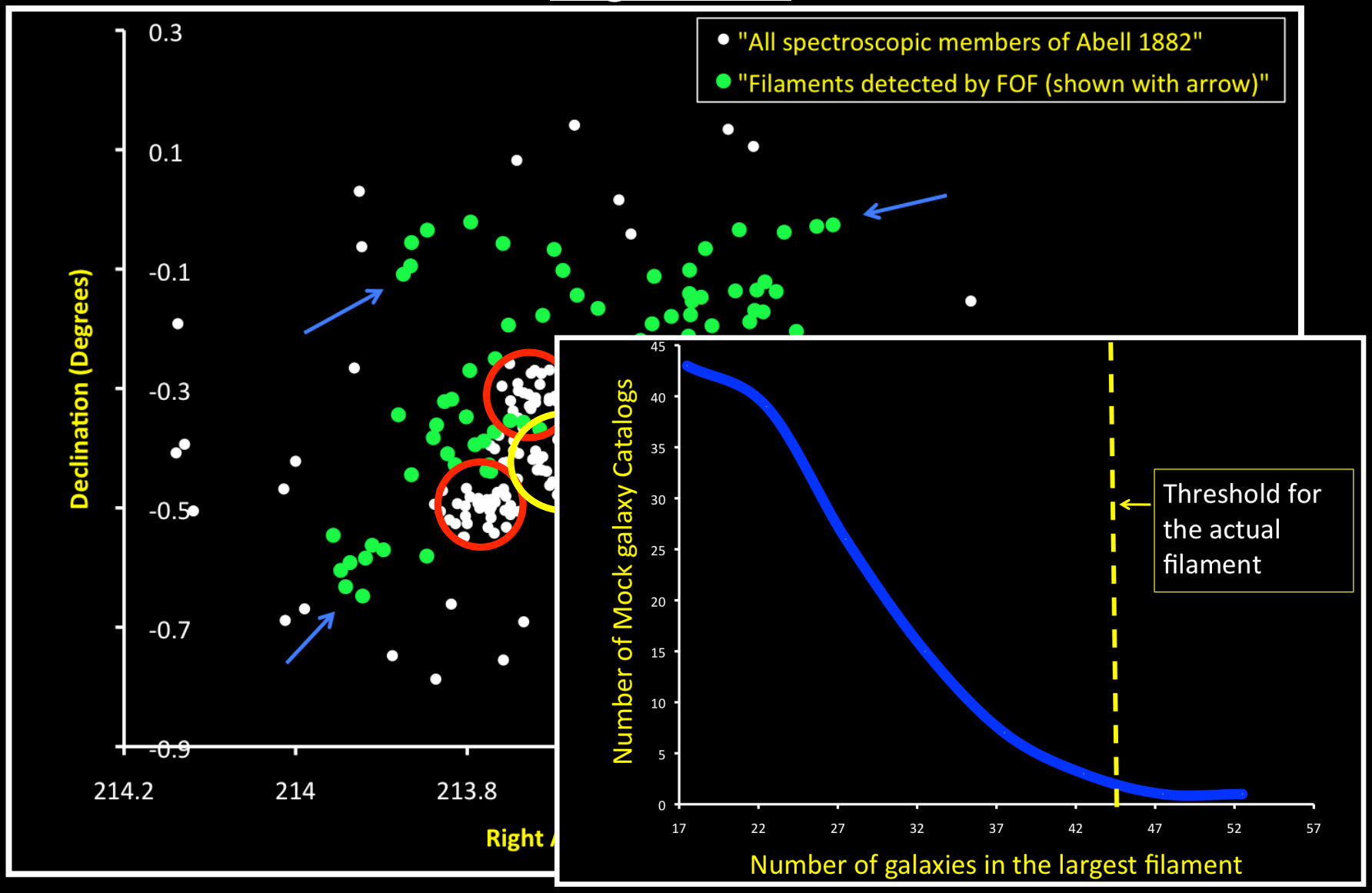
Evolutionary effects due to DENSITY and UNDERLYING LSS may be separated

Filaments Determined By Friends-of-Friends Algorithm

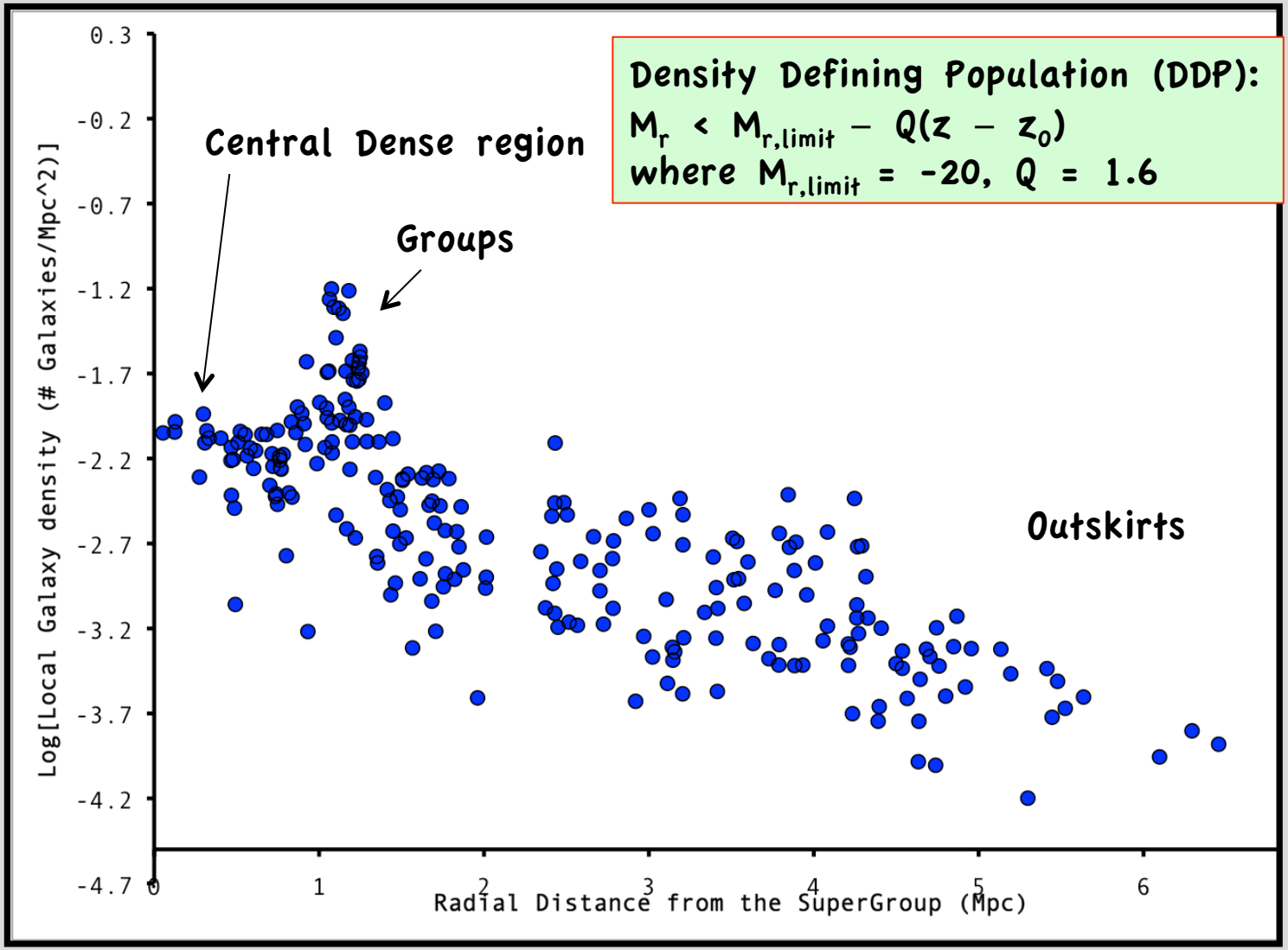


Huchra and Gellar, 1982

Filaments Determined By Friends-of-Friends Algorithm



Determining The Local Galaxy Density:



Recipe for Galaxy Number Density Determination:
Baldry + 2006, Blanton + 2003

Data

Photometric Data:

1) Canada France Hawaii Telescope
2) SDSS Photometric Survey (Archive)
3) 0.9-m SARA-North at Kitt Peak (Southeastern Association for Research in Astronomy Consortium)

Spectroscopic Data:

1) SDSS Archive
2) Upcoming: 6.5m Multiple Mirror Telescope at Mt. Hopkins

UV (135 – 280 nm)

GALEX Archive

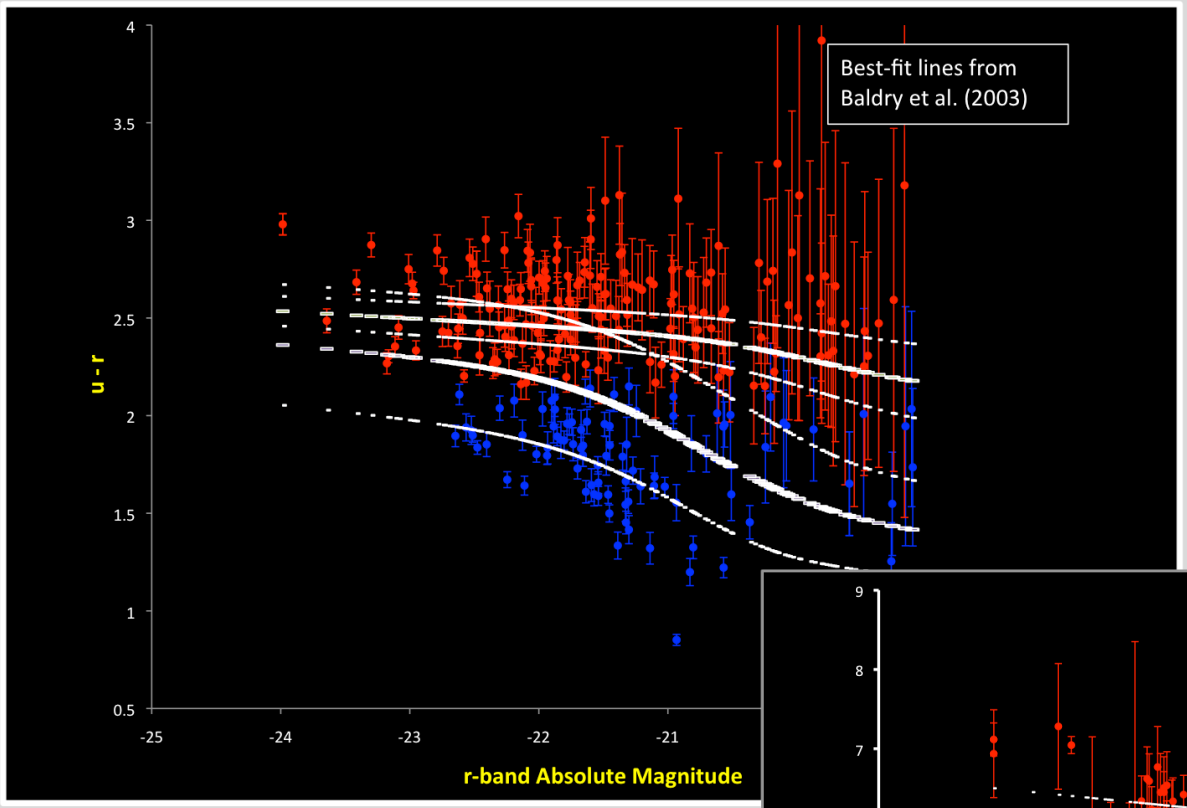
24μm

Spitzer

Sample Selection

Parameters	Range
Redshift	$0.13258 \leq z \leq 0.1576$
Velocity Dispersion	≈1180 km/s
r-Magnitude (M_r)	$-23.98 \leq M_r \leq -19.1$
Local Galaxy Density (Σ)	$6.33\times10^{-5} < \Sigma < 6\times10^{-2}$ Galaxies/ Mpc^2
Mass (in units of Solar Mass)	$10^8\ M_\odot < M < 10^{11}\ M_\odot$

Tracing Bimodality Of The Galaxies



Best Fit Lines:
Baldry et al., 2003

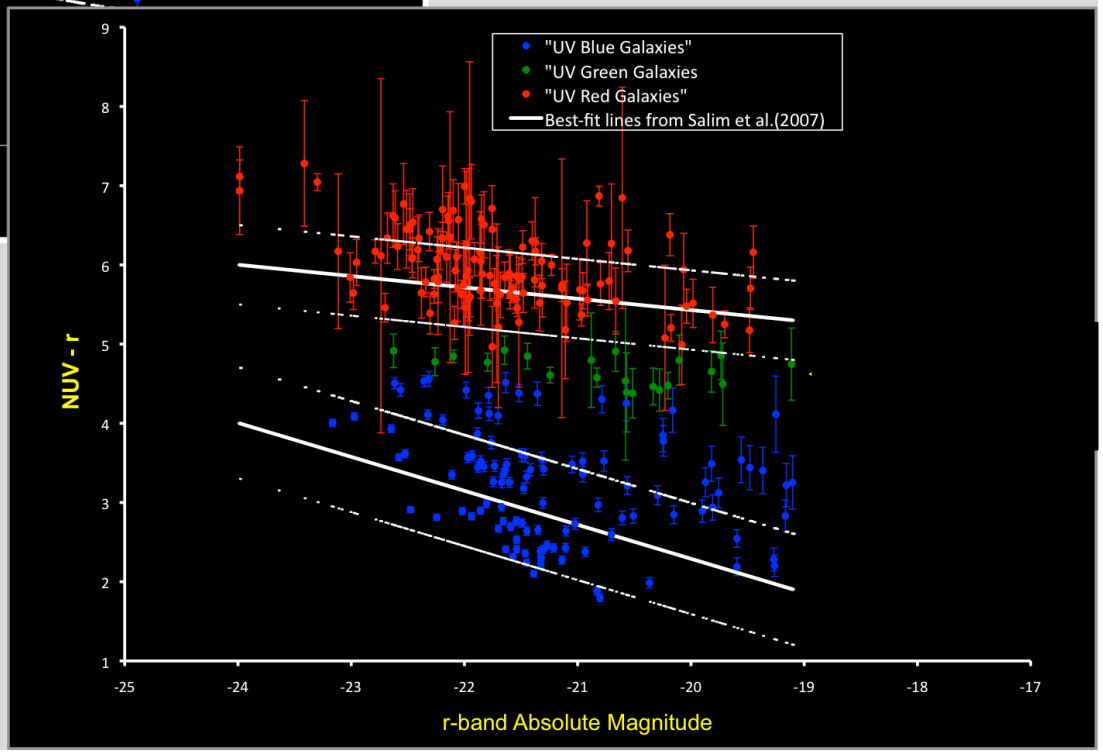
Mr Vs (u - r)

Star Formation Indicator:
> Few Gyrs

Mr Vs (NUV - r)

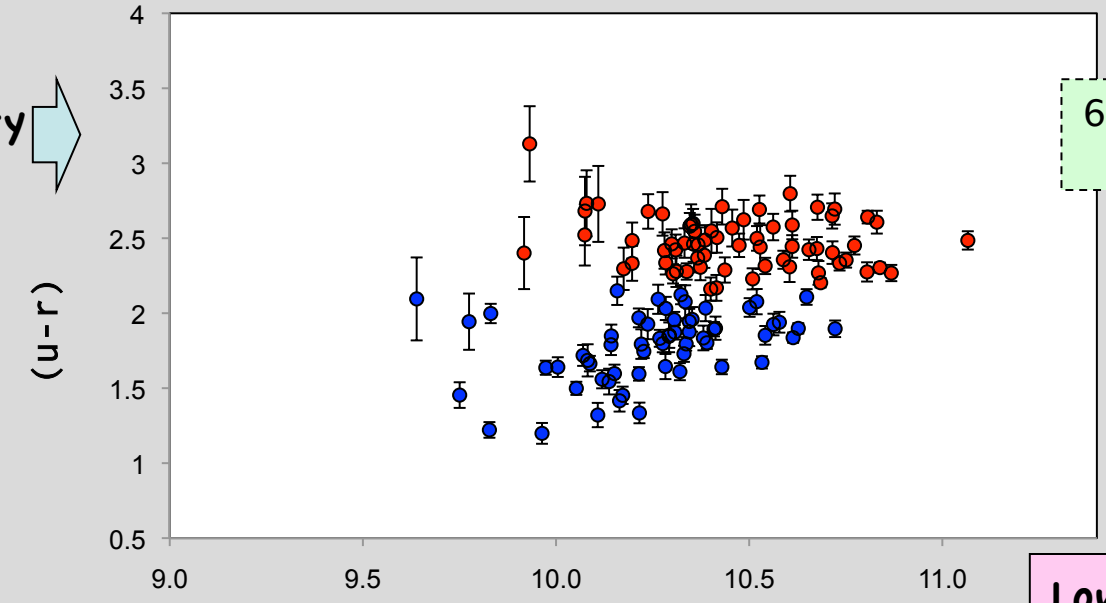
Star Formation Indicator:
10-1000 Myrs

Best Fit lines:
Salim et al., 2007



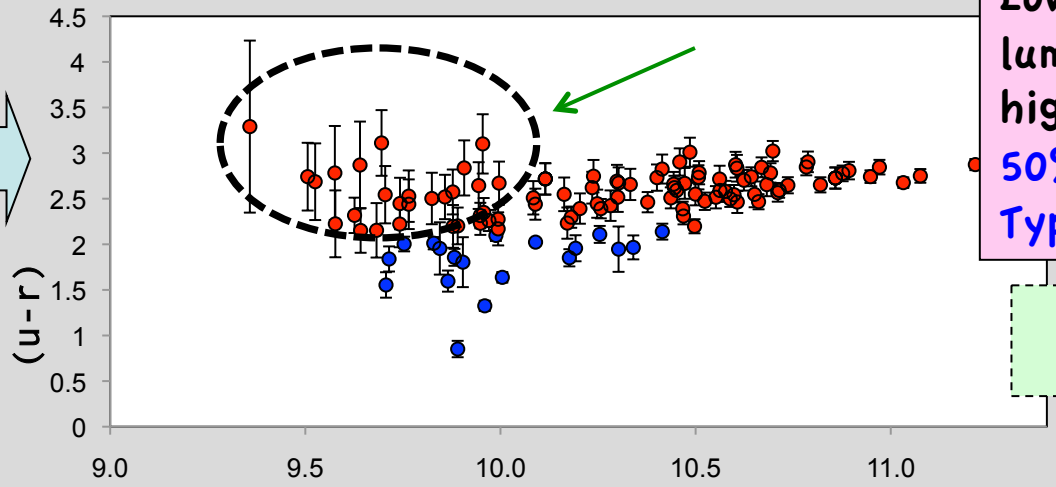
Color-Derived Mass Plots:

Lower Density Region



$6.33\times10^{-5} < \Sigma < 1\times10^{-3}$ Galaxies/Mpc^2

Higher Density Region



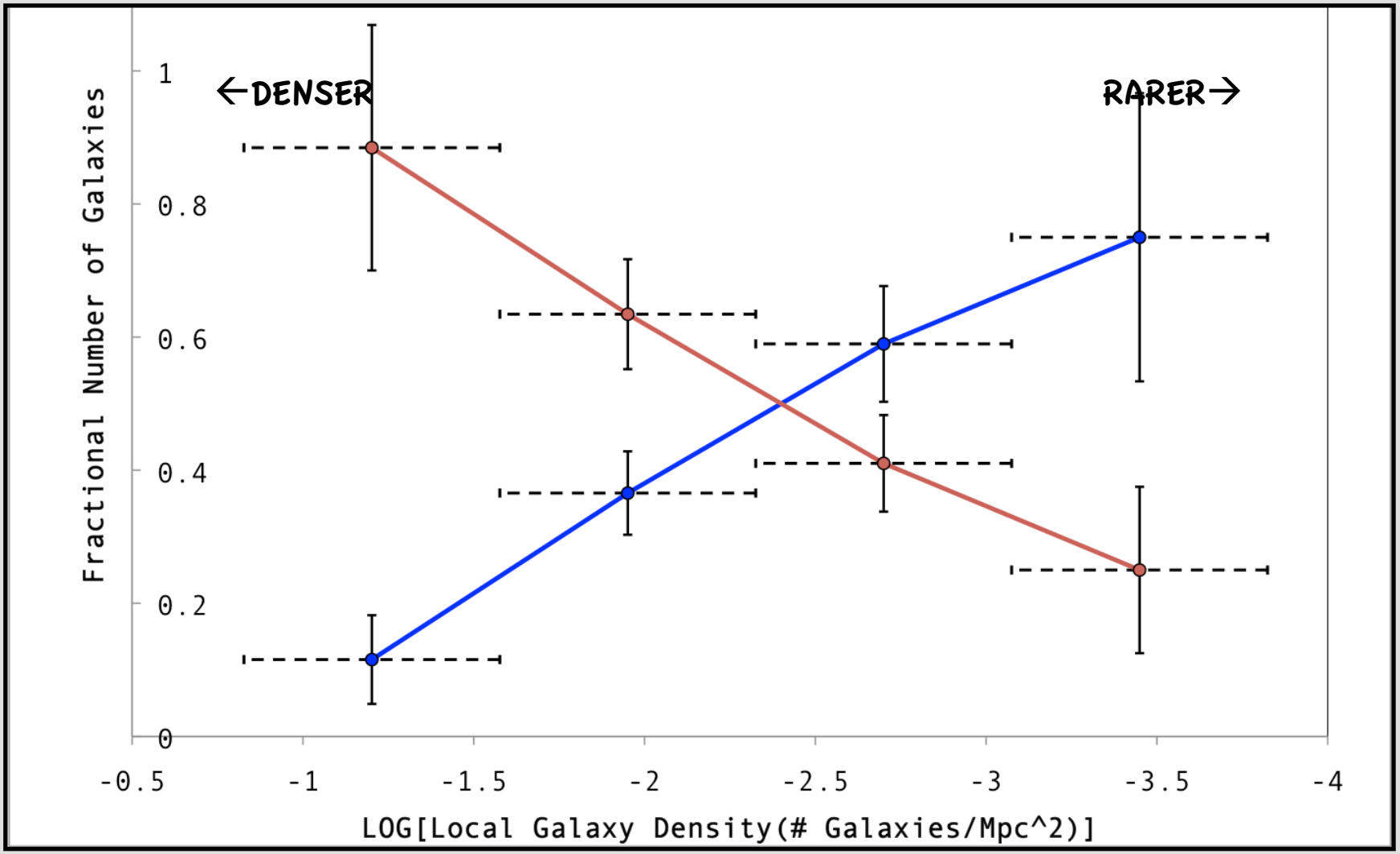
Low mass, low luminosity galaxies in higher density regions: 50% of those are Late Type Spirals

$1\times10^{-3} < \Sigma < 6\times10^{-2}$ Galaxies/Mpc^2

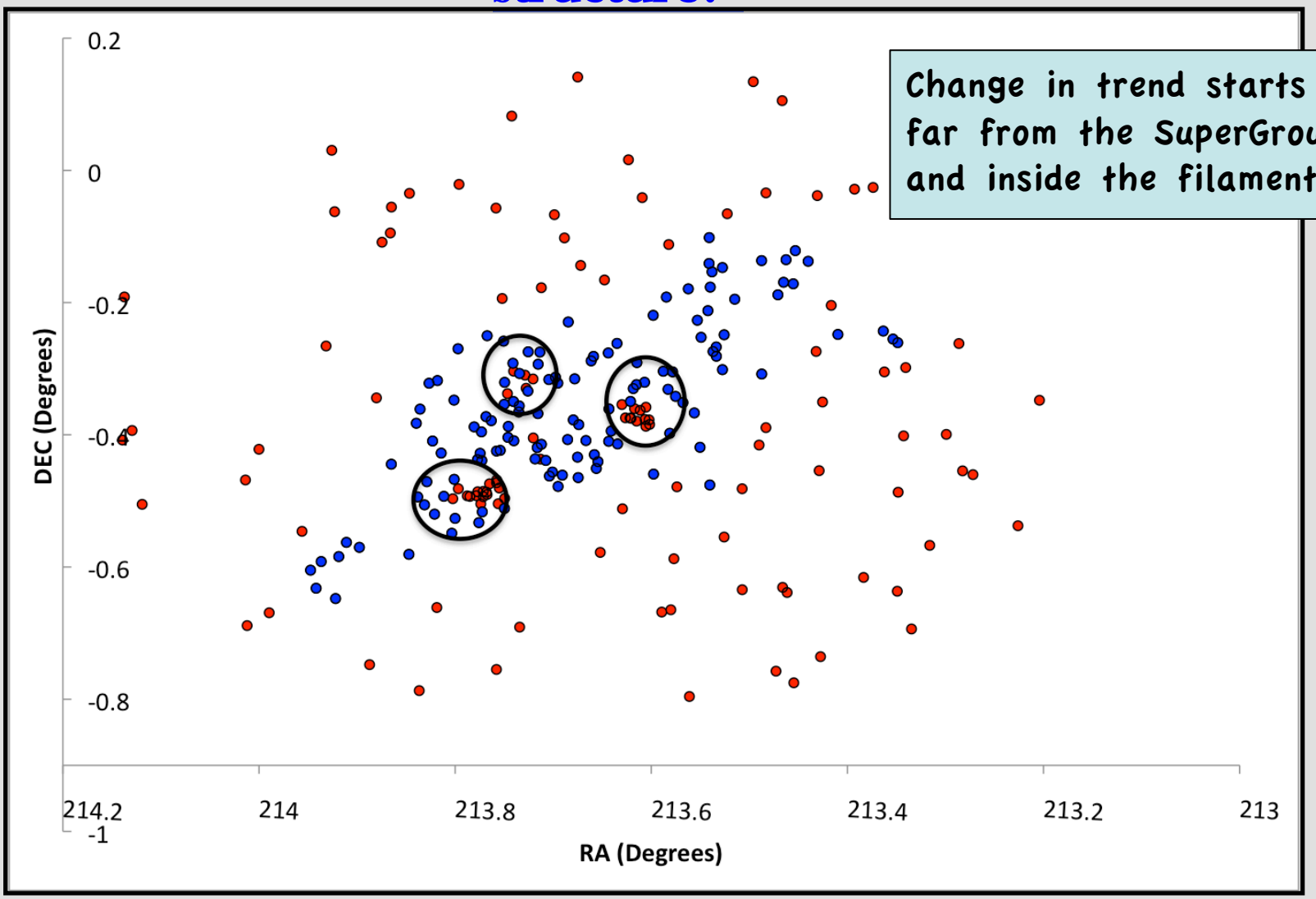
Log[Mass using Bell and de Jong stellar masses]

Mass Determination: Using KCORRECT package

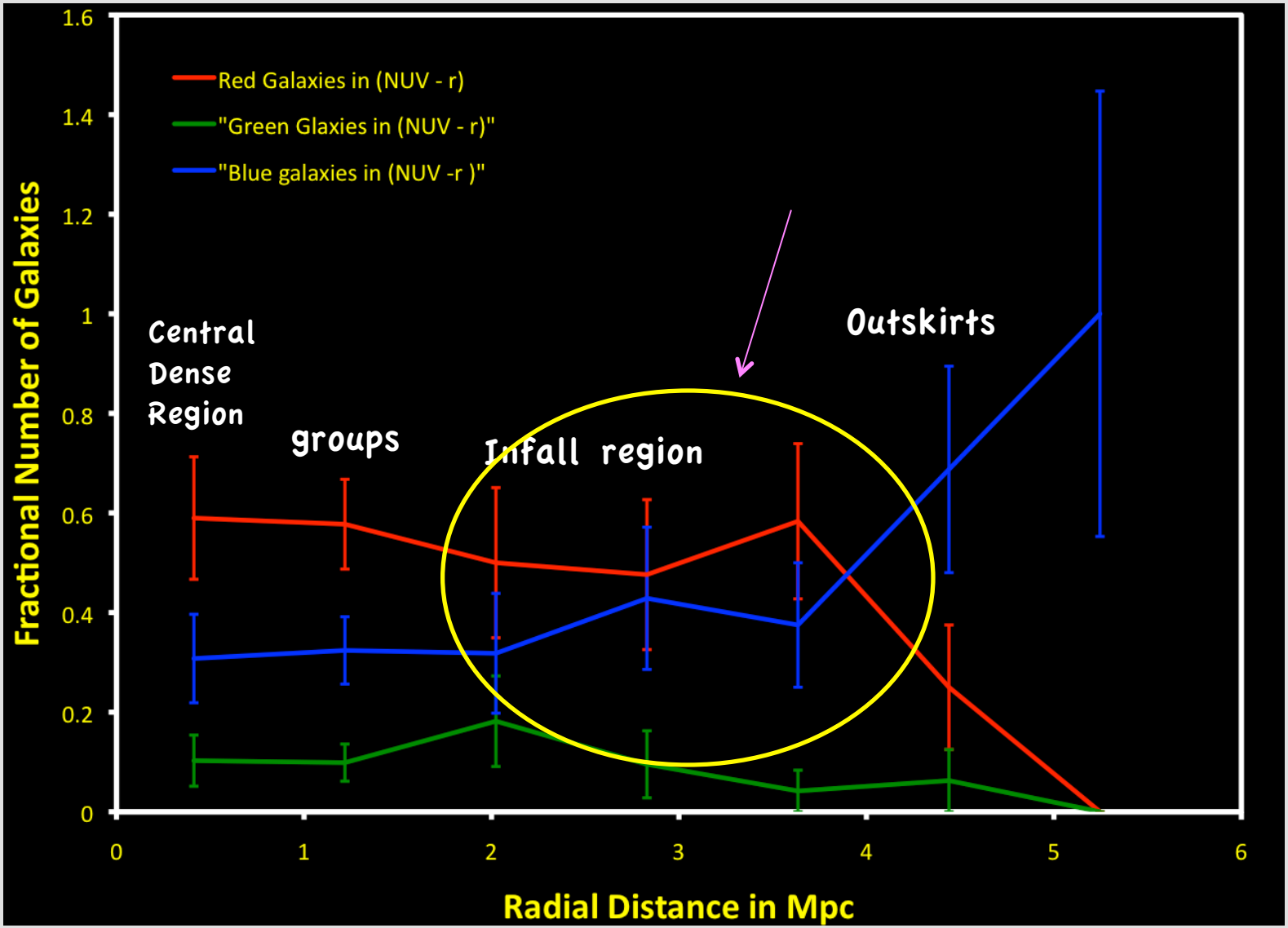
Color-Density Relation



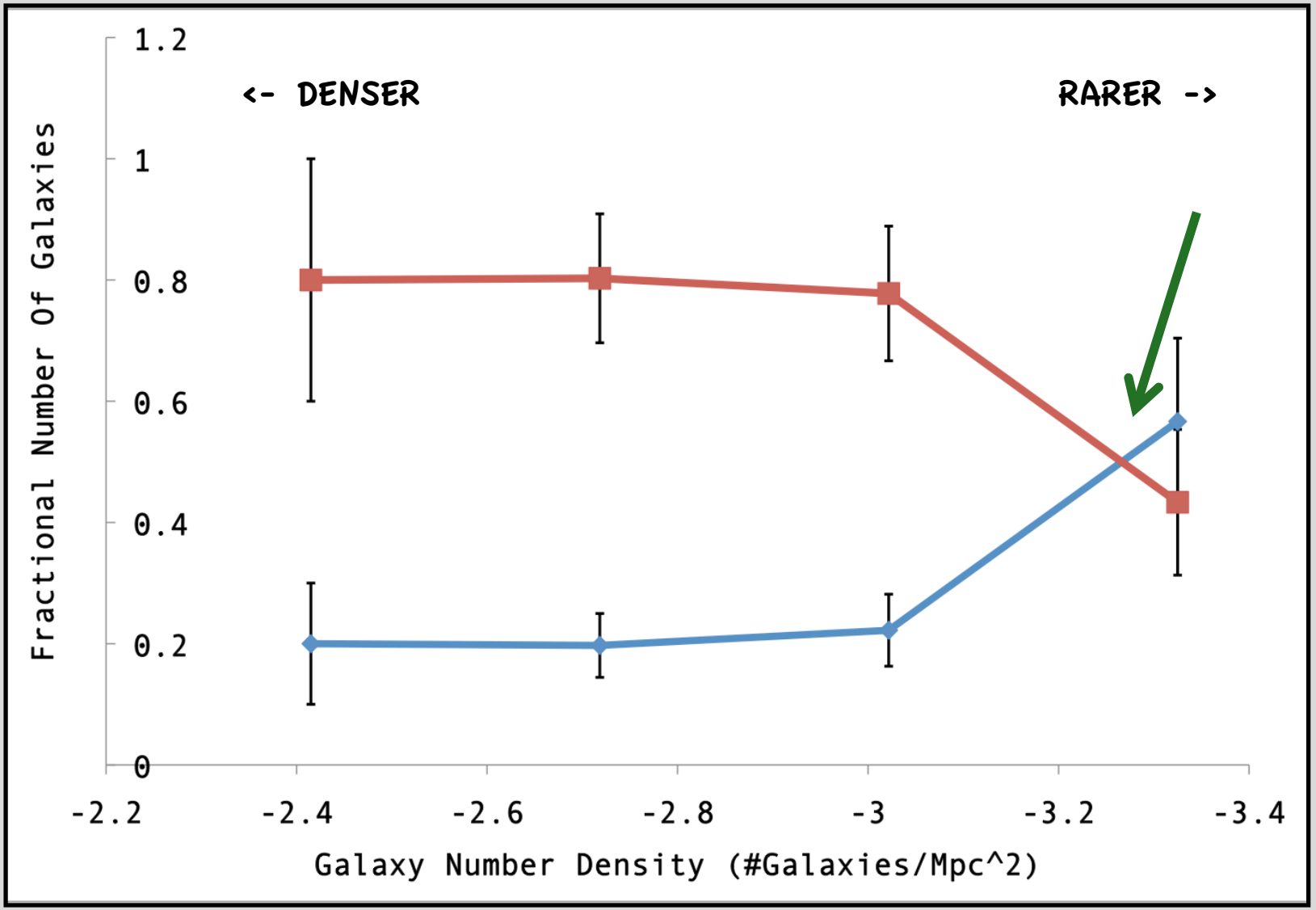
Where does the change in trend of color occur in the structure?



Color-Radial Distance Relation



Morphology-Density Relation



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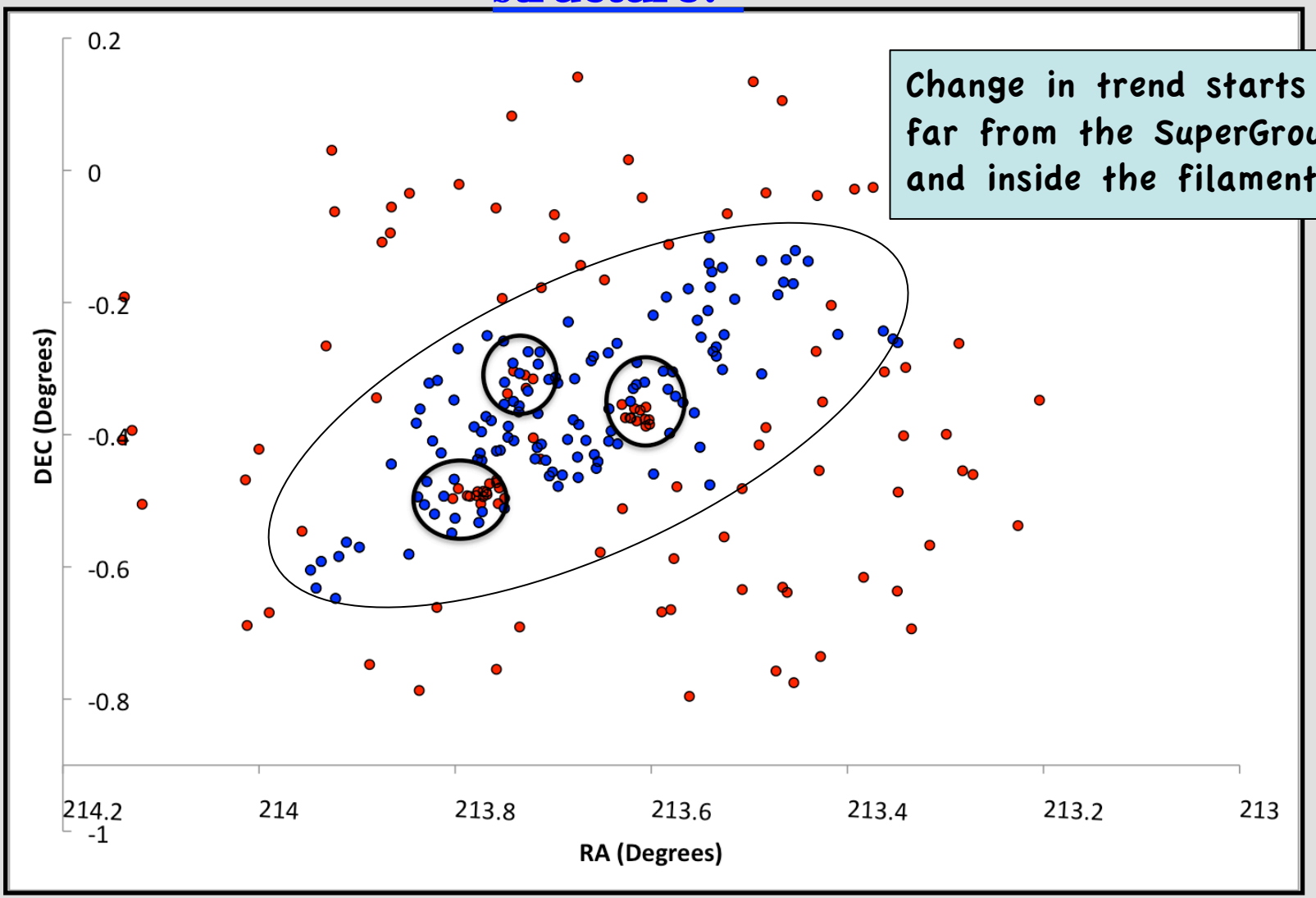
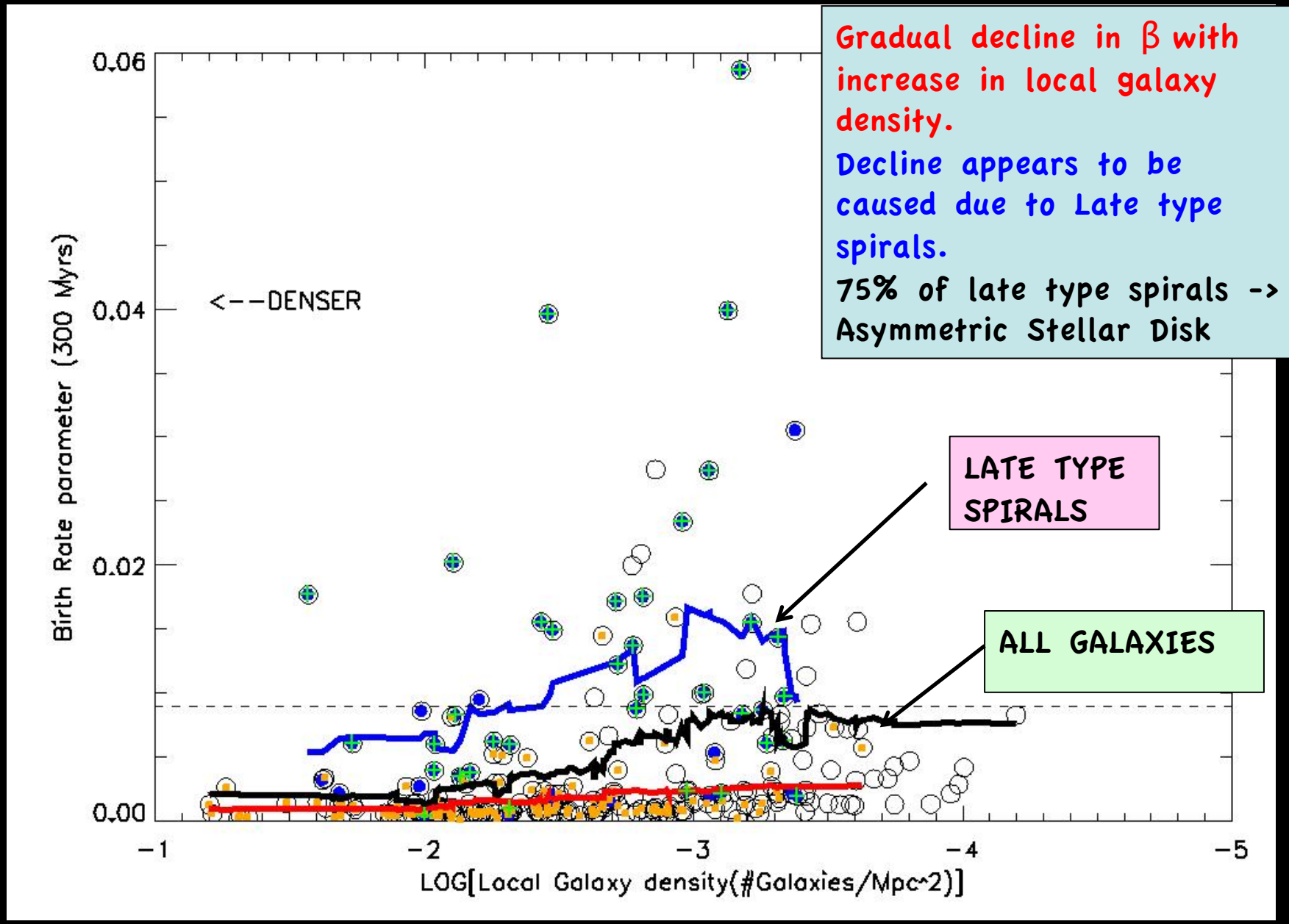
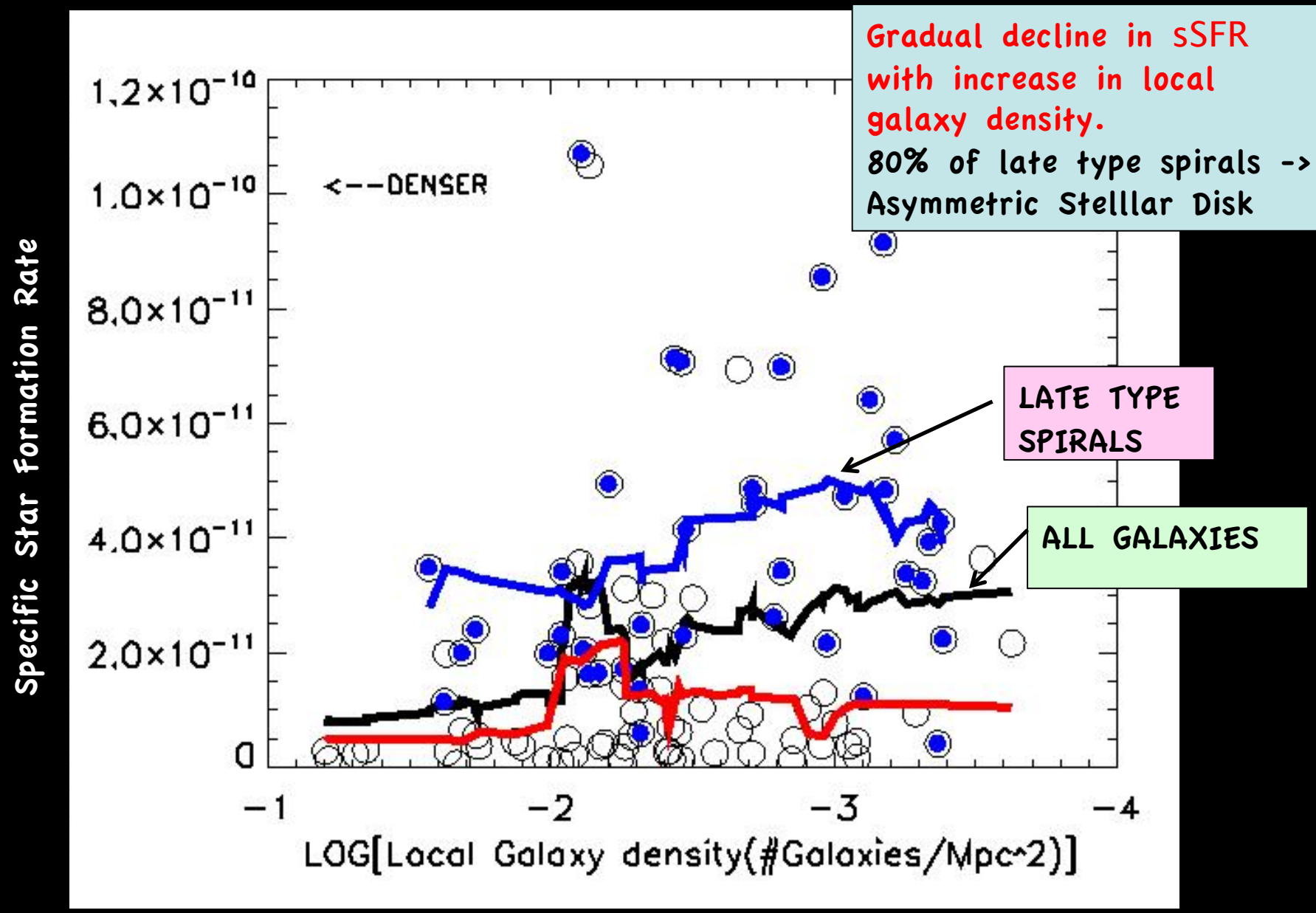


Density Evolution Of Birth Rate Parameter (β)

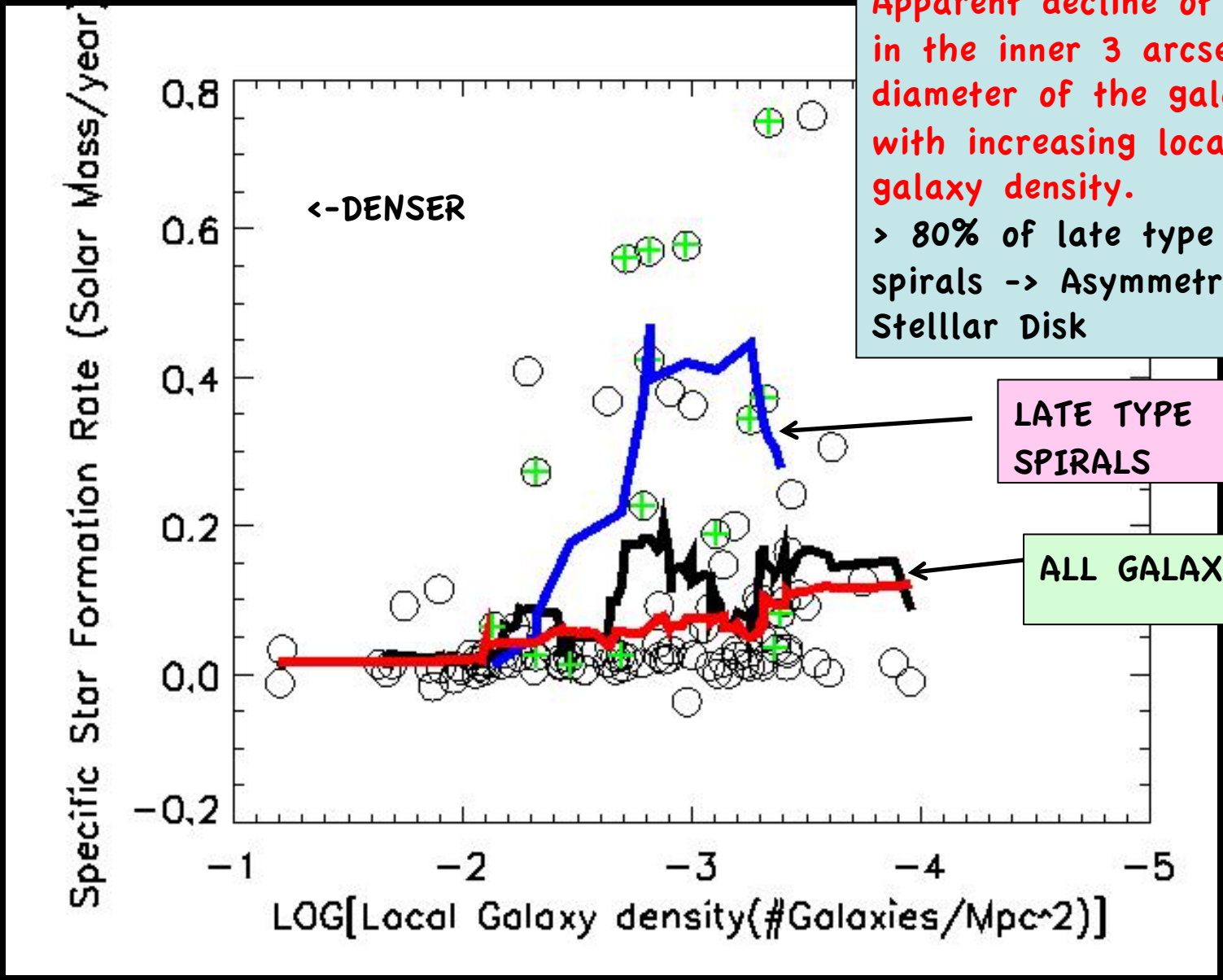


Density Evolution of Specific Star Formation(FUV+24 μm)



Density Evolution of Specific Star Formation(Hα+24 μm)

Specific Star Formation Rate



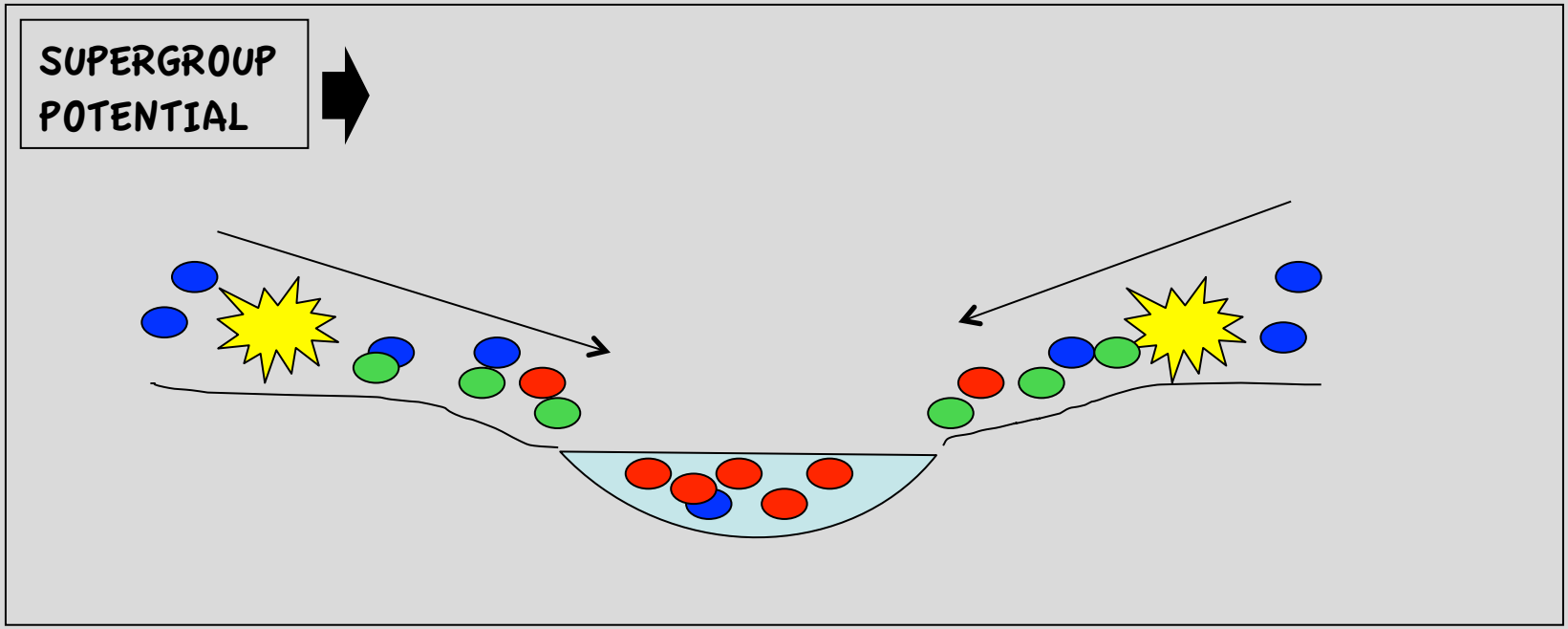
Apparent decline of sSFR in the inner 3 arcsec diameter of the galaxies, with increasing local galaxy density.

> 80% of late type spirals -> Asymmetric Stelllar Disk

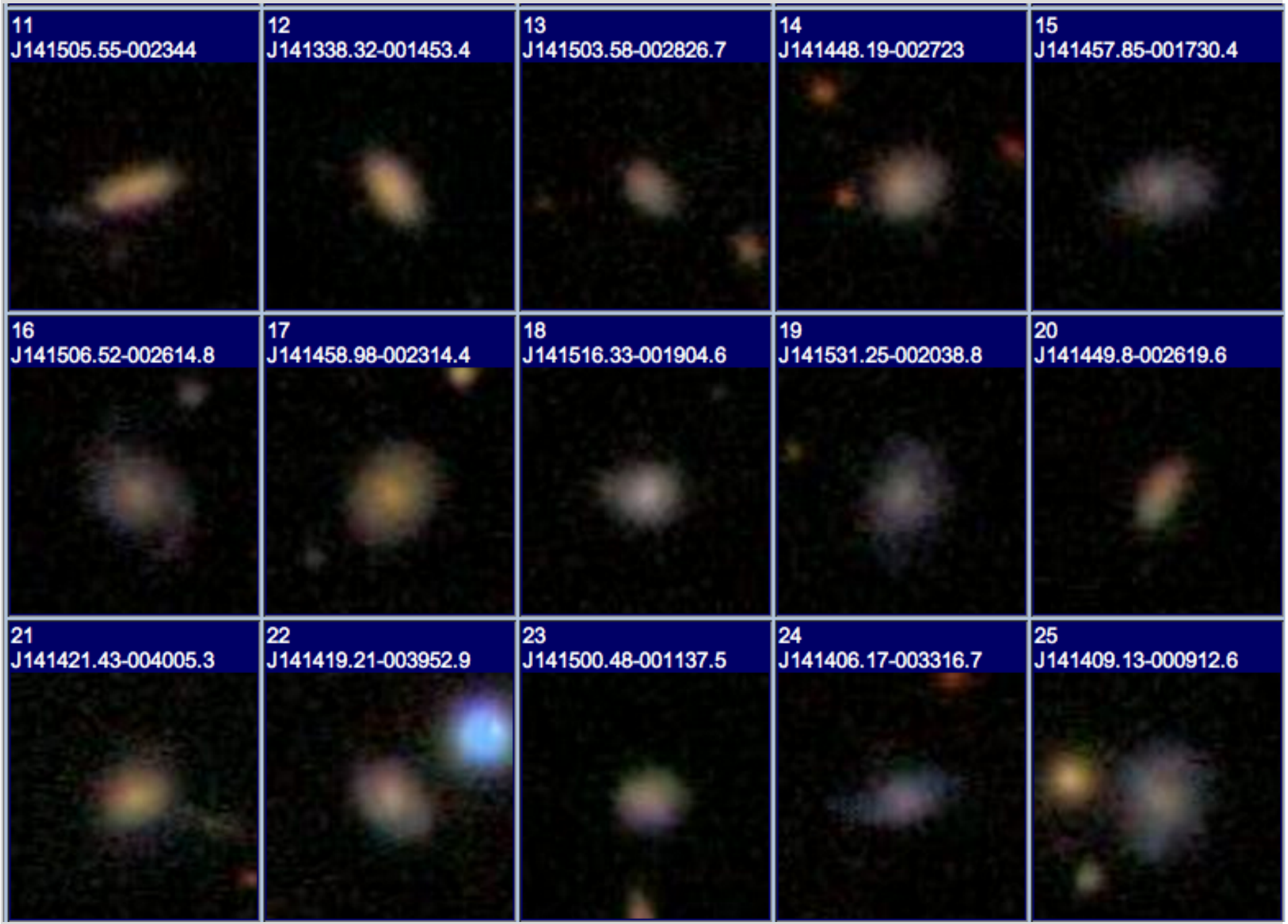
LATE TYPE SPIRALS

ALL GALAXIES

Summary



1. Transformations in color, morphology, birthrate parameter, sSFR of galaxies: Too far out from the SuperGroups
2. Change in sSFR and SFH (over past 300 Mys): Mainly due to Late type spirals with asymmetric stellar disks
   - Unlikely to be caused by Ram-pressure
3. High Velocity dispersion: Possibly not mergers
4. We propose: High speed pass-bys → Harassment → Strangulation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J141409.13-000912.6


Thank you!