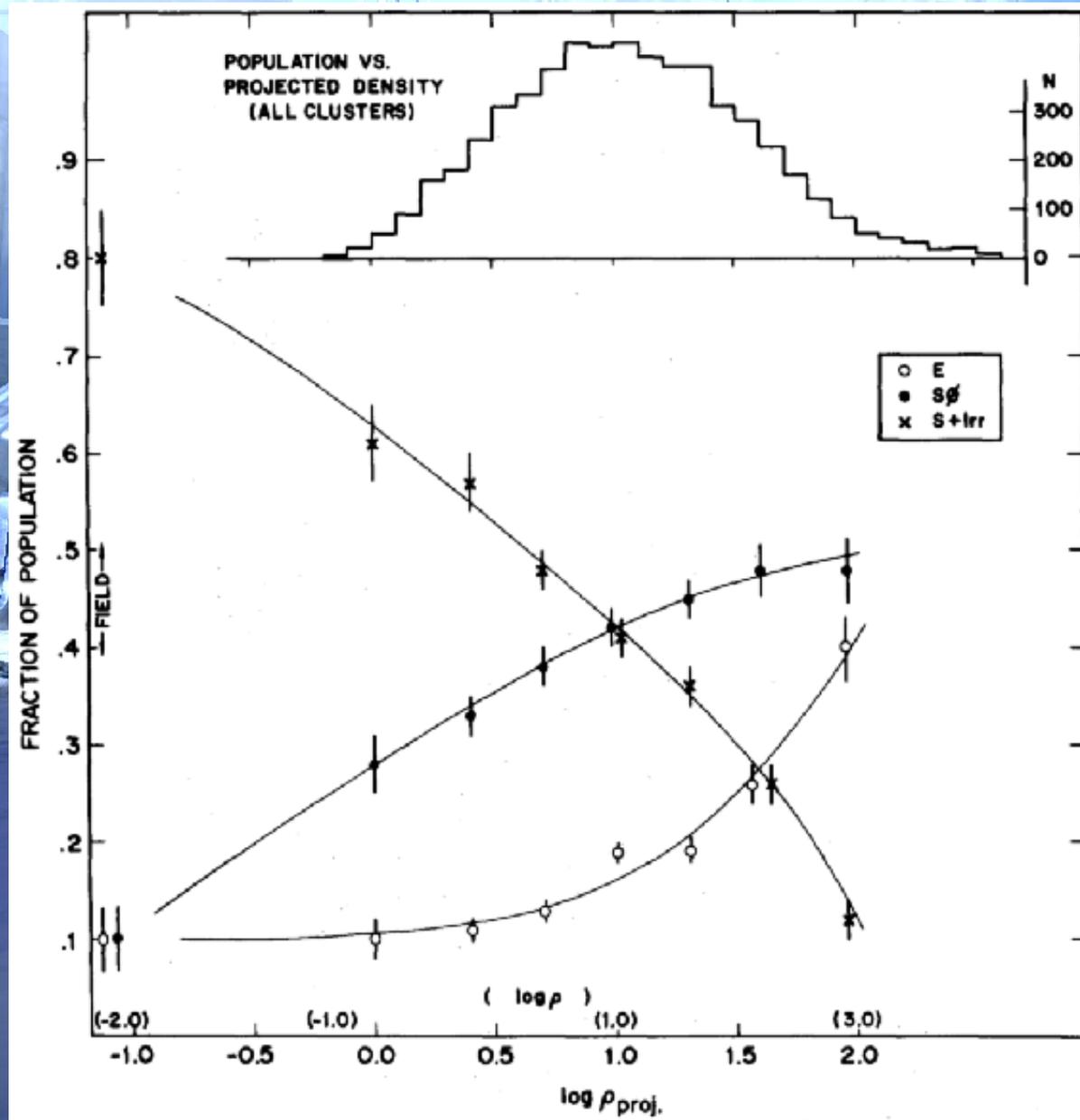


A character in futuristic, dark grey and yellow armor with glowing blue lights on the back and shoulders is seen from behind, looking out over a vast, futuristic city. The city features tall, blue-tinted skyscrapers and a snowy, icy landscape in the foreground. The sky is a pale blue with some clouds.

The role of stellar mass  
and environment:  $f_b$ ,  
 $f_{\text{AGN}}$ , & (S)SFRs

K.A.Pimbblet

# T- $\Sigma$ Relationship (Dressler 1980)

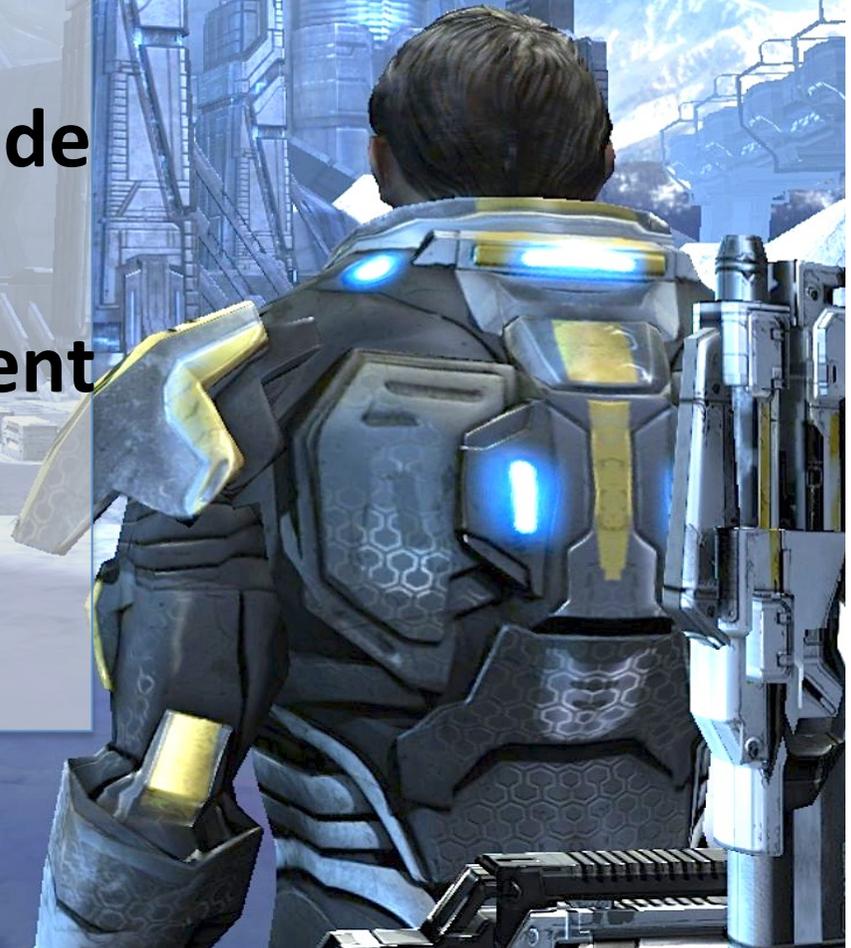


# Mass Effect

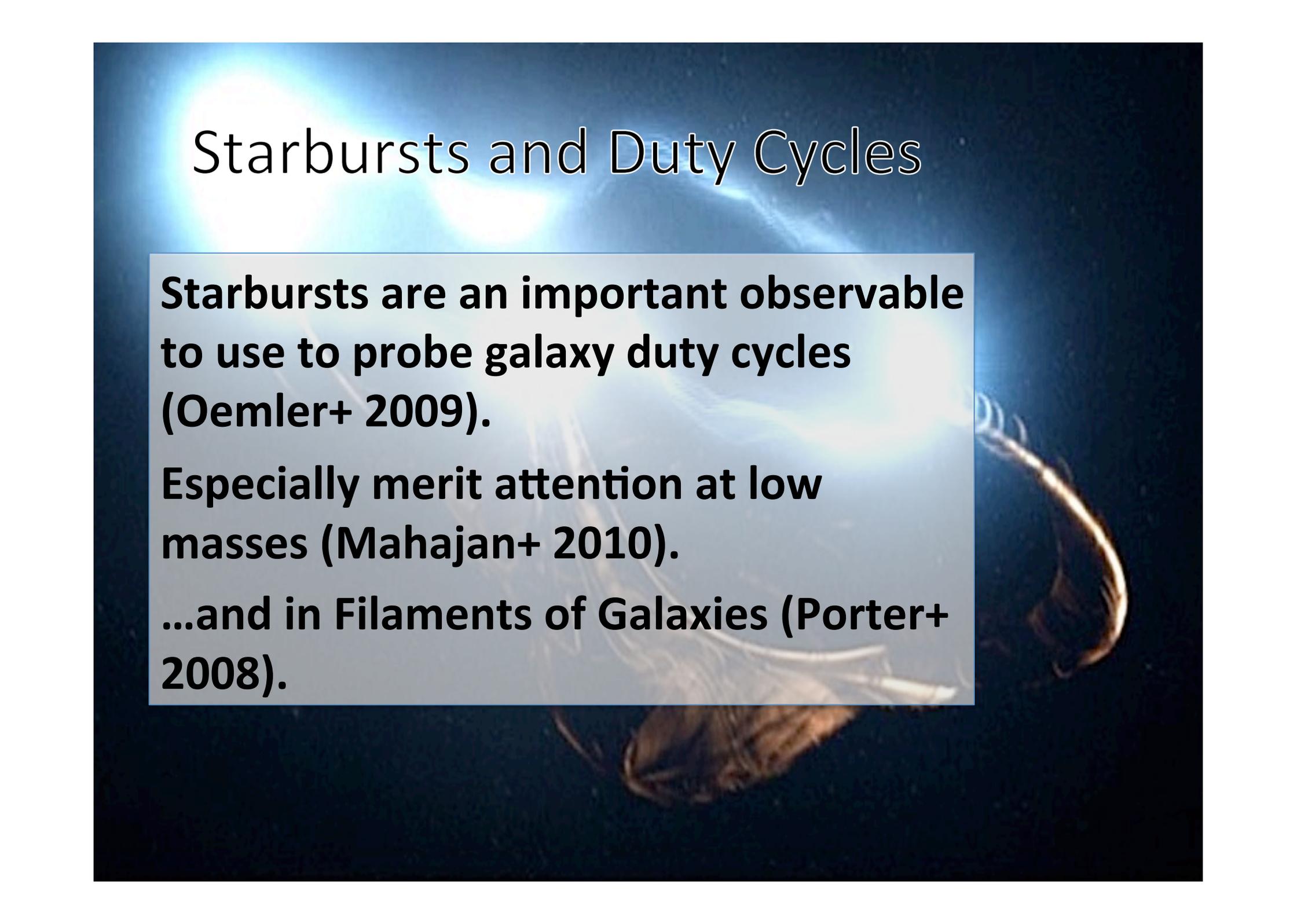
Arguably, the most important conclusions about galaxy evolution in the past ~decade are:

(a) It is mass and environment driven.

(b) Of the two, mass is the more important.



# Starbursts and Duty Cycles

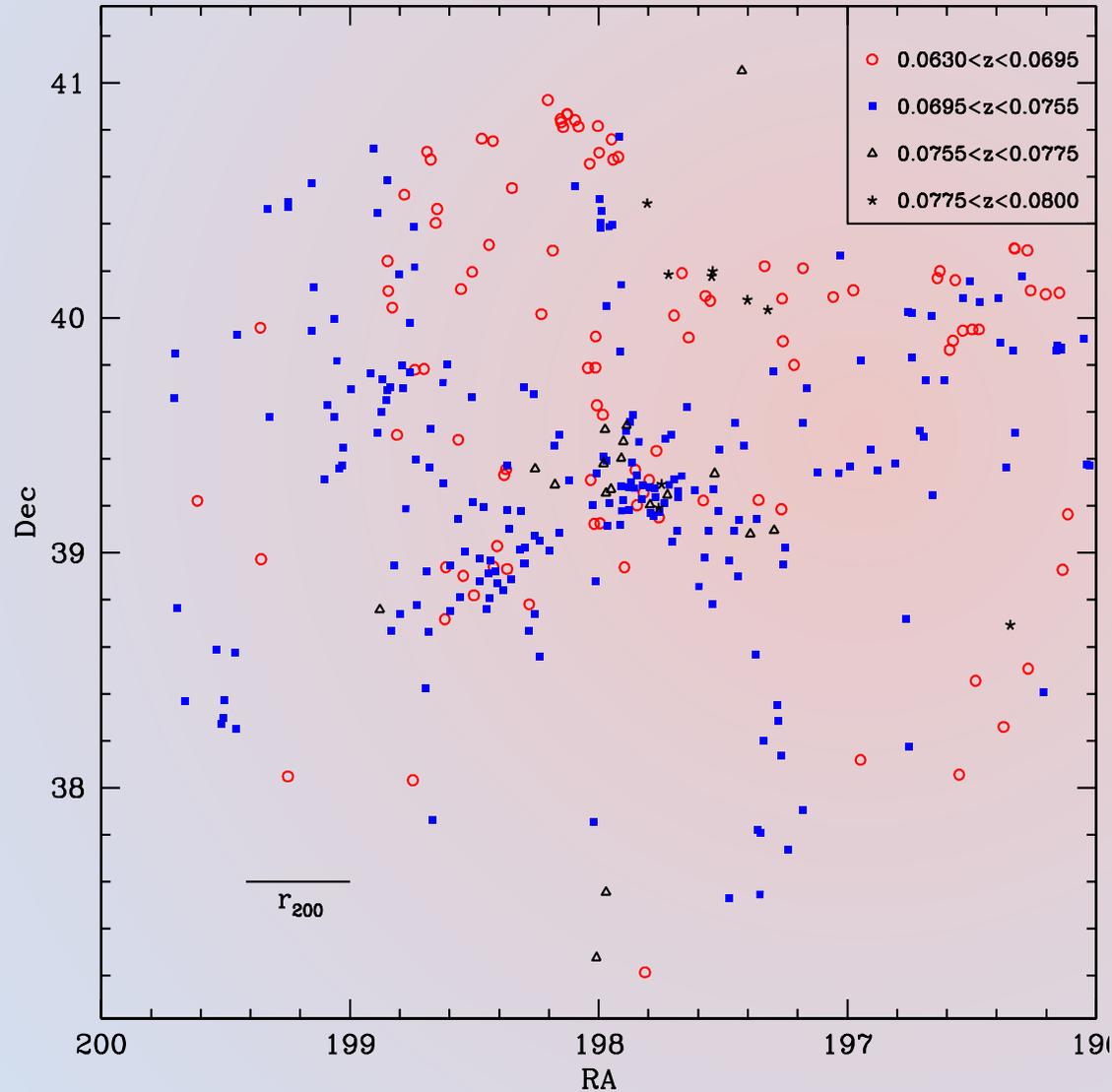
The background of the slide is a deep blue space scene. In the upper left, there is a bright, glowing starburst or galaxy core. A prominent, curved filament of light, likely representing a galaxy filament, extends from the right side towards the center. The overall image is somewhat ethereal and scientific in nature.

**Starbursts are an important observable to use to probe galaxy duty cycles (Oemler+ 2009).**

**Especially merit attention at low masses (Mahajan+ 2010).**

**...and in Filaments of Galaxies (Porter+ 2008).**

# A1691



A case-study of an intermediate X-ray luminosity cluster (Pimbblet & Jensen 2012).

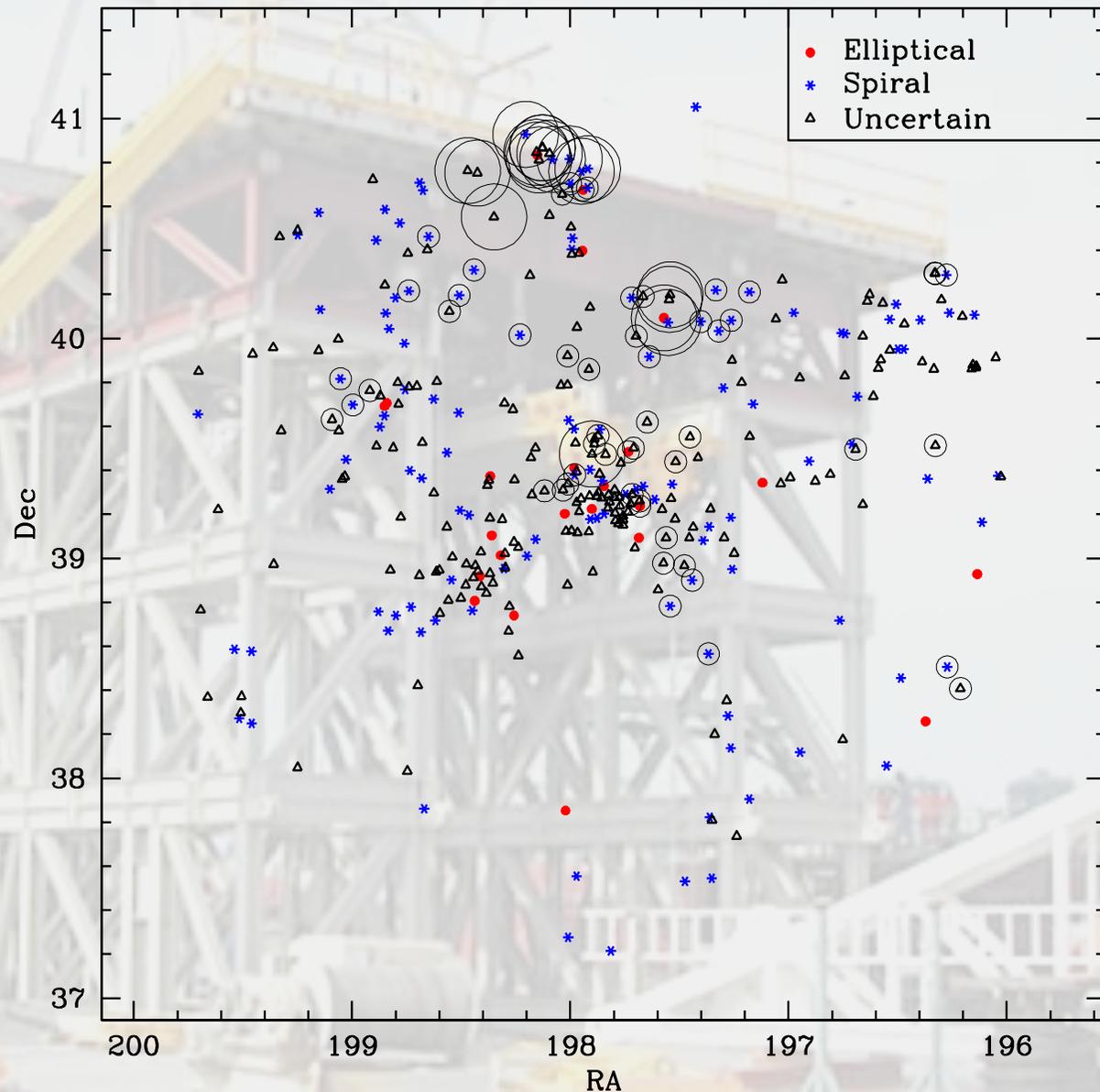
Plenty of coverage and range of environments & masses.

# Substructure

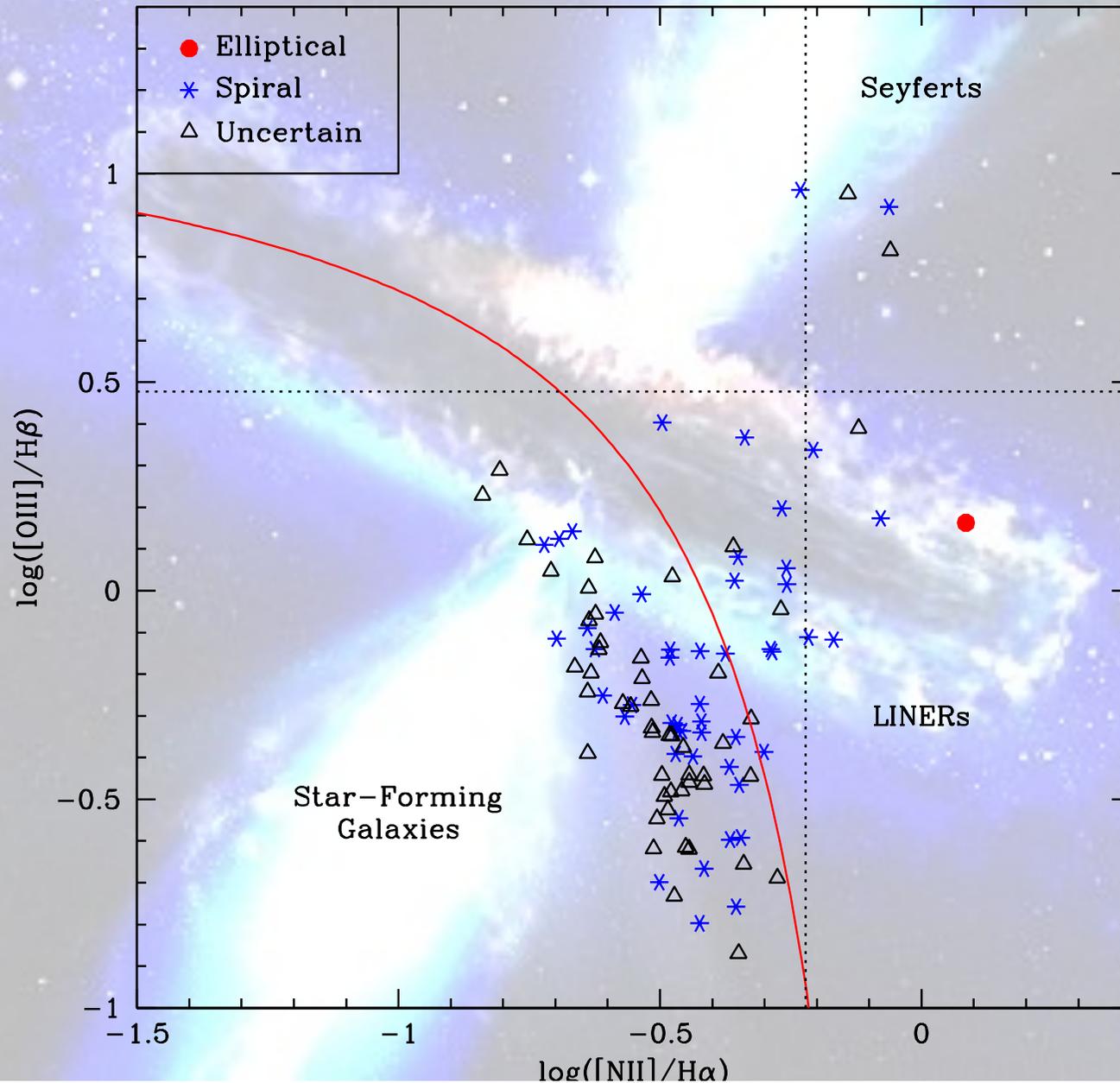
**Virialized core  
( $r < 0.5$  deg).**

**Some infalling  
structure to the  
North (Yoon+  
2008).**

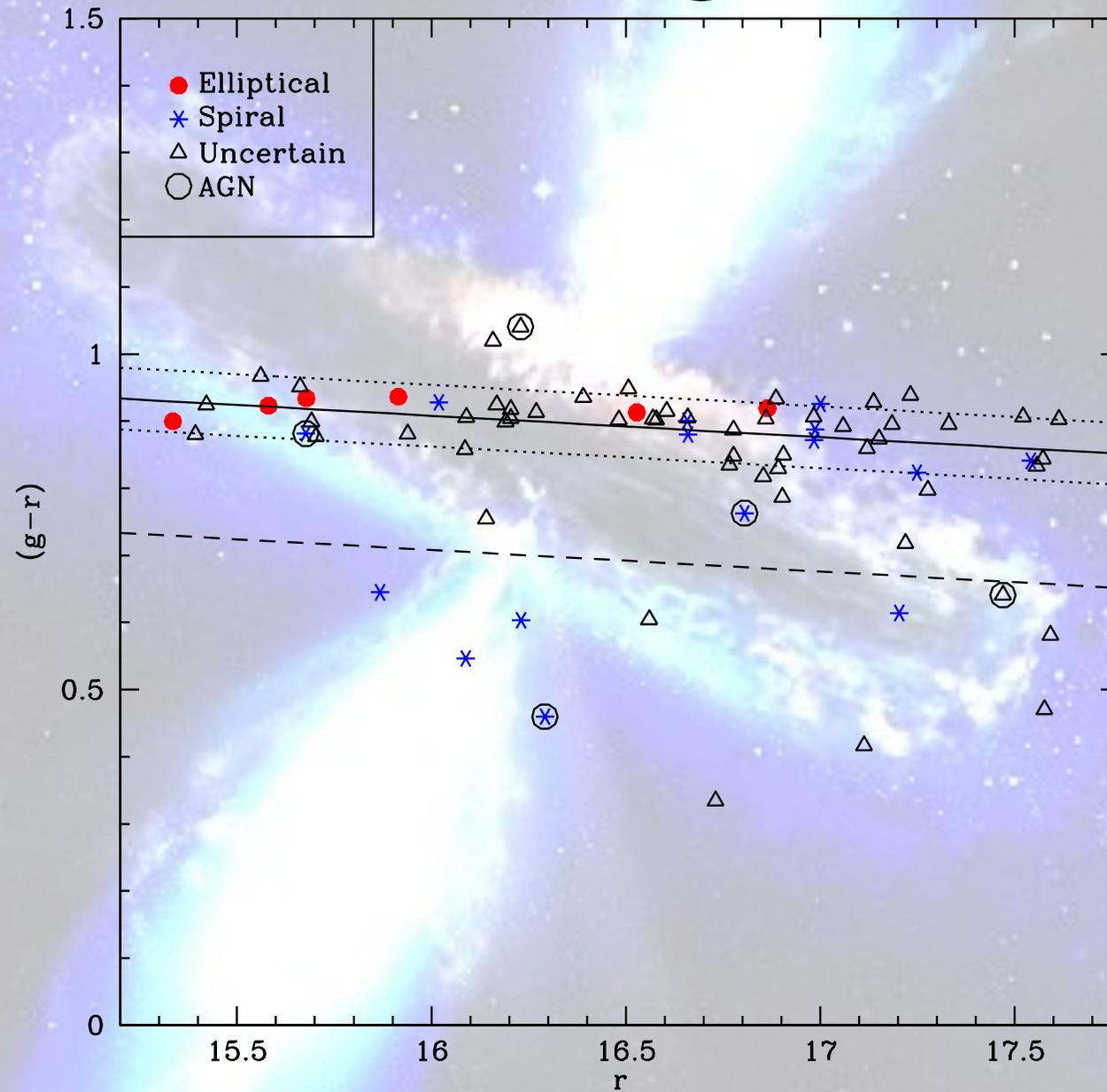
**Several  
prominent  
filaments.**



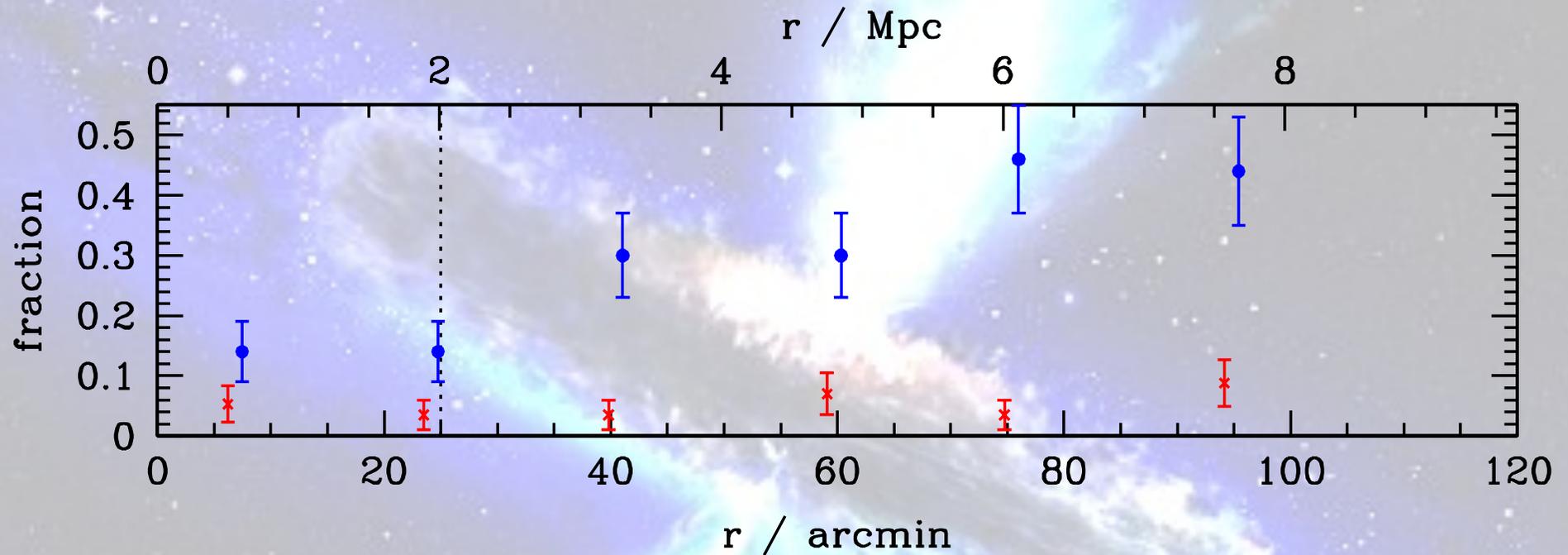
# AGN and blue galaxies



# AGN and blue galaxies



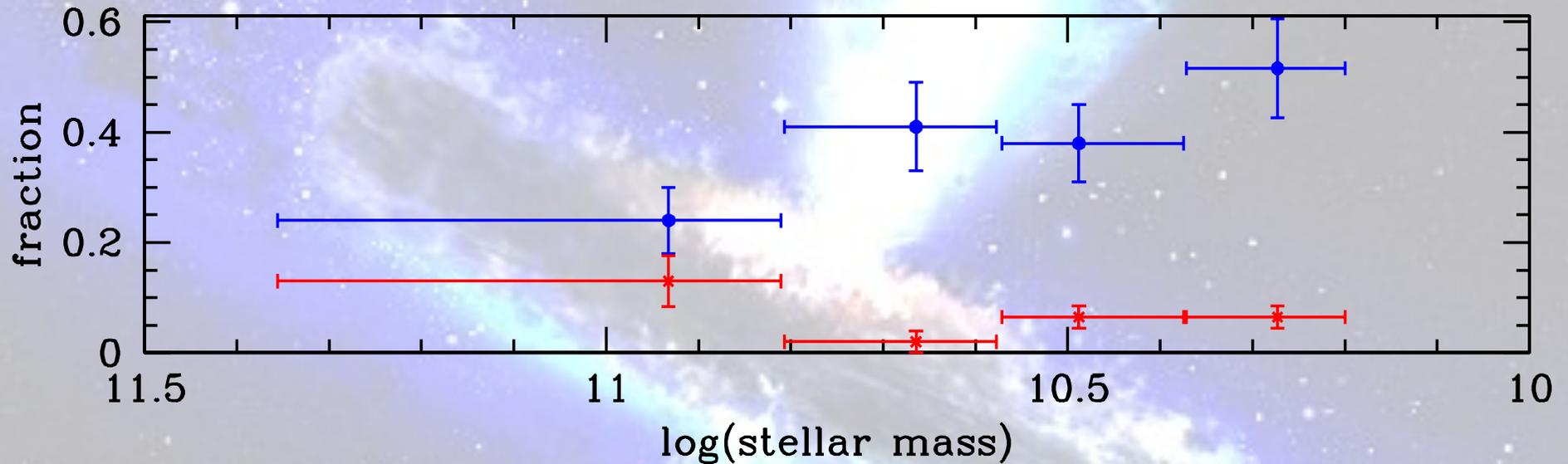
# AGN and blue galaxies



**Environmental trends for blue fraction (blue circles; a starburst proxy) and AGN (red crosses).**

**Little trend in environment for AGN (cf. Pimbblet+ 2013), but starbursts preferentially on outskirts.**

# AGN and blue galaxies

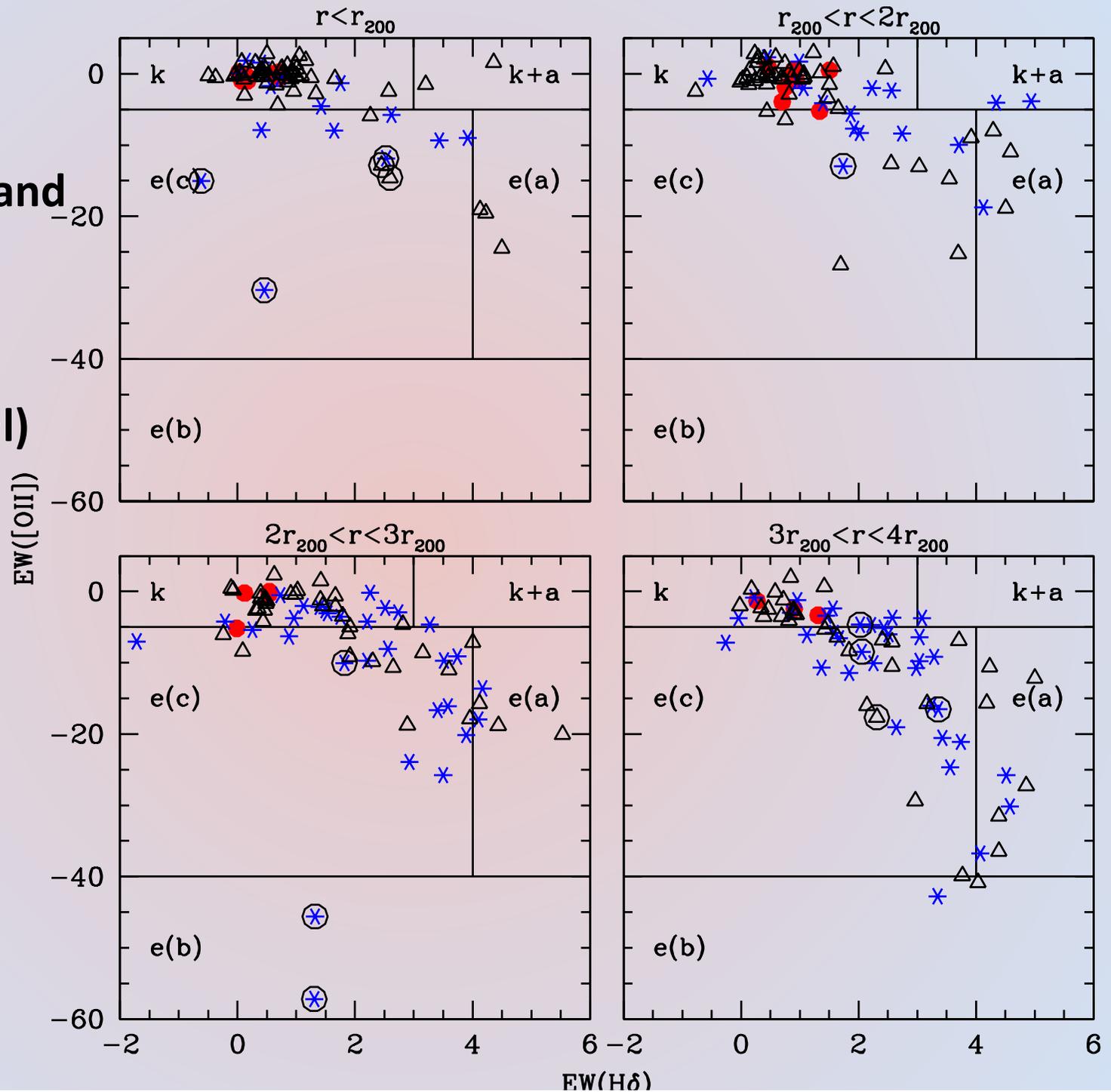


**Mass trends for blue fraction and AGN.**

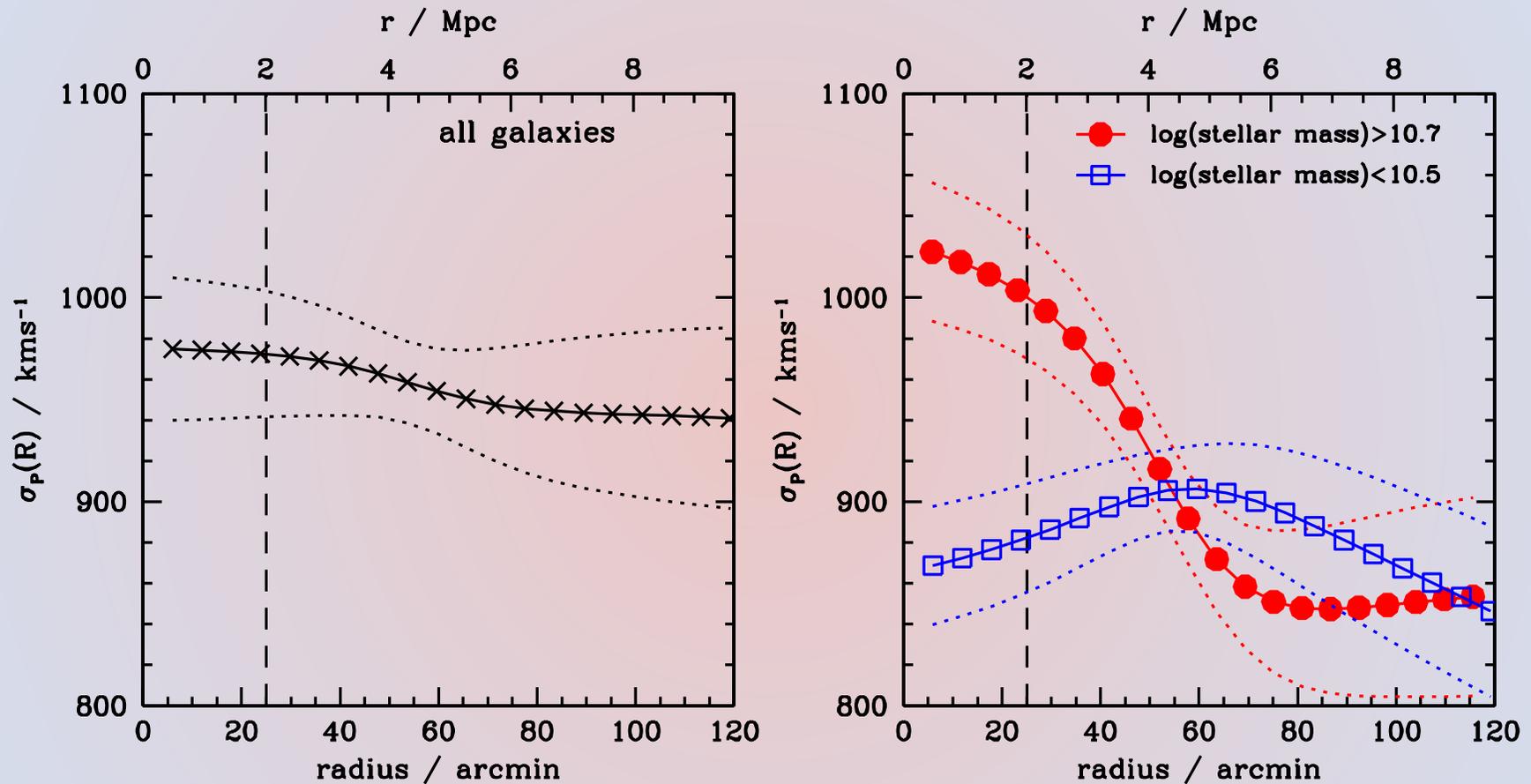
**AGN driven by high mass galaxies; blue fraction dominated by low mass galaxies.**

# Spectral classifications and relationships

No radial  
(environmental)  
trend for red  
spirals.

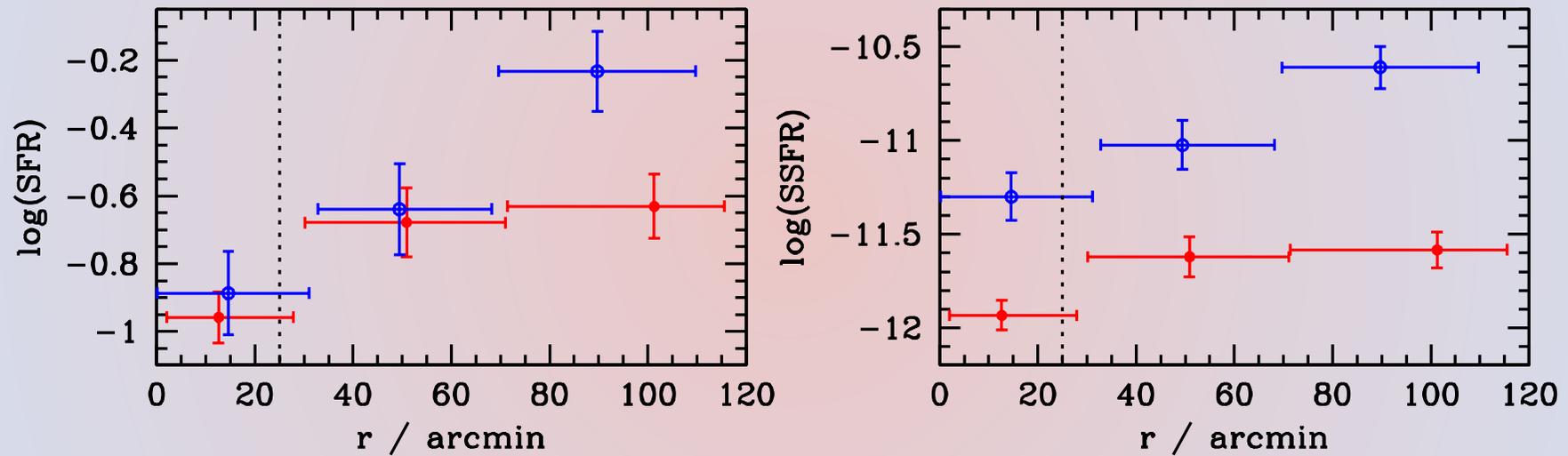


# Velocity Dispersion Profiles



**Figure 13.** Velocity dispersion profile for three sets of galaxies split by mass in A1691: high mass galaxies ( $\log(\text{stellar mass}) > 10.7$ ; filled circles), low mass galaxies ( $\log(\text{stellar mass}) < 10.5$ ; open squares), and all galaxies (open circles; dotted line). For clarity, we plot these galaxies in two panels.  $r_{\text{virial}}$  is denoted by the vertical dashed line. The error bounds (dotted lines) are  $1\sigma$  standard deviations derived from 1000 Monte Carlo resamplings. The high mass sample has a significantly ( $> 3\sigma$ ) different profile to the low mass sample within  $r_{\text{virial}}$ .

# SFR and SSFR



**Figure 14.** Star formation rate ( $\log(\text{SFR})$ ; left) and specific star formation rate ( $\log(\text{SSFR})$ ; right) for galaxies with high stellar mass ( $\log(\text{stellar mass}) > 10.8$ ; filled red circles) and low stellar mass ( $\log(\text{stellar mass}) < 10.5$ ; open blue circles) as a function of radius from the cluster centre (the vertical dotted line denotes  $r_{200}$ ). Horizontal error bars denote the range of radii sampled, the vertical errorbars are one standard deviation from a bootstrapped sampling of the data. The two mass regimes have significantly different forms: the higher mass galaxies quickly plateau in both plots with increasing radius.

# Summary

AGN: Flat to increasing profile with cluster radius. Large fraction are high mass galaxies

Blue Galaxies: Increasing fraction with radius.

Large fraction are low mass galaxies. Similar to emission line galaxies.

⇒ B-O effect a result of mass selection.

Duty cycles vary for red (gentle & slow) and blue galaxies (brutal!).