SUMMARY

B. Poggianti

Rapid quenching of SF in cluster cores – must (slightly) enhance SF in filaments, groups compared to the field – and must reduce the SF activity per unit of system mass in galaxy systems with time

(Biviano)

“Transition galaxies”:

Convincing population of 70mu excess galaxies in the Shapley supercluster – preferentially in cluster cores (Merluzzi)

Post-starburst galaxies in the (clusters of the) Great Wall – large number of low-mass red galaxies *only* in high density regions (Gavazzi)

(ENV? YES)

Gas / interstellar medium

(surely more to come)

Environment changing the properties of the ISM in galaxies? Virgo is a good laboratory - “Decreasing order of being affected”: HI, dust, H_2 (Corbelli)

The occurrence of a significant HI content in early-type galaxies is depends strongly on environment: Virgo vs field (Di Serego Alighieri)

(ENV? YES)

Color gradients in early-type galaxies I

ETGs at low-z in SPIDER – gradients ought to give a very strong constrain on early-type formation processes - for M > 10^11, strong correlation of age and Z gradients with mass, as expected by in-situ formation – gradients in groups stronger than in field - but a variety of properties seem to contribute to the formation of bright ETGs, their efficiency depending on mass,environment and radius (La Barbera)

(ENV? YES)

Color gradients in early-type galaxies II

At z=1-2, the gradients in about half of the population can be explained by an age gradient (or a combination of age and Z) – for the other half behaviour more complex, unable to identify a single or a couple of culprits (Gargiulo)

Low-z: Massive ETGs (Es) and low-mass ETGs (dEs and dSphs) have different color gradients – dichotomy in gradients as well as in formation processes? (Tortora)

Potentially gradients are very powerful tool, but interpretation still tricky

High-z

Galaxies missed by BzK selection contribute to only about 10% in cosmic star formation density – most of the SF in strongly star-forming, but “not starbursting” galaxies (Rodighiero)

Massive galaxies at high-z (system at z=2.2) already passive and assembled – fraction of star-forming galaxies increases with clustercentric distance/lower densities (Raichoor)

Models struggling: red galaxies

Color-density relation up to z=1.5 – observed relation at z =1.2-1.5, not reversed in mocks – but up to z=1.2 trends are well reproduced…(Cucciati)

All models overpredict the number of 10^10 galaxies, and the population of low-mass red galaxies at intermediate z – solution is suppression of low-mass star-forming galaxies at z=5 ? (Monaco)

Evolution of scaling relations of early-type galaxies

Mild evolution in all environments up to z=0.7 - Differences between Es and S0s (S0s younger, faster evolution)- Weak environmental dependence of the evolution, internal galaxy properties more important

Mass-dependent evolution since z=1 – downsizing (Fritz)

AGNs

Not much overlap between samples of AGNs selected in different ways (X, optical em. lines, radio, IRAC) – non passive radio and X-ray AGNs probably same population – new passive galaxies have almost all a central radio AGN and become ellipticals at high densities (Bardelli)

Environmental history of galaxies (making some order…)

Distinction between time of accretion on final cluster and time at which galaxy becomes a satellite – environmental history depending on galaxy mass – to reconcile with observed passive fractions, long timescales…(De Lucia)

N body T-SPH simulations (*with no environment (?)*)

Clear trend of star formation history (and mass assembly history) both with initial halo mass and initial density (Merlin) (set up simply by initial density fluctuations?)

The observed stellar mass-radius relation interpreted as the combination of a quasi dissipationless collapse + the variation with redshift of the most probable mass forming – superdense galaxies remain a puzzle – (Chiosi) – one would expect an age variation in the mass-radius diagram in the sense it is observed (Valentinuzzi et al. 2010)

Ring and polar-ring galaxies

Impressive level of details of simulation to study galaxy collisions and consequent star formation – possible relation with giant low surface brightness galaxies (Mapelli)

A new mechanism for the formation of polar-ring galaxies: cold gas accretion along a filament – cases studied so far support this hypothesis – (Spavone) (if such features are long lived, why polar ring galaxies not common today?)

Availability of stellar libraries and SSP libraries prepared in preparation for GAIA, but with a variety of possible applications to galaxy evolution – a GAIA result already! (Sordo)

Masses I

Dark matter fraction in early-type galaxies

DM fraction higher in more luminous/massive ellipticals (explaining the tilt ot the FP) – no trend with luminosity for S0s

DM content correlated wiith *radius* (evidence for contracted halo), and *age* (due to re-age relation? SF efficiency? IMF?...)

(Napolitano)

Masses II: relation mass-morphology

Dependence of morphological mix on galaxy mass *and* environment evident only above 10^11, weak trends with mass and environment at lower galaxy masses + Peculiarity of S0 trends in clusters

Morphology-mass relation changes with global environment – stellar mass cannot be the only parameter driving the morphological distribution of galaxies

(Calvi)

Masses III

Efficiency of galaxy formation with environment

Bimodality of galaxy stellar mass function mainly arising from different contribution of late-type and early-type galaxies in regions of different density

From galaxy mass function to halo mass function – to estimate the efficiency of galaxy formation as a function of DM halo mass – (Bolzonella)

Masses IV

What is the relation between the galaxy mass distribution and environment?

The shape of the distribution of galaxy stellar massed depends on local density, not on global environment, at z=0-0.8 (*surprising, isn't it??)* - as a consequence, the evolution of the galaxy stellar mass function in clusters and field is the same - Local phenomena dominating

(Vulcani)

Segregation effects (how to reconstruct the accretion history of groups)

From blue fractions in groups as a function of group radius and field: galaxies start to be affected by the group environment (no large scale trend)

Color segregation in poor low-z groups - Mass segregation effects in rich groups both at high- and low-z . Mass segregation driven by dynamical phenomena (poor systems did not have enough time) while nurture effects on SF still active in low.mass groups while higher mass groups are done

(Presotto)

Metallicity near and far

Evolution of the mass-metallicity relation - Inflows and outflows of gas - Metallicity gradients - Fundamental Metallicity relation…

The mass-metallicity evolution up to z=2.5 seems to be only related to the increase of SFR with z – Interplay of infall of pristine gas, outflow of enriched material and star formation history

(Cresci)

Environmental effects on gas and stars

Fraction of galaxies with *disturbed gas kinematics* depends on cluster velocity dispersion and clustercentric radius (not local density) == *disturbance due to ICM* – the mechanism that disturbs the gas must leave the stars unperturbed – ICM winson interactions

No differences of Tully-Fisher relation in clusters, groups and field….in undisturbed galaxies – kinematically disturbed galaxies have lower SSFRs (no SF enhancement)

(Jaffe')

VIPERS

Description and current status of VIPERS, with several ongoing projects for galaxy evolution

YES! To Spectroscopix!

(Scodeggio)

Working hypothesis:

Nature for high.mass galaxies

Nurture for lower mass galaxies

What nature? Primordial conditions, AGN role?

What nurture? (which “environment” matters the most?)

Separate “major properties” (such as galaxy mass, metallicity) from “transient properties” (such as color, even morphology)