On the origin of the faint-end red sequence in high density environments

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"Smoking guns in Local \((z=0)\) clusters"

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• I tool

• Significant infall of satellites on galaxy clusters exists up to $z=0$.

.... click on your favourite cosmological simulation
WE WERE TOLD TO STICK UP A ΛCDM SIMULATION... IT'S MORE "CONCORDANT" AND A LOT CHEAPER.
I tool Velocity anisotropy

... galaxy infall...
IL tool: the color/mass relation

SDSS

g - i_o

M_star
Density slices (Gav+10)

Cluster Cores

Groups & Cluster Oustkirts

Isolated

Loose Groups
• Infall of galaxies from the cosmic web into clusters (and groups) produces quenching of star formation, thus their transformation from late (blue) to early (red) sequence.
• At $z=0$ the process affects mainly low-mass systems
• In clusters the quenching of star formation takes place on short timescale

(Gav+10)
III tool: Models

Black lines: Ram pressure
magenta lines: starvation

(Boselli+Boissier+14)
VCC 1491+1499

Large fraction of dEs in Virgo are fast rotators with TF similar to spirals of similar Vrot

Toloba et al. (2009, 2011)
IV tool: gas content

For massive galaxies this pattern doesn't hold!!!!

remark !!!

$M_* \leq 10^{9.5}$

(Gav+13)
Ha sources are significantly smaller in HI poor LTGs (nuclear)

Even strongly gas deficient LTGs retain some nuclear star formation:
The gas truncation proceeds outside-in

….But nuclear SF is as high in HI rich & poor LTGs

Signature of ram-pressure

(Gav+13)

(Fossati+13)
Smoking guns

ESO137–001 in Norma cluster
Fumagalli+14 First MUSE s.v. paper (28/7/2014)
Subaru Ha
April 2014
3h per field

A1367
97073+97079
27/64 (42%) LTGs display extended asymmetric ionized gas!
ram-pressure occurs in and around clusters at $z=0$ (up to $3r_{200}$) producing gas depletion, thus quenching the star formation.

A significant fraction (up to 40%) of today's LTGs (especially low mass) infalling on clusters are currently suffering gas removal from ram-pressure.