

Issues (1. Evolving Environments)

- Is halo-mass really KING, and does it determine all the environmental dependence of galaxies?
 - It is true that there are more massive galaxies in clusters due to accelerated mass assembly.
 - Does the way they are assembled also matter? ...such as mergers or smoother accretion, which is likely to be environmentally dependent at high-z?
- Is the quenching of SF self-regulated or driven by environmental effects?
 - AGN/SB feedback (high mass) versus RP/tidal stripping (low mass)?

Issues (1. Evolving Environments)

- Are SF/AGN activities boosted in some galaxies in protoclusters?
 - How? Mergers/interactions? The mode?
- Are there any environmental effects on gaseous inflow/outflow processes?
 - Inflow (cold streams): can be different between common haloes and isolated haloes?
 - Outflow: suppressed by IGM pressure?

Issues (1. Evolving Environments)

- How can we properly compare ancestors with descendants if their environments and halo masses change with time due to cluster/group growth through assembly?
 - Galaxies were not always born or modified where they are now.
 - Proto-clusters are much rarer than present-day clusters. Therefore, many progenitors of today's cluster galaxies were “*not*” in protoclusters.
 - Pre-processing can be important.

Discussion items and my preferable answers

1. **Halo-mass** is really king?
..... Not sure yet. The way of mass assembly may also matter at high-z?
2. **Quenching** also by external effects?
..... Yes, in particular in satellite galaxies.
3. **Boost** of SF/AGN activities in protoclusters?
..... Maybe yes in some galaxies, probably due to mergers, but a larger sample and IFU obs. are required.
4. **Inflows/outflows** depend on environment?
..... Yes, these are the key mechanisms on top of the merger, and should be investigated by CE and IFU obs.
5. **Ancestors/descendants** relation in growing environments?
..... Yes, this complicates our understanding of environmental effects, and should be properly incorporated.