**MOTIVATION**

Some observational facts about the formation of S0s:

- The morphology-density relation at z=0: the fraction of S0s increases with density, while spirals become comparatively scarcer.
- Morphology evolution with z: at intermediate redshifts many spirals are found in clusters when compared with the local Universe, S0s show the inverse trend.
- A CDM structure formation scenario tells us many galaxies have undergone the transition from field to cluster environments.

**HOW?** Studying the relation between disk luminosity and maximum rotational velocity, i.e. the Tully Fisher relation (TFR, Tully & Fisher). In particular, comparing cluster and field TFRs (can we see SF enhancement?).

**THE DATA**

To construct the cluster vs. field Tully-Fisher diagram, we used a sub-set of the ESO Distant Cluster Survey (EDisCS) database for which we have:

- Deep multi-slit spectroscopy (FORS2/VLT)
- Deep optical and near-IR photometry (FORS2/VLT + SOFI/NTT)
- HST imaging for the highest z clusters

- We selected EDisCS emission-line galaxies from which we could fit a rotation curve. Galaxies with inclinations close to face-on were rejected.
- Total sample = 418 galaxies in clusters and the field.
- We then drew matched samples (in M_B and z) in order to make a fair comparison between cluster and field galaxies (see dashed boxes in the Figure → ).

**RESULTS**

1. Rotation curve fitting

- We fitted 1038 emission lines from 428 galaxies.
- Typically there were 1-3 lines per galaxy ([OII], [OIII], Hj, H6, Hγ).

2. Quality of the fits: in the quest for disturbed kinematics

- We looked at every fit to ensure reliable Vrot. Measurements. 32% of the sample had “bad” rotation curve fits due to presumably disturbed kinematics in the galaxy.

3. The cluster vs. field TFR:

- To compare cluster and field Tully-Fisher relations we created matched sub-samples in M_B and z (See Figure in “The Data” Section).
- Then we compared the difference (∆M_B) between the M_B of our galaxies and the one given by the local relation (Pierce & Tully 1992).

4. Morphologies and surprises

- HST visual morphologies were available for 61% of the sample. Most galaxies show late type morphology (as expected) but there are also early-types in our sample:

- Kinematically-disturbed galaxies are much more abundant in clusters than in the field.

**CONCLUSIONS:**

- We find NO difference between the cluster and field Tully-Fisher relation. This suggests that if there is an initial enhancement of the star formation when galaxies fall into clusters, it must happen extremely quickly.
- Kinematically-disturbed galaxies are much more abundant in clusters.
- Most emission-line galaxies in our sample showed late type morphology. Nevertheless, we discovered 12 elliptical galaxies with an extended gas disk at z < 1.

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