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Spectroscopic Analysis of Dwarf Ellipticals in the Fornax Cluster



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Aim: to study the observational structure of low-mass galaxies



Photometry: Fornax Deep Survey (FDS)

Kinematics (this work): High resolution IFU spectroscopy using SAMI.



SAMI has 13 fiber bundles with a diameter of 15", each of 61 fibers of 1.6" diameter. We observed each galaxy at the AAT for 5-7 hours.

Do dEs and giant galaxies follow the same scaling relations? (FP, FJ, etc.)

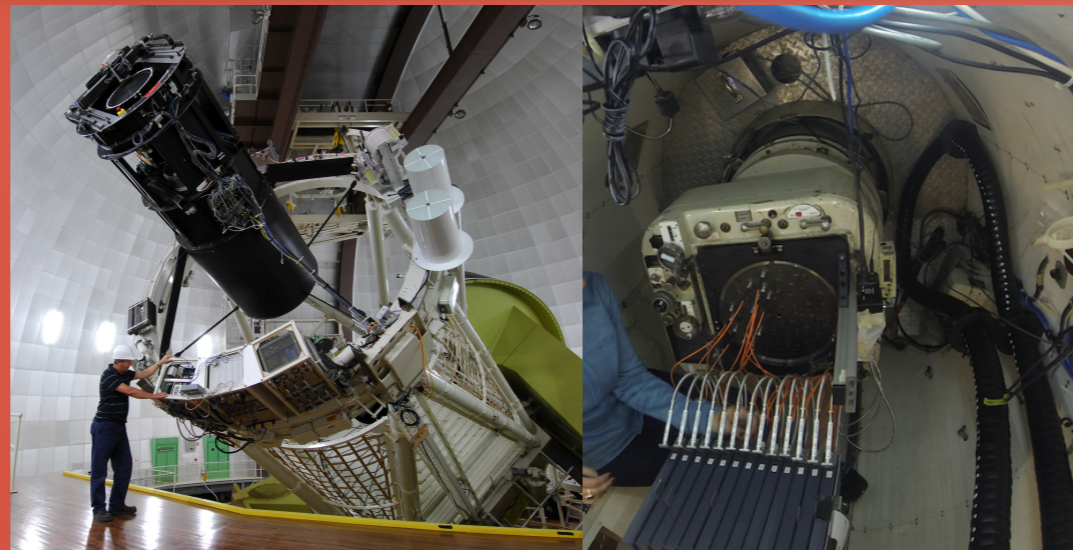
What is the DM contents of faint cluster dEs?

What is the physical role of the environment in the evolution of dEs?

What is the fraction of rotational over pressure supported dEs?

Can we detect the effects of starvation or ram-pressure on dEs?

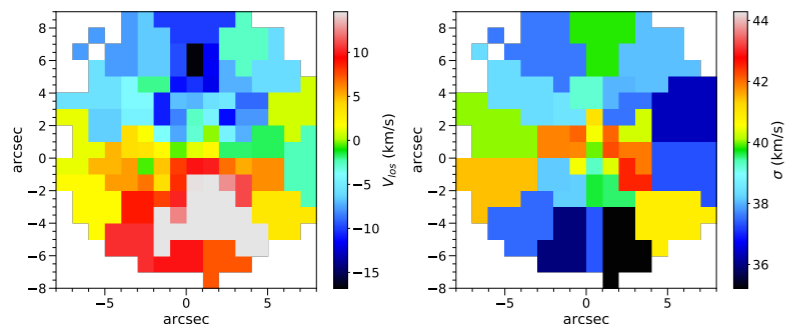
How do the stellar populations of dEs depend on the environment?



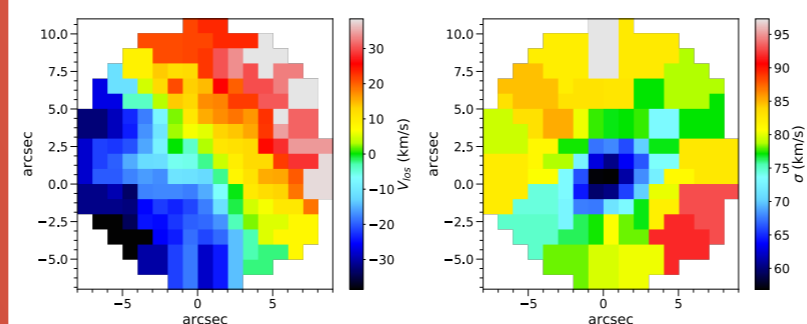
Blue
1500V gratings
 $R = 5100$ (FWHM = 1.1 \AA)
 $\sim 4660 - 5430 \text{ \AA}$

Red
1000R gratings
 $R = 4300$ (FWHM = 1.6 \AA)
 $\sim 6250 - 7350 \text{ \AA}$

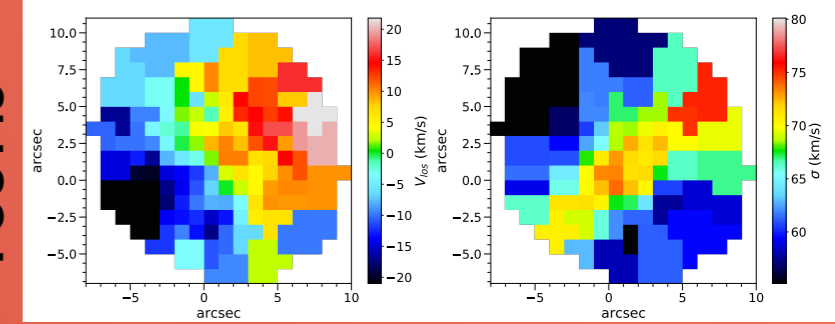
FCC182



FCC190



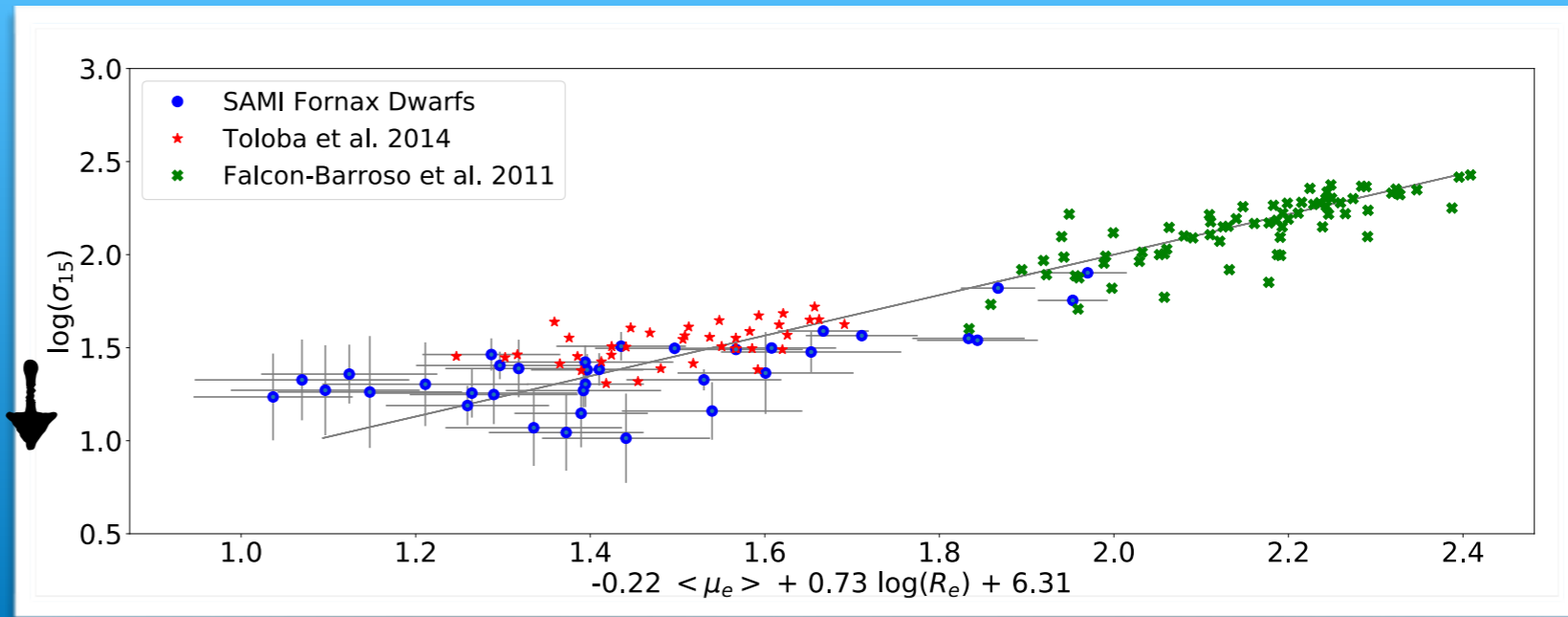
FCC143



Fundamental Plane

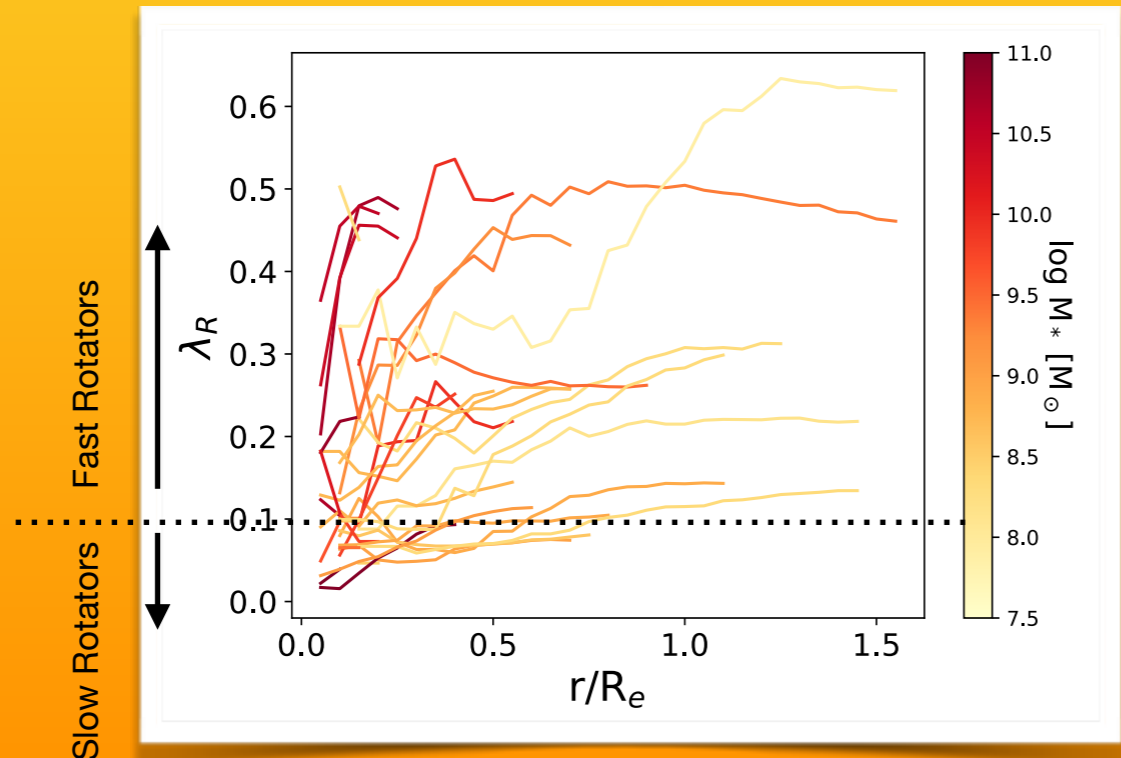
- A tight relation with the same slope from giants to dwarf ellipticals, so these classes of objects have similar internal structure.

Our sample includes galaxies that are 1-2 mag fainter than in other IFU surveys, allowing us to measure velocity dispersions down to 10 km/s.



- With our deep, high-resolution spectroscopy we are able to obtain kinematics down to stellar masses of $\sim 10^{7.4} M_{\odot}$, much smaller than in previous studies.
- Showing a variety of behavior : staying low at all radii to rising very slowly at low values
- Dwarfs in the range $M_* = 10^7 - 10^9 M_{\odot}$ rotate very slowly as compared to giants

Angular Momentum profile



- The dark matter properties of these dwarfs in clusters are the same as in the Local Group, implying that the dark matter distribution inside the galaxies is not affected by the cluster environment.

Dynamical Mass Vs. Luminosity

