

IFU observations of the core of Abell 2218

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Abstract. We present a study of the morphologies and stellar content of the galaxies in the central $\sim 74'' \times 64''$ region of the galaxy cluster Abell 2218 (see Fig. 1). The spectroscopic data were obtained with the integral field unit PMAS (Roth *et al.* 2005) in the PPAK mode (Verheijen *et al.* 2004; Kelz *et al.* 2006), at the 3.5 m telescope of the Calar Alto Observatory. The covered wavelength range was 4650–8000 Å, with a spectral resolution FWHM ~ 10 Å. These data were combined with deep HST/ACS F475W, F555W, F625W and F850LP imaging, and additional data from the literature.

In Fig. 2 we show the rest-frame $B - V$ vs. M_V colour-magnitude diagram for the identified cluster members. The data are segregated according to an objective morphological classification based on the Sérsic index. Contrary to previous results (e.g. Ziegler *et al.* 2001; Smail *et al.* 2001) there is a clear indication that the cluster population is not dominated by early-type galaxies, and that there exists an almost parity between early- and late-type objects. In addition, the late-type galaxies spread over a wider range of colours and luminosities with respect to the early-types. This indicates that early-type objects are more massive and have older stellar populations, while late-type galaxies are less massive and exhibit a wider range of stellar population properties.

The results agree with the two-steps scenario for the evolution of galaxies in clusters (e.g. Poggianti 2003), which explains the co-existence of a primordial population of early-type galaxies formed at early epochs, with an additional population of late-type galaxies that have been captured by the cluster, infalling, suffering a short enhancement of the star formation that is later quenched by the interaction with the environment, and that afterwards evolved passively, becoming redder and fainter. Finally, galaxy-galaxy interactions and dry merging processes were responsible for the building up of new massive spheroidal galaxies.

Full details are given in Sánchez *et al.* (2007).

Keywords. galaxies: clusters: general, galaxies: clusters: individual (Abell 2218), galaxies: elliptical and lenticular, cD, galaxies: spiral, galaxies: irregular, galaxies: stellar content, instrumentation: spectrographs

References

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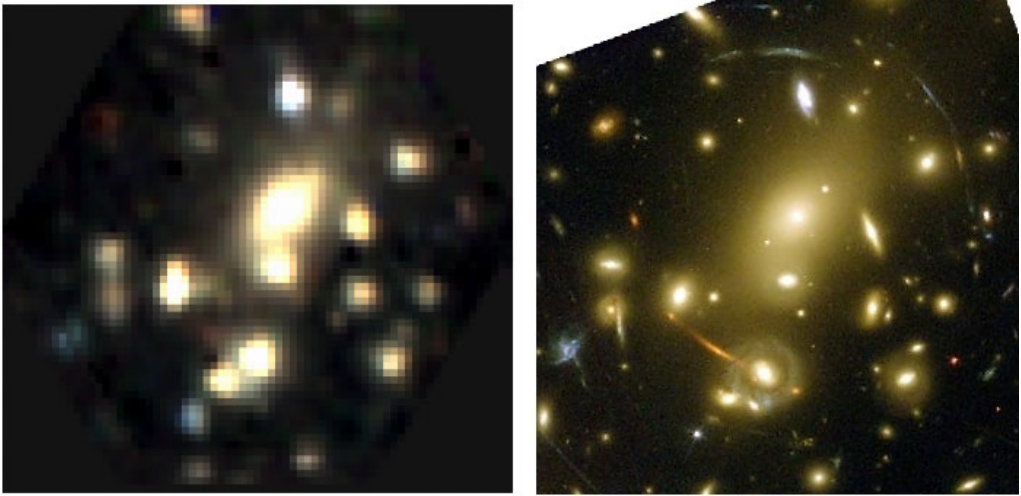


Figure 1. *Left panel:* Three-color image created by coadding the flux of the final IFU datacube through three broad-bands corresponding approximately to B , R and I . *Right panel:* Similar image created from HST/ACS data.

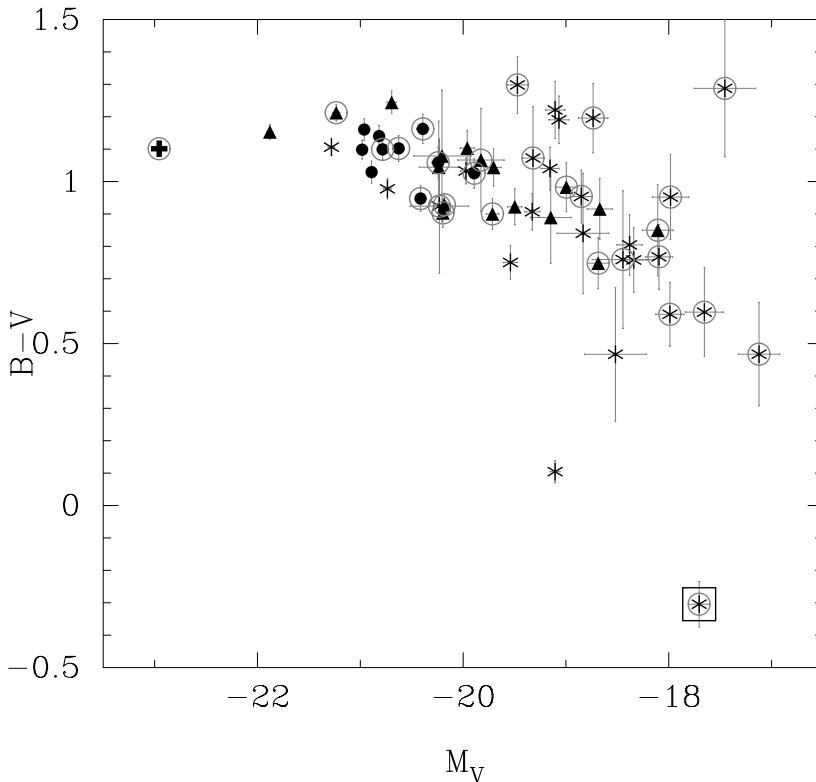


Figure 2. Rest-frame $B-V$ color distribution as a function of absolute magnitude M_V . Solid circles indicate early-type galaxies (Sérsic index $n > 2.5$), asterisks are late-type galaxies ($n < 1.75$), whereas filled triangles correspond to lenticular galaxies ($1.75 \leq n \leq 2.5$). The cD galaxy is shown as a filled cross (top left), and the only galaxy with a high asymmetry index is surrounded by a big open square (bottom right). The 28 encircled galaxies belong to our sample, observed within the field-of-view of PMAS (in the PPAK mode).