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THE COMA CLUSTER REVISITED

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Abstract. We summarize our main results on the Coma cluster.

1 Introduction

With the aim of understanding better the structure and formation history of the Coma cluster, we have undertaken a deep multi-band imaging survey. The images were obtained at CFHT with the CFH12K camera in two fields. The redshift catalogue included 1000 redshifts, among which about 500 are in the region covered by our images. XMM-Newton data by Neumann et al. (2003) were also considered. The data are presented by Adami et al. (2006a) and are available on line at the CENCOS (OAMP): http://cencosw.oamp.fr/.

2 Diffuse light in Coma

A multi-scale analysis has shown the existence of four large scale sources of diffuse light detected above 3.5σ (Adami et al. 2005a). Two of them have colours of elliptical galaxies, while one appears to be bluer, suggesting ongoing star formation.

3 Dynamics of Coma

A search for substructures based on the Serna & Gerbal (1996) method have shown the existence of 17 groups. Our main result is that NGC 4874 was probably the first giant galaxy present in the Coma cluster while NGC 4889 was accreted later (see Adami et al. 2005b).

4 Searching for low surface brightness galaxies (LSBs) in Coma

735 LSBs have been detected in Coma with absolute magnitudes $M_B = -9$ to -13 and B−R=0.8 to 1.4. From their positions in the CMR and from statistical empty field comparisons, they are probably members of Coma. Three main populations of LSBs are found: those following the CMR, those that are redder and those that are bluer. LSBs that do not follow the CMR are mainly located in groups that appear to be falling from the west. A concentration of LSBs is found around NGC 4889, and LSBs are observed to be anti-correlated with diffuse light. Details can be found in Adami et al. (2006b).

5 The Coma cluster colour-magnitude relation (CMR) and galaxy luminosity function (GLF)

The Coma cluster CMR appears to be well defined over more than 8 orders of magnitude, as illustrated by Fig. 1.

The Coma GLFs were extracted in regions of 10×10 arcmin^2 throughout the cluster (see Fig. 2). They steeply rise in the north–northeast (N–NE) regions, while they remain flat in the south–southwest ones (S–SW). The flatness of the GLF in the S-SW can only be partially explained by the fact that faint galaxies were accreted by larger ones on their way to the cluster center; on the other hand, faint galaxies in the N–NE were not removed. In the N–NE zone, bright galaxies tend to be blue while faint galaxies tend to be red. A full description can be found in Adami et al. (2006c).

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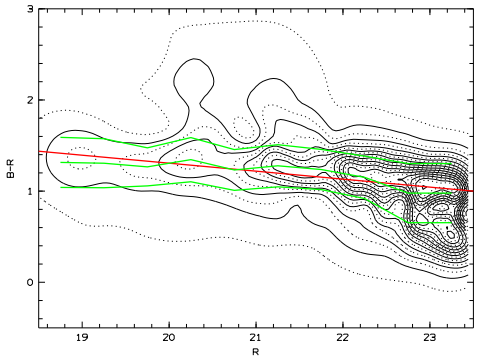

Fig. 1. Difference between the cluster maps of Coma and of the field (18.5<R<23.5). The red line shows the sequence obtained from spectroscopy (15<R<19.5).

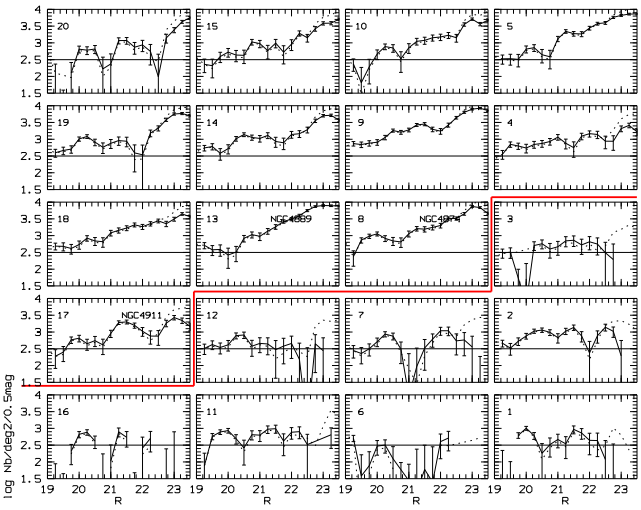

Fig. 2. R band GLFs for different locations in the Coma cluster. North is top and East is left. The locations of the three main galaxies (NGC 4874, NGC 4889 and NGC 4911) are shown along with the number of galaxies brighter than R=23.5. The red solid line delineates N–NE and S–SW regions. Continuous lines correspond to two different empty field comparisons.

6 Conclusions and perspectives

We have acquired a good knowledge of the overall structure and building history of Coma. The analysis of a very deep strip where the north and south fields overlap is under way, and so is the analysis of luminosity functions based on photometric redshifts (we have already obtained 40% of the Megacam data in the U band necessary for this study and hope to have the rest in a near future).

References

Adami, C., Slezak, E., Durret, F. et al. 2005a, A&A 429, 39
Adami, C., Biviano, A., Durret, F., Mazure A. 2005b, A&A 443, 17
Adami, C., Picat, J.-P., Savine, C. et al. 2006a, A&A 451, 1159
Adami, C., Scheidegger, R., Ulmer, M. 2006b, A&A in press, astro-ph/0607559
Adami, C., Durret, F., Mazure, A. et al. 2006c, A&A in press, astro-ph/0609391
Neumann, D.M., Lumb, D.H., Pratt, G.W., Briel, U.G. 2003, A&A 400, 811
Serna, A. & Gerbal, D., 1996, A&A 309, 65