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CLASH-VLT: Substructure in the galaxy cluster MACS J1206.2-0847 from kinematics of galaxy populations.

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Coe D., Kelson D., Koekemoer A., Lombardi M., Medezinski E., Postman M.,
Sartoris B., Umetsu K., Zitrin A., Boschin W., Czoske O., De Lucia G.,
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<Astron. Astrophys. 579, A4 (2015)>

=2015A&A...579A...4G

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ADC_Keywords: Clusters, galaxy ; Galaxies, photometry ; Redshifts ; Spectroscopy

Keywords: galaxies: clusters: individual: MACS J1206.2-0847 -

galaxies: clusters: general - galaxies: kinematics and dynamics -

galaxies: evolution - cosmology: observations

Abstract:

In the effort to understand the link between the structure of galaxy clusters and their galaxy populations, we focus on MACS J1206.2-0847 at $z \sim 0.44$ and probe its substructure in the projected phase space through the spectrophotometric properties of a large number of galaxies from the CLASH-VLT survey. Our analysis is mainly based on an extensive spectroscopic dataset of 445 member galaxies, mostly acquired with VIMOS@VLT as part of our ESO Large Programme, sampling the cluster out to a radius $\sim 2R_{200}$ (4Mpc). We classify 412 galaxies as passive, with strong H δ absorption (red and blue galaxies), and with emission lines from weak to very strong. A number of tests for substructure detection are applied to analyze the galaxy distribution

in the velocity space, in 2D space, and in 3D projected phase-space. The observational scenario agrees with MACS J1206.2-0847 having WNW-ESE as the direction of the main cluster accretion, traced by passive galaxies and red strong H δ galaxies. The red strong H δ galaxies, interpreted as poststarburst galaxies, date a likely important event 1-2Gyr before the epoch of observation. The emission line galaxies trace a secondary, ongoing infall where groups are accreted along several directions.

Description:

The table contains the spectral classification of 412 galaxies analysed in the paper. The objects are part of the spectroscopic dataset collected within the ESO Large Programme 186.A-0798 "Dark Matter Mass Distributions of Hubble Treasury Clusters and the Foundations of LambdaCDM Structure Formation Models" (P.I.: P. Rosati). This program aims at obtaining spectra for at least 500 cluster members for each of the 14 southern CLASH clusters with $0.2 < z < 0.6$, using the Visible Multi-Object Spectrograph (VIMOS) at VLT (CLASH-VLT survey).

File Summary:

FileName	Lrecl	Records	Explanations

ReadMe	80	.	This file
table2.dat	78	412	Spectral classification of 412 member galaxies of MACS 1206.2-0847

See also:

J/ApJ/749/97 : Multiple lensed images in MCS J1206.2-0847 (Zitrin+, 2012)

Byte-by-byte Description of file: table2.dat

Bytes	Format	Units	Label	Explanations
1- 3	I3	---	Seq	[1/412] Running ID for galaxies
5- 6	I2	h	RAh	Right ascension (J2000.0)
8- 9	I2	min	RAm	Right ascension (J2000.0)
11- 15	F5.2	s	RA s	Right ascension (J2000.0)
17	A1	---	DE-	Declination sign (J2000.0)
18- 19	I2	deg	DEd	Declination (J2000.0)
21- 22	I2	arcmin	DEm	Declination (J2000.0)
24- 27	F4.1	arcsec	DEs	Declination (J2000.0)
29- 34	F6.4	---	z	[0.427/0.453] Spectroscopic redshift
36- 39	F4.2	mag	B-Rc	[0.27/2.49] Johnson-Cousins B-R color index
41- 44	F4.2	mag	e_B-Rc	[0.01/0.3] rms uncertainty on B-Rc
46- 51	F6.2	0.1nm	EW([OII])	[-99/-1.5]?=0 Equivalent width of [OII] (1)
53- 57	F5.2	0.1nm	e_EW([OII])	[0/88] rms uncertainty on EW([OII])
59- 64	F6.2	0.1nm	EW(Hd)	[-31/15.2] Equivalent width of H{delta}
66- 70	F5.2	0.1nm	e_EW(Hd)	[0.2/21] rms uncertainty on EW(Hd)
72- 76	A5	---	Class	Spectral classification (3)
78	A1	---	Note	[a] Note (2)

Note (1): We list '0.00' for EW[OII] when no emission is observed.

Note (2): Label 'a' indicates the few galaxies for which the spectrum does not cover the [OII] region. In this cases, the Equivalent width of [OIII] line is reported instead of [OII].

Note (3): the classes are as follows:

PAS = passive galaxy ([OIII] absent, H{delta} absent)

HDSr = strong H{delta} absorption, and red color

(no [OIII], EW(H{delta})) > 3{AA}

HDSb = strong H δ absorption, and blue color

(no [OIII], EW(H δ) > 5{AA})

wELG = weak emission lines (EW([OIII]) > -7{AA})

mELG = medium emission lines (-15{AA} <= EW([OIII]) < -7{AA})

sELG = strong emission lines (-40{AA} <= EW([OIII]) < -15{AA})

vsELG = very strong emission lines (EW([OIII]) <= -40{AA})

Acknowledgements:

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(End)

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