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J/MNRAS/456/2829 Radial velocities of galaxies in A523 field (Girardi+, 2016)

A multiwavelength view of the galaxy cluster Abell 523 and its peculiar diffuse radio source.

Girardi M., Boschini W., Gastaldello F., Giovannini G., Govoni F., Murgia M., Barrera R., Ettori S., Trasatti M., Vacca V.
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=2016MNRAS.456.2829G (SIMBAD/NED BibCode)

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Keywords: galaxies: clusters: general -
galaxies: clusters: individual: Abell 523 -
galaxies: kinematics and dynamics - radio continuum: general -
X-rays: galaxies: clusters

Abstract:
We study the structure of the galaxy cluster Abell 523 (A523) at $z=0.104$ using new spectroscopic data for 132 galaxies acquired at the Telescopio Nazionale Galileo, new photometric data from the Isaac Newton Telescope, and X-ray and radio data from the Chandra and Very Large Array archives. We estimate the velocity dispersion of the galaxy population, $\sigma_v=949_{-60}^{+80}$ km/s, and the X-ray temperature of the hot intracluster medium, $kT=5.3\pm0.3$ keV. We infer that A523 is a massive system: $M_{200}\sim7\cdot9\times10^{14}M_\odot$. The analysis of the optical data confirms the presence of two subclusters, 0.75 Mpc apart, tracing the SSW-NNE direction and dominated by the two brightest cluster galaxies (BCG1 and BCG2). The X-ray surface brightness is strongly elongated towards the NNE direction, and its peak is clearly offset from both the brightest cluster galaxies (BCGs). We confirm the presence of a 1.3 Mpc large radio halo, elongated in the ESE-WNW direction and perpendicular to the optical/X-ray elongation. We detect a significant radio/X-ray offset and radio polarization, two features which might be the result of a magnetic field energy spread on large spatial scales. A523 is found consistent with most scaling relations followed by clusters hosting radio haloes, but quite peculiar in the $P_{\text{radio}}\text{-}L_X$ relation: it is underluminous in the X-rays or overluminous in radio. A523 can be described as a binary head-on merger caught after a collision along the SSW-NNE direction. However, minor optical and radio features suggest a more complex cluster structure, with A523 forming at the crossing of two filaments along the SSW-NNE and ESE-WNW directions.

Description:
Multi-object spectroscopic observations of A523 were carried out at the TNG in 2012 December and 2014 January. We used the instrument DOLORES in MOS mode with the LR-B Grism. In summary, we observed six MOS masks for a total of 210 slits. The total exposure time was 3600s for three masks, 5400s for two masks and 7200s for the last one.

Our photometric observations were carried out with the Wide Field Camera (WFC), mounted at the prime focus of the 2.5-m INT telescope. We observed A523 in g, r and i Sloan-Gunn filters in photometric conditions and a seeing of ~1.4 arcsec.

File Summary:

FileName	Lrec1	Records	Explanations
ReadMe	80	.	This file
table1.dat	45	132	Radial velocities of 132 galaxies in the field of A523

Byte-by-byte Description of file: [table1.dat](#)

Bytes	Format	Units	Label	Explanations
1- 3	I3	---	ID	Sequential number
4	A1	---	n_ID	[*AB] Note on ID (1)
6- 7	I2	h	RAh	Right ascension (J2000)
9- 10	I2	min	RAm	Right ascension (J2000)
12- 16	F5.2	s	RA s	Right ascension (J2000)
18	A1	---	DE-	Declination sign (J2000)
19- 20	I2	deg	DEd	Declination (J2000)
22- 23	I2	arcmin	DEm	Declination (J2000)
25- 28	F4.1	arcsec	DEs	Declination (J2000)
30- 34	F5.2	mag	rmag	?= INT dereddened r-band magnitude
36- 41	I6	km/s	HRV	Heliocentric radial velocity
43- 45	I3	km/s	e_HRV	rms uncertainty on HRV

Note (1): Notes as follows:

* = non-member galaxies
A = Galaxy ID 75 is the BCG1
B = Galaxy ID 56 is the BCG2

History:

From electronic version of the journal

(End)

Patricia Vannier [CDS]

27-Sep-2016

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