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Title	VizieR Online Data Catalog: MACS J0416.1-2403 redshift catalogue (Caminha+, 2017)
Authors	Caminha, G. B., Grillo, C., Rosati, P., Balestra, I., MERCURIO, AMATA, VANZELLA, Eros, BIVIANO, ANDREA, Caputi, K. I., Delgado-Correal, C., Karman, W., Lombardi, M., MENEGHETTI, MASSIMO, Sartoris, B., Tozz, P.
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[Portal](#) [Simbad](#) [VizieR](#) [Aladin](#) [X-Match](#) [Other](#) [Help](#)**J/A+A/600/A90** MACS J0416.1-2403 redshift catalogue (Caminha+, 2017)

A refined mass distribution of the cluster MACS J0416.1-2403 from a new large set of spectroscopic multiply lensed sources.
Caminha G.B., Grillo C., Rosati P., Balestra I., Mercurio A., Vanzella E., Biviano A., Caputi K.I., Delgado-Correal C., Karman W., Lombardi M., Meneghetti M., Sartoris B., Tozz P.
<Astron. Astrophys. 600, A90 (2017)>
[=2017A&A...600A...90C](#) (SIMBAD/NED BibCode)

ADC_Keywords: Clusters, galaxy ; Redshifts**Keywords:** galaxies: clusters: individual: MACS J0416.1-2403 -
gravitational lensing: strong - cosmology: observations**Abstract:**

We report the spectroscopic confirmation of 22 new multiply lensed sources behind the Hubble Frontier Field (HFF) galaxy cluster MACS J0416.1-2403 (MACS 0416), using archival data from the Multi Unit Spectroscopic Explorer (MUSE) on the VLT. Combining with previous spectroscopic measurements of 15 other multiply imaged sources, we obtain a sample of 102 secure multiple images with measured redshifts, the largest to date in a single strong lensing system. The newly confirmed sources are largely low-luminosity Lyman α -emitters with redshift in the range [3.08-6.15]. With such a large number of secure constraints, and a significantly improved sample of galaxy members in the cluster core, we have improved our previous strong lensing model and obtained a robust determination of the projected total mass distribution of MACS 0416. We find evidence of three cored dark-matter halos, adding to the known complexity of this merging system. The total mass density profile, as well as the sub-halo population, are found in good agreement with previous works. We update and make public the redshift catalog of MACS 0416 from our previous spectroscopic campaign with the new MUSE redshifts. We also release lensing maps (convergence, shear, magnification) in the standard HFF format.

Description:

We used archival MUSE (Bacon et al., 2012, The Messenger, 147, 4) data from two different programs which covered the North-East (NE) and South- West (SW) regions of MACS 0416.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
tablea1.dat	61	114	Information on spectroscopically identified multiple images in MACS 0416
catalog.dat	82	4594	Full redshift catalog, combining the MUSE and VIMOS measurements

See also:

[III/250](#) : The VIMOS VLT deep survey (VVDS-DEEP) (Le Fevre+ 2005)
[J/A+A/428/1043](#) : Redshifts from VIMOS VLT Deep Survey (Le Fevre+, 2004)

Byte-by-byte Description of file: [tablea1.dat](#)

Bytes	Format	Units	Label	Explanations
1-	3	A3	---	ID
4	A1	---	n_ID	[+)] Note on ID (1)
6-	14	F9.6	deg	RAdeg
15	A1	---	n_RAdeg	[)]) for model-predicted position
16-	25	F10.6	deg	DEdeg
26	A1	---	n_DEdeg	[)]) for model-predicted position
28-	33	F6.4	---	zMUSE
35-	39	F5.3	---	zprev
40-	42	A3	---	r_zprev
44-	48	A5	---	IDref
				ID column in Table 2 of Hoag et al. (2016, Cat. J/ApJ/831/182), [HHT2016] NNN.N in Simbad
50-	54	F5.2	mag	F814Wmag
				?=- F814W magnitude based on the ASTRODEEP catalog (Castellano et al., 2016, Cat. J/A+A/590/A31)
56-	59	F4.2	mag	e_F814Wmag
61	A1	---	n_F814Wmag	? rms uncertainty on F814Wmag
				[*] * for objects whose magnitude might be

affected by source confusion

Note (1): Note as follows:

-) = model-predicted positions
- + = positions measured in MUSE narrow band images

Note (2): MUSE redshifts are generally based on the Ly- α line when present, with exception of IDs 1, 3, 9, 20, 26, and 27 for which CIV and CIII] lines were used to better estimate the systemic redshift. This table includes 56 new redshifts belonging to 22 multiply lensed sources.

Note (3): References as follows:

- a = GLASS redshifts Hoag et al. (2016, [J/ApJ/831/182](#))
- b = Balestra et al. (2016, Cat. [J/ApJS/224/33](#))
- c = Rodney et al., in prep.
- d = Grillo et al. ([2015ApJ...800...38G](#))
- e = Jauzac et al. (2014, Cat. [J/MNRAS/443/1549](#))
- f = Richard et al. ([2010MNRAS.402L..44R](#))
- g = Zitrin et al. (2013, Cat. [J/ApJ/762/L30](#))

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

Bytes	Format	Units	Label	Explanations
1- 8	A8	---	---	[CLASHVLT]
9- 27	A19	---	CLASHVLT	CLASHVLT designation (JHHMMSS.ss+DDMMSS.s)
31- 40	F10.6	deg	RAdeg	Right ascension (J2000)
44- 53	F10.6	deg	DEdeg	Declination (J2000)
58- 63	F6.4	---	z	Redshift
68	I1	---	q_z	[2/9] Redshift quality flag (1)
73	I1	---	r_z	[1/6] Redshift reference (2)
78- 82	F5.2	mag	Rmag	?=9.99 Kron R band mag (AB system) from ESO-WFI 2.2m (3)

Note (1): Quality flag as follows:

- 2 = LIKELY [726] VLT-VIMOS [~80% reliability]
- 3 = SECURE [3512] VLT-VIMOS [100% reliability]
- 9 = SINGLE-LINE [345] VLT-VIMOS [>90% reliability]
- 4 = literature [6] MAGELLAN [>90% reliability]
(D. Kelson, private communication)
- 5 = literature [5] CFHT [>90% reliability]
(Ebeling et al., 2014, Cat. [J/ApJS/211/21](#))

Note (2): Reference for redshift as follows:

- 1 = CLASH-VLT LR grism [3689]
- 2 = CLASH-VLT MR grism [593]
- 4 = MAGELLAN (D. Kelson private communication) [6]
- 5 = CFHT (Ebeling et al., 2014, Cat. [J/ApJS/211/21](#)) [5]
- 6 = VLT/MUSE (This paper) [301]

Note (3): 9.99 indicates lack of ground-based photometry.

Acknowledgements:

From Gabriel Caminha, gbcaminha(at)gmail.com
when using these redshifts, please acknowledge the papers Balestra et al. 2016 (ApJS, 224, 33), Caminha et al. 2017 (A&A, 600, A90), and the VLT programme IDs 186.A-0798, 094.A-0115(B), ID 094.A-0525(A)

History:

- * 05-Apr-2017: On-line version
- * 05-Apr-2019: tablea1.dat added, from electronic version

(End)

Patricia Vannier [CDS] 15-Feb-2017

The document above follows the rules of the [Standard Description for Astronomical Catalogues](#); from this documentation it is possible to generate *f77* program to load files [into arrays](#) or [line by line](#)

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