J/A+A/622/A15 Broad absorption line quasars in LDR1 (Morabito+, 2019)

The origin of radio emission in broad absorption line quasars:
Results from the LOFAR Two-metre Sky Survey.
Morabito L.K., Matthews J.H., Best P.N., Guerkan G., Jarvis M.J.,
Prandoni I., Duncan K.J., Hardcastle M.J., Kunert-Bajraszewska M.,
Mechev A.P., Mooney S., Sabater J., Roettgering H.J.A., Shimwell T.W.,
Smith D.J.B., Tasse C., Williams W.L.
<Astron. Astrophys. 622, A15 (2019)>
=2019A&A...622A..15M (SIMBAD/NED BibCode)

ADC_Keywords: Galaxies, radio ; Active gal. nuclei ; QSOs

Keywords: galaxies: active - galaxies: jets -
radio continuum: galaxies - quasars: general -
radiation mechanisms: non-thermal - acceleration of particles

Abstract:
We present a study of the low-frequency radio properties of broad absorption line quasars (BALQSOs) from the LOFAR Two-metre Sky-Survey Data Release 1 (LDR1). The value-added LDR1 catalogue contains Pan-STARRS counterparts, which we match with the Sloan Digital Sky Survey (SDSS) DR7 and DR12 quasar catalogues. We find that BALQSOs are twice as likely to be detected at 144MHz than their non-BAL counterparts, and BALQSOs with low-ionisation species present in their spectra are three times more likely to be detected than those with only high-ionisation species. The BALQSO fraction at 144MHz is constant with increasing radio luminosity, which is inconsistent with previous results at 1.4GHz, indicating that observations at the different frequencies may be tracing different sources of radio emission. We cross-match radio sources between the Faint Images of the Radio Sky at Twenty Centimeters (FIRST) survey and LDR1, which provides a bridge via the LDR1 Pan-STARRS counterparts to identify BALQSOs in SDSS. Consequently we expand the sample of BALQSOs detected in FIRST by a factor of three. The LDR1-detected BALQSOs in our sample are almost exclusively radio-quiet (logr<2), with radio sizes at 144$ $MHz typically less than 200kpc these radio sizes tend to be larger than those at 1.4GHz, suggesting more extended radio emission at low frequencies. We find that although the radio detection fraction increases with increasing balnicity index (BI), there is no correlation between BI and either low-frequency radio power or radio-loudness. This suggests that both radio emission and BI may be linked to the same underlying process, but are spatially distinct phenomena.

Description:
Measured and derived parameters for quasars from the SDSS DR7/DR12 catalogs within the footprint of the LOFAR Two-metre Sky Survey data realease 1 (LDR1). This is a combination of data from SDSS DR7/DR12, with accretion properties from Shen et al., (2011, Cat. J/ApJS/194/45) and Kozlowski (2017. Cat. J/ApJS/228/9). Radio properties from LDR1 and FIRST are presented.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
ldr1qsos.dat	436	21812	*Measured and derived parameters for quasars from SDSS DR7/DR12 catalogs within the footprint of the LOFAR Two-metre Sky Survey data realease 1 (LDR1) (corrected version)

Note on ldr1qsos.dat: Note that we include all quasars within the LDR1 footprint, but only a subset of them will have LDR1 information.

See also:
VIII/92 : The FIRST Survey Catalog, Version 2014Dec17 (Helfand+ 2015)
J/ApJS/194/45 : QSO properties from SDSS-DR7 (Shen+, 2011)
J/ApJS/228/9 : Physical parameters of ~300000 SDSS-DR12 QSOs (Kozlowski 2017)
J/A+A/598/A104 : LOFAR Two-metre Sky Survey (Shimwell+, 2017)

J/A+A/622/A1 : LOFAR Two-metre Sky Survey DR1 source catalog (Shimwell+ 2019)
J/A+A/622/A4 : LOFAR observations XMM-LSS field (Hale+, 2019)
J/A+A/622/A8 : NGC 3184, 4736, 5055 & 5194 LOFAR & WSRT maps (Heesen+, 2019)
J/A+A/622/A11 : LoTSS/HETDEX. Optical quasars. I. (Guerkan+, 2019)
J/A+A/622/A13 : VLA double-double radio galaxy candidates images (Mahatma+, 2019)
J/A+A/622/A23 : LoTSS HCG and MLCG systems (Nikiel-wroczynski+, 2019)
J/A+A/623/A71 : LOTSS HETDEX Faraday depth cube (Van Eck+, 2019)

Byte-by-byte Description of file: ldr1qsos.dat

Bytes	Format	Units	Label	Explanations

1- 18	A18	---	SDSS	SDSS name From DR12 (HHMMSS.ss+DDMMSS.s) (SDSS_Name)
20- 28	I9	---	THINGID	Unique SDSS object id (THINGID)
30- 37	F8.6	---	z	Visually inspected SDSS redshifts (z_v)
39	I1	---	BALVI	[0/1] Flag, visual BAL ident (BAL_VI)
41- 47	F7.1	km/s	BICIVt	? Balnicity index for CIV trough (BI_CIVt)
49	I1	---	LOBALVIMG	[0/1]? Flag, visual LoBAL ident, MgII ($LOBAL_{VI}MG$)
51	I1	---	LOBALVIAL	[0/1]? Flag, visual LoBAL ident, AlIII ($LOBAL_{VI}AL$)
53- 56	A4	---	r_logMBH	Source of MBh measurement (Mbh_source)
58- 63	F6.3	[Msun]	logMBH	? logarithm of black hole mass (Mbh)
65- 70	F6.3	[10-7W]	logLbol	? logarithm of bolometric luminosity (log_Lbol)
72- 76	F5.3	[10-7W]	e_logLbol	? Error in logarithm of bolometric luminosity ($e_{log}Lbol$)
78- 83	F6.3	---	logedd	? logarithm of Eddington ratio (log_edd)
85	I1	---	f_FIRST	[0/1] Flag, DR7/FIRST match ($DR7_{FIRST}$detected)
87-106	E20.6	W/Hz	RP20	? Peak radio power at 1.4GHz - DR7 ($DR7_{20cm}$peak_power)
108-127	E20.6	W/Hz	e_RP20	? Error in Peak radio power at 1.4GHz ($e_{DR7}20cm_{peak}$power)
129-150	A22	---	LDR1	Source name in LDR1 (Cat. J/A+A/598/A104) catalogue (ILTJHHMMSS.ss+DDMMSS.s) ($LDR1_{Source}$Name)
152-167	F16.12	deg	RAdeg	? Right ascension of LDR1 source (J2000) (LDR1_RA)
169-184	F16.13	deg	DEdeg	? Declination of LDR1 source (J2000) (LDR1_DEC)
186-203	F18.15	arcsec	Maj	? Deconvolved major axis in LDR1 (DC_Maj)
205-222	F18.14	arcsec	Size	? LOFAR Galaxy Zoo size in LDR1 (LGZ_Size)
224-242	F19.14	kpc	LLS	? Projected largest linear size (LLS)
244	A1	---	Res	[RU] LDR1 resolved or unresolved (Resolved)
246-265	E20.6	W/Hz	L144	? Radio power at 144MHz (L_144)
267-286	E20.6	W/Hz	e_L144	? error in radio power at 144MHz (e_L144)
288-304	F17.15	[-]	logR144	? Radio loudness at 144MHz (log_R144)
306-332	A27	---	LDR1opt	Name of LDR1 optical ID (PSO JHHMMSS.sss+DDMMSS.sss) ($LDR1_{opt}$ID_name)
334-345	F12.8	deg	RAodeg	? Right ascension of LDR1 optical ID ($LDR1_{opt}$ID_ra)
347-357	F11.8	deg	DEodeg	? Declination of LDR1 optical ID ($LDR1_{opt}$ID_dec)
359-374	A16	---	FIRST	FIRST source (Cat. VIII/92) matched with LDR1 (Cat. J/A+A/598/A104) (JHHMMSS.s+DDMMSS) (FIRST_Name)
376-395	E20.6	W/Hz	L1400	? Total power at 1.4GHz (L_1400)
397-416	E20.6	W/Hz	e_L1400	? Error in total power at 1.4GHz (e_L1400)
418-436	F19.14	kpc	FIRSTLLS	? FIRST projected largest linear size (FIRST_LLS)

Acknowledgements:
Leah Morabito, leah.morabito(at)physics.ox.ac.uk

References:

Shimwell et al.,	Paper I	2019A&A...622A...1S	Cat. J/A+A/622/A1
Williams et al.,	Paper II	2019A&A...622A...2W	
Duncan et al.,	Paper III	2019A&A...622A...3D	
Hale et al.,	Paper IV	2019A&A...622A...4H	Cat. J/A+A/622/A4
de Gasperin et al.,	Paper V	2019A&A...622A...5D	
Arias et al.,	Paper VI	2019A&A...622A...6A	
Emig et al.,	Paper VII	2019A&A...622A...7E	
Heesen et al.,	Paper VIII	2019A&A...622A...8H	Cat, J/A+A/622/A8
Miskolczi et al.,	Paper IX	2019A&A...622A...9M	
Croston et al.,	Paper X	2019A&A...622A..10C	
Gurkan et al.,	Paper XI	2019A&A...622A..11G	Cat. J/A+A/622/A11
Hardcastle et al.,	Paper XII	2019A&A...622A..12H	
Mahatma et al.,	Paper XIII	2019A&A...622A..13M	Cat. J/A+A/622/A13
Mooney et al.,	Paper XIV	2019A&A...622A..14M	
Morabito et al.,	Paper XV	2019A&A...622A..15M	Cat. J/A+A/622/A15
O'Sullivan et al.,	Paper XVI	2019A&A...622A..16O	
Sabater et al.,	Paper XVII	2019A&A...622A..17S	
Stacey et al.,	Paper XVIII	2019A&A...622A..18S	
Botteon et al.,	Paper XIX	2019A&A...622A..19B	
Hoang et al.,	Paper XX	2019A&A...622A..20H	
Hoang et al.,	Paper XXI	2019A&A...622A..21H	
Mandal et al.,	Paper XXII	2019A&A...622A..22M	Cat J/A+A/622/A22
Nikiel-Wroczynski et al.,	Paper XXIII	2019A&A...622A..23N	Cat J/A+A/622/A23
Savini et al.,	Paper XXIV	2019A&A...622A..24S	
Wiber et al.,	Paper XXV	2019A&A...622A..25W	

History:
21-Feb-2019: on-line version
13-Jul-2020: corrected version

(End) Leah Morabito [Oxford, UK], Patricia Vannier [CDS] 20-Aug-2018

*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*