J/A+A/622/A11 LoTSS/HETDEX. Optical quasars. I. (Guerkan+, 2019)

LoTSS/HETDEX: Optical quasars.
I. Low-frequency radio properties of optically selected quasars.

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Jarvis M.J., Duncan K.J., Calistro Rivera G., Callingham J.R.,
Cochrane R.K., Croston J.H., Heald G., Mingo B., Mooney S., Sabater J.,
Roettgering H.J.A., Shimwell T.W., Smith D.J.B., Tasse C., Williams W.L.

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=2019A&A...622A..11G (SIMBAD/NED BibCode)

ADC_Keywords: Surveys ; QSOs ; Radio sources

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Abstract:
The radio-loud/radio-quiet (RL/RQ) dichotomy in quasars is still an open question. Although it is thought that accretion onto supermassive black holes in the centre the host galaxies of quasars is responsible for some radio continuum emission, there is still a debate as to whether star formation or active galactic nuclei (AGN) activity dominate the radio continuum luminosity. To date, radio emission in quasars has been investigated almost exclusively using high-frequency observations in which the Doppler boosting might have an important effect on the measured radio luminosity, whereas extended structures, best observed at low radio frequencies, are not affected by the Doppler enhancement. We used a sample of quasars selected by their optical spectra in conjunction with sensitive and high-resolution low-frequency radio data provided by the LOw Frequency ARray (LOFAR) as part of the LOFAR Two-Metre Sky Survey (LoTSS) to investigate their radio properties using the radio loudness parameter ($R=L_{144MHz}/L_{iband}$). The examination of the Li band radio continuum emission and RL/RQ dichotomy in quasars exhibits that quasars show a wide continuum of radio properties (i.e. no clear bimodality in the distribution of R). Radio continuum emission at low frequencies in low-luminosity quasars is consistent with being dominated by star formation. We see a significant albeit weak dependency of R on the source nuclear parameters. For the first time, we are able to resolve radio morphologies of a considerable number of quasars. All these crucial results highlight the impact of the deep and high-resolution low-frequency radio surveys that foreshadow the compelling science cases for the Square Kilometre Array (SKA).

Description:
Low-frequency radio continuum, far-infrared measurements and derived of properties of SDSS quasars over the HETDEX and H-ATLAS/NGP regions.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
catalog.dat	262	49925	Measured properties of SDSS quasars

See also:
- 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/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 and 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/A15 : Broad absorption line quasars in LDR1 (Morabito+, 2019)
- J/A+A/622/A22 : Abell 1914 multiwavelength radio images (Mandal+, 2019)
- J/A+A/622/A23 : LoTSS HCG and MLCG systems (Nikiel-wroczynski+, 2019)

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

Bytes	Format	Units	Label	Explanations
1- 18	A18	---	SDSS	SDSS name (HHMMSS.ss+DDMMSS.s)
20- 38	F19.15	mag	iMAG	SDSS i-band magnitude (z=2 k-corrected)
40- 61	A22	---	LOFAR	Unique LOFAR name (ILTJHHMMSS.ss+DDMMSS.s) (1)
63- 84	E22.19	Jy	F150	LOFAR 144 MHz flux density
86-106	E21.19	Jy	e_F150	Error on LOFAR 144 MHz flux density
108-116	E9.6	Jy	F100	?=- Herschel 100micron flux density (2)
118-125	F8.6	Jy	e_F100	?=- Error on Herschel 100micron flux density
127-135	E9.6	Jy	F160	?=- Herschel 160micron flux density (2)
137-144	F8.6	Jy	e_F160	?=- Error on Herschel 160micron flux density
146-154	E9.6	Jy	F250	?=- Herschel 250micron flux density (2)
156-163	F8.6	Jy	e_F250	?=- Error on Herschel 250micron flux density

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 165-173  E9.6   Jy       F350     ?=- Herschel 350micron flux density (2)
 175-182  F8.6   Jy       e_F350   ?=- Error on Herschel 350micron flux density
 184-192  E9.6   Jy       F500     ?=- Herschel 500micron flux density (2)
 194-201  F8.6   Jy       e_F500   ?=- Error on Herschel 500micron flux density
 203-232  E30.26 ---      RL       Radio loudness parameter
 234-239  F6.3   Msun     BHmass   ?=- Black hole mass (3)
 241-262  E22.19 ---     Eddratio  ?=- Eddington ratio
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Note (1): Only quasars that match LOFAR sources in the LoTSS catalogue (Shimwell et al., 2019, Cat. J/A+A/622/A1) have unique LOFAR names.
Note (2): Herschel measurements are only available over the HATLAS/NGP region.

Note (3): Black hole masses and Eddington ratio measurements provided by Shen et al. (2011, Cat. J/ApJS/194/45) and Kozlowski (2017, Cat. J/ApJS/228/9) were utilised.

Acknowledgements:
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References:

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  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
  Savini et al.,            Paper XXIV   2019A&A...622A..24S
  Wiber et al.,             Paper XXV    2019A&A...622A..25W
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(End) Gulay Gurkan [CSIRO, Australia], Patricia Vannier [CDS] 16-Jan-2019