

FAIR & Open Science With VizieR

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Outline

- 1) FAIR & Open Science
- 2) VizieR
- 3) Challenges



VizieR Staff and contributors:

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FAIR & Open Science

F
indable

A
ccessible

I
nteroperable

R
eusable



A common language: FAIR principles enable Open Science

- FAIR: Findable, Accessible, Interoperable, Reusable
- (FAIR: Facile A trouver, Interopérable, Réutilisable)
- Open Science: Data sharing with open and seamless services to analyse and reuse research data to improve science.

What is Vizier ? - II

Vizier can be queried:

- By catalog name
- By wavelength, Mission name, object type / process, ...
- By keyword (galaxies, quasars, ISM, ...)
- By column description
- By position, through ALL catalogs (>50 years of observations)

Find catalogs among 23753 available

Clear Find...

Expand search

? *Catalog, author's name,
word(s) from title, description, etc.
e.g.: AGN, Veron, I/239, or bibcodes...*

▶ **Search for catalogs by column descriptions (UCD)** ?

▶ **Search for catalogs containing additional data**

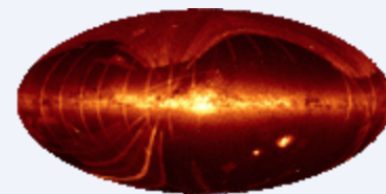
Wavelength	Mission	Astronomy
Radio	AKARI	Abundances
Millimeter	ANS	Ages
IR	ASCA	AGN
optical	BeppoSAX	Associations
UV	Cassini-Huygens	Asteroseismology
EUV	CGRO	Atomic_Data
X-ray	Chandra	Binaries:cataclysmic

Search by Position across 26466 tables

Target Name (resolved by [Sesame](#)) or Position:

Clear J2000 2 arcmin Go!

NB: The epoch used for the query is the original epoch of the table(s) Radius Box size



[More about Vizier](#)

Find Catalogs

Meta data

The metadata describes the data:

- Type of data (catalog, spectra, light curves etc...)
- Units
- Wavelengths / filters / bands / instrument
- Magnitude system, Coordinates system
- Since 2018: time system

... with homogenized descriptions

Goal: **Discoverability, reusability (FAIR)**,
platform for higher level services (phot.
Viewer, associated data, ...) = added value

Added value

Added value

I/A+A/549/A133/table3 Bright northern radio sources with VLA/VLA (Karlinsky, 2013)
 Post annotation VLA/VLA source coordinates [2011AAA...50A...133K](#) Res(Mesta)

FullP	Source	RAJ2000 deg	DEJ2000 deg	ObsDate "YMD"	SC mJy	ε _{SC} mJy	SX mJy	ε _{SX} mJy	n	SKa mJy	ε _{SKa} mJy	SQ mJy	ε _{SQ} mJy
1P	J0006-0623	001.557887	-06.393149	2010-07-02	2415.0	9.3	2301.6	14.9		1653.4	8.2	1369.1	10.0
2	J0019+7327	004.940777	+73.458338	2009-08-27	1191.9	0.7	1224.7	1.4*		1051.2	4.0	901.9	6.0
3	J0050-0929	012.672156	-09.484781	2010-07-23	254.1	1.0	209.9	1.4		123.7	0.6	115.2	0.8
4P	J0108+0135	017.161546	+01.583421	2010-07-23	3558.8	13.6	3909.3	25.4		2736.1	13.6	2295.3	16.0
5P	J0125-0005	021.370182	-00.098870	2010-08-03	1263.6	4.8				787.1	3.9	649.7	4.0
6P	J0137+3309 024.420833	+33.159722	2009-08-27	5537.1	0.1	3267.0	0.1*		1234.9	0.1	635.4	0.1	
7P	J0137+3309 024.422081	+33.159759	2009-11-15	5543.7	0.4	3280.7	0.3*		1266.6	0.3	667.1	0.3	
8P	J0137+3309 024.422081	+33.159759	2010-07-02	5440.2	20.8	3278.5	21.3		858.1	4.3	670.7	4.0	
9P	J0137+3309 024.422081	+33.159759	2010-07-23	5438.7	20.8				858.9	4.3	669.5	4.0	
10P	J0137+3309 024.422081	+33.159759	2010-08-03	5434.5	20.8				858.1	4.3	669.8	4.0	
11P	J0137+3309 024.422081	+33.159759	2010-09-07	5428.6	20.8	3279.9	21.3		858.4	4.3	670.6	4.0	
12P	J0137+3309 024.422081	+33.159759	2010-09-20	5440.3	21.0				858.8	4.3	666.3	4.0	
13P	J0137+3309 024.422081	+33.159759	2010-09-24	5431.0	21.2				858.5	4.3	684.7	5.0	
14P	J0137+3309 024.422081	+33.159759	2010-10-20	5434.2	21.2				860.7	4.3	672.6	5.0	
15P	J0137+3309 024.422081	+33.159759	2010-11-09	5392.7	24.5				860.5	4.5	672.7	5.0	
16P	J0137+3309 024.422081	+33.159759	2010-11-20	5403.8	21.9				858.9	4.3	674.7	5.0	
17P	J0137+3309 024.422081	+33.159759	2010-11-27	5385.6	23.5	3316.1	23.0		861.8	4.4	674.0	5.0	
18P	J0217+7349 034.378389	+73.825728	2009-08-27	4253.2	1.0	4255.6	4.2*		2974.5	14.2	2169.1	17.0	
19P	J0217+7349 034.378389	+73.825728	2010-09-20	3874.4	14.9				2244.3	11.1	1922.5	14.0	
20P	J0217+7349 034.378389	+73.825728	2010-09-24						2284.8	11.3	2284.6	16.0	
21P	J0228+6721 037.208548	+67.350841	2010-09-20	1108.8	4.3				903.6	4.5	861.8	6.0	
22P	J0319+4130 049.950667	+41.511695	2010-09-07	14555.1	56.1	21103.0	137.0		18627.6	92.4	16539.0	121.0	
23P	J0336+3218 054.125448	+32.308151	2010-09-07			2095.6	13.6		2843.4	14.1	2571.6	18.0	
24P	J0359+5057 059.873947	+50.963934	2010-09-20	8834.3	33.8				8346.9	40.9	7162.9	52.0	
25P	J0418+3801 064.588654	+38.026611	2010-09-20	2827.4	19.6				2233.3	11.1	2077.3	15.0	
26P	J0423-0120 065.812500	-01.342500	2009-11-03						8505.0	0.1	9245.7	0.1	
27P	J0423-0120 065.815792	-01.342611	2009-11-03	3966.9	0.5	4398.9	0.5*		8585.7	0.6	9246.5	0.6	
28P	J0423-0120 065.815836	-01.342518	2010-09-07			6200.0	40.2		5651.5	28.0	5183.3	37.0	

Added value

I/A+A/549/A133/table3 Bright northern radio sources with VLA/JVLA (Korinkya, 2013)
 Post-announcement VLA/JVLA source coordinates 2011AAA...549A.133K Res/Mecha

Full P.	Source	RAJ2000 deg	DEJ2000 deg	ObsDate "Y-M-D"	SC mJy	ε mJy	SX mJy	ε mJy	fl.	SKa mJy	SQ mJy
1P	J0006-0623	001.557887	-06.393149	2010-07-02	2415.0	9.3	2301.6	14.9	1653.4	32	1369.1
2	J0019+7327	004.940777	+73.458338	2009-08-27	1191.9	0.7	1224.7	1.4*	1051.2	0	901.9
3	J0050-0929	012.672156	-09.484781	2010-07-23	254.1	1.0	209.9	1.4	123.7	0	285.5
4P	J0108+0135	017.161546	+01.583421	2010-07-23	3558.8	13.6	3909.3	25.4	2736.1	13.6	2295.3
5P	J0125-0005	021.370182	-00.098870	2010-08-03	1263.6	4.8			787.1	3.9	649.7
6P	J0137+3309	024.422081	+33.159722	2009-08-27	5537.1	0.1	3267.0	0.1*	1234.9	0.1	635.4
7P	J0137+3309	024.422081	+33.159759	2009-11-15	5543.7	0.4	3280.7	0.3*	1266.6	5.7	667.1
8P	J0137+3309	024.422081	+33.159759	2010-07-02	5440.2	20.8	3278.5	21.3	858.1	4.3	670.7
9P	J0137+3309	024.422081	+33.159759	2010-07-23	5438.7	20.8			858.9	4.3	669.5
10P	J0137+3309	024.422081	+33.159759	2010-08-03	5434.5	20.8			858.1	4.3	669.8
11P	J0137+3309	024.422081	+33.159759	2010-09-07	5428.6	20.8	3279.9	21.3	858.4	4.3	670.6
12P	J0137+3309	024.422081	+33.159759	2010-09-20	5440.3	21.0			858.8	4.3	666.3
13P	J0137+3309	024.422081	+33.159759	2010-09-24	5431.0	21.2			858.5	4.3	684.7
14P	J0137+3309	024.422081	+33.159759	2010-10-20	5434.2	21.2			860.7	4.3	672.6
15P	J0137+3309	024.422081	+33.159759	2010-11-09	5392.7	24.5			860.5	4.5	672.7
16P	J0137+3309	024.422081	+33.159759	2010-11-20	5403.8	21.9			858.9	4.3	674.7
17P	J0137+3309	024.422081	+33.159759	2010-11-27	5385.6	23.5	3316.1	23.0	861.8	4.4	674.0
18P	J0217+7349	034.378389	+73.825728	2009-08-27	4253.2	1.0	4255.6	4.2*	2974.5	14.2	2169.1
19P	J0217+7349	034.378389	+73.825728	2010-09-20	3874.4	14.9			2244.3	11.1	1922.5
20P	J0217+7349	034.378389	+73.825728	2010-09-24					2284.8	11.3	2284.6
21P	J0228+6721	037.208548	+67.350841	2010-09-20	1108.8	4.3			903.6	4.5	861.8
22P	J0319+4130	049.950667	+41.511695	2010-09-07	14555.1	56.1	21103.0	137.0	18627.6	92.4	16539.0
23P	J0336+3218	054.125448	+32.308151	2010-09-07			2095.6	13.6	2843.4	14.1	2571.6
24P	J0359+5057	059.875947	+50.963934	2010-09-20	8834.3	33.8			8346.9	40.9	7162.9
25P	J0418+3801	064.588654	+38.026611	2010-09-20	2827.4	19.6			2233.3	11.1	2077.3
26P	J0423-0120	065.812500	-01.342500	2009-11-03					8505.0	0.1	9245.7
27P	J0423-0120	065.815792	-01.342611	2009-11-03	3966.9	0.5	4998.9	0.5*	8585.7	0.6	9246.5
28P	J0423-0120	065.815836	-01.342518	2010-09-07			6200.0	40.2	5651.5	28.0	5183.3

Added value

I/A+A/549/A133
Post annotation

II/311/wise
Post annotation

WISE All-Sky Data Release (Cutri+ 2012)
The WISE All-Sky data Release; please *acknowledge* the usage of the WISE data products (563921584 rows)

2012/Cu.2111..0C

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Full P.	Source	Full	WISE	RAJ2000	DEJ2000	exMaj	exMin	l	W1mag	W2mag	W3mag	W4mag	
				deg	deg	arcsec	arcsec	mag	mag	mag	mag	mag	
1P	J0006-0623	1	J122902.49+015316.0	187.260381	+01.887784	0.299	0.275	15.451	0.052	15.214	0.126	11.960	0.29
2	J0019+7327	2	J122904.24+015315.2	187.267696	+01.887558	0.637	0.588	16.408	0.102	16.093	0.274	12.639	
3	J0050-0929	3	J122855.66+015441.1	187.231933	+01.911430	0.972	0.879	16.855	0.146	16.471		12.544	
4P	J0108+0135	4	J122854.39+015506.8	187.226636	+01.918556	0.260	0.238	15.216	0.046	15.111	0.118	12.564	
5P	J0125-0005	5	J122854.14+015451.4	187.225603	+01.914284	1.382	1.241	17.281	0.213	16.267		12.511	
6P	J0137+3309	6	J122845.69+015455.9	187.190380	+01.915539	0.206	0.189	14.785	0.039	14.792	0.095	12.155	
7P	J0137+3309	7	J122849.04+015417.7	187.204369	+01.904939	1.002	0.919	16.885	0.153	16.831		12.207	
8P	J0137+3309	8	J122847.00+015441.6	187.195854	+01.911573	0.992	0.944	16.897	0.155	16.686		12.115	
9P	J0137+3309	9	J122853.00+015530.4	187.220856	+01.925131	1.114	1.020	16.116	0.083	15.701	0.197	11.663	0.24
10P	J0137+3309	10	J122847.39+015458.3	187.197478	+01.916203	0.565	0.525	16.990	0.172	16.178		12.422	
11P	J0137+3309	11	J122851.54+015519.8	187.214766	+01.922193	0.628	0.572	16.375	0.102	15.936	0.238	12.609	
12P	J0137+3309	12	J122850.17+015544.1	187.209054	+01.928917	0.454	0.418	16.024	0.077	15.532	0.169	12.436	0.47
13P	J0137+3309	13	J122845.40+015521.2	187.189180	+01.922580	0.286	0.262	15.330	0.049	15.462	0.161	12.281	
14P	J0137+3309	14	J122852.47+015505.7	187.218636	+01.918268	0.438	0.393	15.874	0.071	16.036	0.259	11.853	
15P	J0137+3309	15	J122852.19+015458.0	187.217474	+01.916122	0.339	0.305	15.564	0.058	15.269	0.133	12.193	
16P	J0137+3309	16	J122927.79+015443.8	187.365800	+01.912187	1.293	1.182	17.243	0.212	16.081		12.631	
17P	J0217+7349	17	J122924.23+015425.1	187.350980	+01.906983	1.068	0.971	16.968	0.170	16.729	0.486	12.325	
18P	J0217+7349	18	J122927.51+015512.0	187.364625	+01.920000	0.991	0.923	16.942	0.165	16.241	0.312	12.580	
19P	J0228+6721	19	J122927.17+015523.1	187.363248	+01.923086	0.591	0.537	16.287	0.094	16.129	0.287	12.572	
20P	J0319+4130	20	J122928.39+015519.8	187.368299	+01.922181	1.252	1.154	17.104	0.191	16.767		12.562	
21P	J0336+3218	21	J122932.89+015628.5	187.387082	+01.941264	0.445	0.407	15.978	0.075	15.908	0.153	12.633	
22P	J0359+5057	22	J122932.73+015616.6	187.386399	+01.937951	0.896	0.806	16.797	0.147	16.467	0.360	12.569	
23P	J0418+3801	23	J122934.73+015658.2	187.394715	+01.949520	0.354	0.315	15.918	0.071	14.701	0.079	11.696	0.23
24P	J0423-0120	24	J122934.53+015624.5	187.389748	+01.940144	0.587	0.540	16.266	0.093	16.234	0.295	12.470	
25P	J0423-0120	25	J122936.21+015646.0	187.400909	+01.946117	0.994	0.882	16.905	0.159	16.352	0.328	12.592	
26P	J0423-0120	26	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
27P	J0452-0130	27	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
28P	J0452-0130	28	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
29P	J0452-0130	29	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
30P	J0452-0130	30	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
31P	J0452-0130	31	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
32P	J0452-0130	32	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
33P	J0452-0130	33	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
34P	J0452-0130	34	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
35P	J0452-0130	35	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
36P	J0452-0130	36	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
37P	J0452-0130	37	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
38P	J0452-0130	38	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
39P	J0452-0130	39	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	
40P	J0452-0130	40	J122906.95+015311.9	187.278966	+01.886659	0.622	0.572	16.412	0.104	15.915	0.229	11.877	

Added value

I/A+A/549/A133
Post annotation

II/311/wise
Post annotation

WISE All-Sky Data Release (Cutri+ 2012)
The WISE All-Sky data Release; please *acknowledge* the usage of the WISE data products (563921584 rows)

2012/Cutri+11_06 ReadMe.htm



Full P	Source	Full	WISE	RAJ2000	DEJ2000	exMaj	exMin	W1mag	W2mag	W3mag	W4mag
			deg	deg	arcsec	arcsec	mag	mag	mag	mag	mag
1P	J0006-0623	1	J122902.49+015316.0	187.260381	+01.887784	0.299	0.275	15.451	16.052	15.214	12.639
2	J0019+7327	2	J122904.24+015315.2	187.267696	+01.887558	0.637	0.588	16.408	16.102	16.093	12.544
3	J0050-0929	3	J122855.66+015441.1	187.231933	+01.911430	0.972	0.879	16.855	16.471	16.471	12.566
4P	J0108+0135	4	J122854.39+015506.8	187.226636	+01.918556	0.260	0.238	15.216	15.111	15.111	12.511
5P	J0125-0005	5	J122854.14+015451.4	187.225603	+01.914284	1.382	1.241	17.281	17.213	16.267	12.511
6P	J0137+3309	6	J122845.69+015455.9	187.190380	+01.915539	0.206	0.189	14.785	14.792	14.792	12.155
7P	J0137+3309	7	J122844.46+015450.3	187.185272	+01.913979	1.002	0.919	16.885	16.831	16.831	12.207
8P	J0137+3309	8	J122849.04+015417.7	187.204369	+01.904939	0.992	0.944	16.897	16.155	16.686	12.115
9P	J0137+3309	9	J122847.00+015441.6	187.195854	+01.911573	0.478	0.443	16.116	16.083	15.701	12.663
10P	J0137+3309	10	J122853.00+015530.4	187.220856	+01.925131	1.114	1.020	16.990	16.172	16.178	12.422
11P	J0137+3309	11	J122847.39+015458.3	187.197478	+01.916203	0.565	0.525	16.214	16.091	16.105	12.154
12P	J0137+3309	12	J122851.54+015519.8	187.214766	+01.922193	0.628	0.572	16.375	16.102	15.936	12.609
13P	J0137+3309	13	J122850.17+015544.1	187.209054	+01.928917	0.454	0.418	16.024	16.077	15.532	12.436
14P	J0137+3309	14	J122845.40+015521.2	187.189180	+01.922580	0.286	0.262	15.330	15.049	15.462	12.281
15P	J0137+3309	15	J122852.47+015505.7	187.218636	+01.918268	0.438	0.393	15.874	15.071	16.036	11.853
16P	J0137+3309	16	J122852.19+015458.0	187.217474	+01.916122	0.339	0.305	15.564	15.058	15.269	12.193
17P	J0137+3309	17	J122927.79+015443.8	187.365800	+01.912187	1.293	1.182	17.243	17.212	16.081	12.631
18P	J0217+7349	18	J122924.23+015425.1	187.350980	+01.906983	1.068	0.971	16.968	16.170	16.729	12.325
19P	J0217+7349	19	J122927.51+015512.0	187.364625	+01.920000	0.991	0.923	16.942	16.165	16.241	12.580
20P	J0217+7349	20	J122927.17+015523.1	187.363248	+01.923086	0.591	0.537	16.287	16.094	16.129	12.572
21P	J0228+6721	21	J122928.39+015519.8	187.368299	+01.922181	1.252	1.154	17.104	17.191	16.767	12.562
22P	J0336+3218	22	J122932.89+015628.5	187.387082	+01.941264	0.445	0.407	15.978	15.075	15.908	12.633
23P	J0359+5057	23	J122932.73+015616.6	187.386399	+01.937951	0.896	0.806	16.797	16.147	16.467	12.569
24P	J0418+3801	24	J122934.73+015658.2	187.394715	+01.949520	0.354	0.315	15.918	15.071	14.701	11.696
25P	J0423-0120	25	J122934.73+015658.2	187.394715	+01.949520	0.587	0.540	16.266	16.093	16.234	12.470
26P	J0423-0120	26	J122933.53+015624.5	187.389748	+01.940144	0.994	0.882	16.905	16.159	16.352	12.592
27P	J0423-0120	27	J122936.21+015646.0	187.400909	+01.946117	0.622	0.572	16.412	16.104	15.915	12.529
28P	J0423-0120	28	J122906.95+015311.9	187.278966	+01.886659						

Added value

I/A+A/549/A133
Post annotation

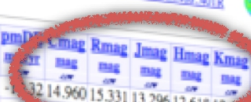
II/311/wise
Post annotation

WISE
The W data p

I/312/sample
Post annotation

PPMX Catalog of positions and proper motions (Roesser+ 2008)
The PPMX Catalog (Position and Proper Motions eXtended) (18088919 rows)

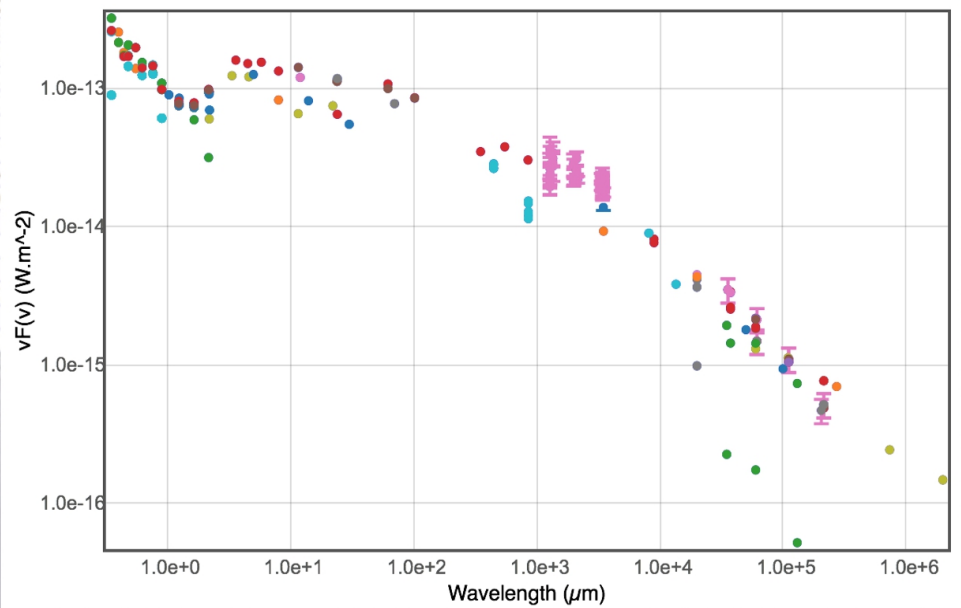
ReadMe:fp
2008AA...488...A1R



Full P	Source	Full	WISE	Full	PPMX	RAJ2000	DEJ2000	pmRA	pmDec	Rmag	Imag	Hmag	Kmag	ln Psub
id		id		id	deg	deg	mas/yr	mas/yr	mag	mag	mag	mag		
1 P J0006-0623		1 J122902.49+01531		1 122831.7+020442	187.132204	+02.078369	1.84	32.14	9.60	15.331	13.295	12.618	12.479	3 Q
2 J0019+7327		2 J122904.24+01531		2 122836.5+020103	187.152120	+02.017671	-8.78	9.78	14.140	14.810	13.731	12.685	15.435	4 Q
3 J0050-0929		3 J122855.66+01544		3 122837.2+015720	187.155009	+01.955664	-63.80	47.07	14.670	12.728	10.901	10.263	10.037	3 S
4 P J0108+0135		4 J122854.39+01550		4 122845.8+020214	187.191214	+02.037443	-11.72	-8.94	11.130	11.511	9.931	9.373	9.286	7 S
5 P J0125-0005		5 J122854.14+01545		5 122846.3+020545	187.193033	+02.095850	18.93	-1.07	14.430	14.934	12.706	11.942	11.779	3 Q
6 P J0137+3309		6 J122845.69+01545		6 122849.6+020430	187.206749	+02.075096	8.43	14.85	14.720	15.452	13.967	13.516	13.440	3 Q
7 P J0137+3309		7 J122844.46+01545		7 122850.9+020631	187.212086	+02.108697	-10.63	5.75	12.090	12.497	11.559	11.281	11.233	6 S
8 P J0137+3309		8 J122849.04+01541		8 122858.4+021127	187.243549	+02.190882	-2.01	-1.10	15.180	16.410	14.689	14.158	13.647	3 Q
9 P J0137+3309		9 J122847.00+01544		9 122859.1+015648	187.246371	+01.946842	-2.73	-5.81	13.520	12.733	10.913	10.278	10.167	4 S
10 P J0137+3309		10 J122853.00+01553		10 122902.8+020216	187.261792	+02.037813	36.15	-17.79	14.170	14.689	12.804	12.176	12.070	4 P Q
11 P J0137+3309		11 J122847.39+01545		11 122903.1+020318	187.263319	+02.055157	-26.47	-1.04	12.880	13.276	12.374	12.124	12.056	5 Q
12 P J0137+3309		12 J122851.54+01551		12 122906.6+020308	187.277891	+02.052398	-11.01	-1.95	12.880	13.838	11.766	11.047	9.976	6 S
13 P J0137+3309		13 J122850.17+01554		13 122908.3+020018	187.284975	+02.005243	-12.81	-34.37	12.000	12.454	11.345	10.996	10.924	6 S
14 P J0137+3309		14 J122852.47+01550		14 122909.9+015446	187.291603	+01.912876	-4.71	-12.08	14.920	13.495	11.645	11.011	10.850	3 Q
15 P J0137+3309		15 J122852.19+01545		15 122913.1+020009	187.304846	+02.002561	5.88	-6.58	14.470	15.073	13.731	13.332	13.281	3 Q
16 P J0137+3309		16 J122852.47+01550		16 122915.9+021123	187.316628	+02.189749	17.04	-20.53	13.670	14.292	12.797	12.322	12.294	4 Q
17 P J0137+3309		17 J122852.19+01545		17 122917.5+020301	187.323008	+02.050420	25.49	12.54	14.670	15.312	13.708	13.206	13.070	3 Q
18 P J0217+7349		18 J122924.23+01542		18 122917.5+020301	187.323008	+02.050420	25.49	12.54	14.670	15.312	13.708	13.206	13.070	3 Q
19 P J0217+7349		19 J122927.51+01551		19 122922.2+015840	187.342567	+01.977797	-3.04	-7.54	10.500	10.180	9.533	9.334	9.319	5 S
20 P J0217+7349		20 J122927.17+01552		20 122922.2+015840	187.342567	+01.977797	-3.04	-7.54	10.500	10.180	9.533	9.334	9.319	5 S
21 P J0228+6721		21 J122928.39+01551		21 122929.0+021022	187.370974	+02.172922	0.51	2.62	12.250	12.669	11.739	11.467	11.416	4 Q
22 P J0319+4130		22 J122932.89+01562		22 122932.1+021035	187.383795	+02.176478	-32.87	-17.82	14.560	15.167	13.965	13.625	13.618	4 Q
23 P J0336+3218		23 J122932.73+01561		23 122935.3+020001	187.397194	+02.000412	-18.98	7.09	15.500	14.989	13.961	13.689	13.815	3 Q
24 P J0359+5057		24 J122934.73+01565		24 122941.9+020229	187.424703	+02.041460	4.57	-14.01	15.130	16.169	14.651	14.199	14.251	2 Q
25 P J0418+3801		25 J122933.53+01562		25 122942.6+020401	187.427639	+02.066953	8.49	7.16	13.010	13.551	12.400	12.053	11.991	5 P Q
26 P J0423-0120		26 J122936.21+01564		26 122943.3+020431	187.430630	+02.075472	-10.31	10.43	13.670	14.035	13.023	12.741	12.628	5 P Q
27 P J0423-0120		27 J122906.95+01531		27 122943.3+020431	187.430630	+02.075472	-10.31	10.43	13.670	14.035	13.023	12.741	12.628	5 P Q

Added value

I/A		I/A+I/549/A133	I/311/wise	WISE	I/312/sample	PPM	I/289/out	UCAC2 Catalogue (Zacharias+ 2004)												
Post annotation		Post annotation	Post annotation	The W data p	Post annotation	The P eXten	Post annotation	The Second U.S. Naval Observatory CCD Astrograph Catalog (4833057)												
		Source	WISE		PPMX			RAJ2000	ϵ	DEJ2000	ϵ	UCmag	No	Nc	pmRA	pmDE	2Mkey	Jmag	Kmag	
Full	Full	Full	Full	Full	Full	Full	Full	deg	mas	deg	mas	mag			mas/yr	mas/yr		mag	mag	
1	1P	J0006-0623	1	J122902.49+01531	1	122831.7+020442	1	32373958	187.2463827	15	+01.9468434	15	12.43	4	2	-15.7	-7.6	855626345	10.913	10.167
2	2	J0019+7327	2	J122904.24+01531	2	122836.5+020103	2	32373967	187.3425680	12	+01.9778012	13	10.20	4	8	-3.3	-3.7	855626394	9.533	9.319
3	3	J0050-0929	3	J122855.66+01544	3	122837.2+015720	3	32543380	187.1322115	15	+02.0783695	15	15.87	2	2	-11.9	-25.0	855619080	13.296	12.489
4	4P	J0108+0135	4	J122854.39+01550	4	122845.8+020214	4	32543381	187.1521298	15	+02.0176656	15	14.90	2	2	-6.6	-3.5	855619129	13.731	13.435
5	5P	J0125-0005	5	J122854.14+01545	5	122846.3+020545	5	32543385	187.1763859	22	+02.0937712	42	15.64	3	2	-10.1	17.1	855619047	13.940	13.168
6	6P	J0137+3309	6	J122845.69+01545	6	122849.6+020430	6	32543388	187.1912221	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
7	7P	J0137+3309	7	J122844.46+01545	7	122850.9+020631	7	32543389	187.1930359	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
8	8P	J0137+3309	8	J122849.04+01541	8	122858.4+021127	8	32543391	187.2067492	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
9	9P	J0137+3309	9	J122847.00+01544	9	122859.1+015648	9	32543392	187.2120939	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
10	10P	J0137+3309	10	J122853.00+01553	10	122902.8+020216	10	32543391	187.2067492	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
11	11P	J0137+3309	11	J122847.39+01545	11	122903.1+020318	11	32543392	187.2120939	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
12	12P	J0137+3309	12	J122851.54+01551	12	122903.1+020318	12	32543401	187.2618106	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
13	13P	J0137+3309	13	J122850.17+01554	13	122906.6+020308	13	32543402	187.2633268	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
14	14P	J0137+3309	14	J122850.17+01554	14	122906.6+020308	14	32543405	187.2779130	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
15	15P	J0137+3309	15	J122845.40+01552	15	122908.3+020018	15	32543407	187.2849845	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
16	16P	J0137+3309	16	J122852.47+01550	16	122909.9+015446	16	32543409	187.3048380	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
17	17P	J0137+3309	17	J122852.19+01545	17	122913.1+020009	17	32543411	187.3230024	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
18	18P	J0217+7349	18	J122927.79+01544	18	122915.9+021123	18	32543413	187.3708653	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
19	19P	J0217+7349	19	J122924.23+01542	19	122917.5+020301	19	32543414	187.3709759	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
20	20P	J0217+7349	20	J122927.51+01551	20	122917.5+020301	20	32543417	187.3837915	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
21	21P	J0228+6721	21	J122927.17+01552	21	122922.2+015840	21	32543419	187.3971745	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
22	22P	J0319+4130	22	J122928.39+01551	22	122929.0+021022	22	32543422	187.4276480	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
23	23P	J0336+3218	23	J122932.89+01562	23	122932.1+021035	23	32543423	187.4306356	15	+02.0374417	17	11.40	2	2	-10.1	17.1	855619047	13.940	13.168
24	24P	J0359+5057	24	J122932.73+01561	24	122935.3+020001	24													
25	25P	J0418+3801	25	J122932.73+01561	25	122935.3+020001	25													
26	26P	J0423-0120	26	J122934.73+01565	26	122941.9+020229	26													
27	27P	J0423-0120	27	J122933.53+01562	27	122942.6+020401	27													
28	28P	J0423-0120	28	J122936.21+01564	28	122943.3+020431	28													
29			29	J122906.95+01531	29		29													



Added value

VizieR Photometry viewer

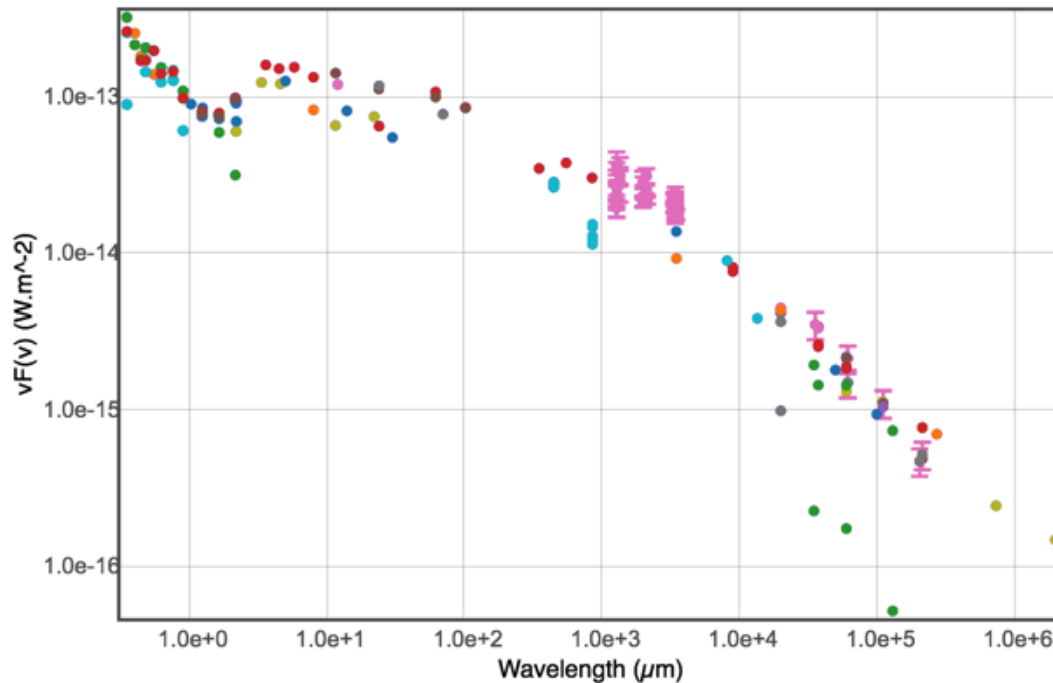
[share +](#)

Target

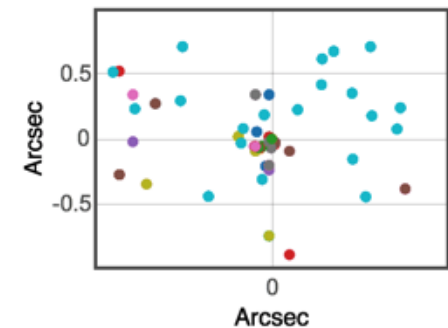
Radius (in arcsec)



3c273 (12 29 6.695+02 03 8.662),
radius : 1 arcsec



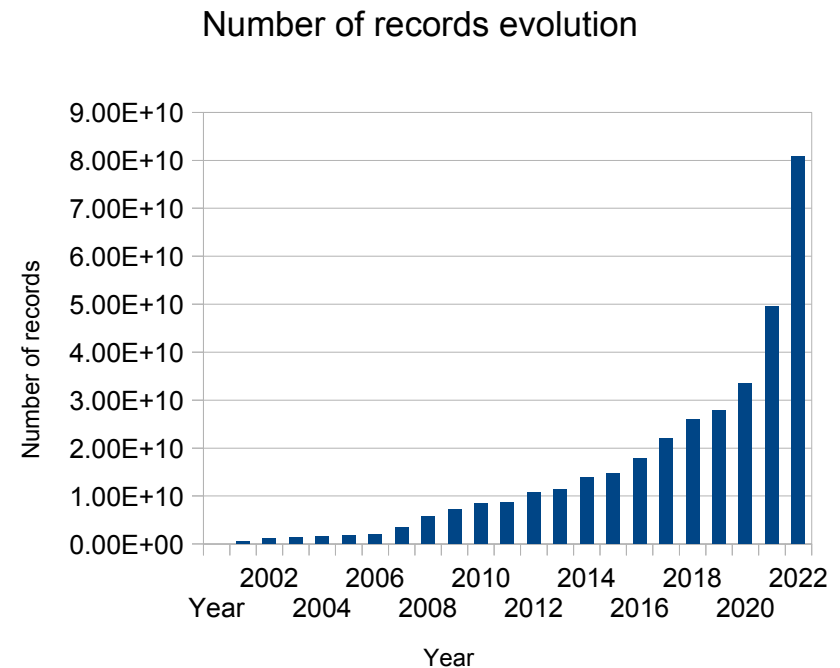
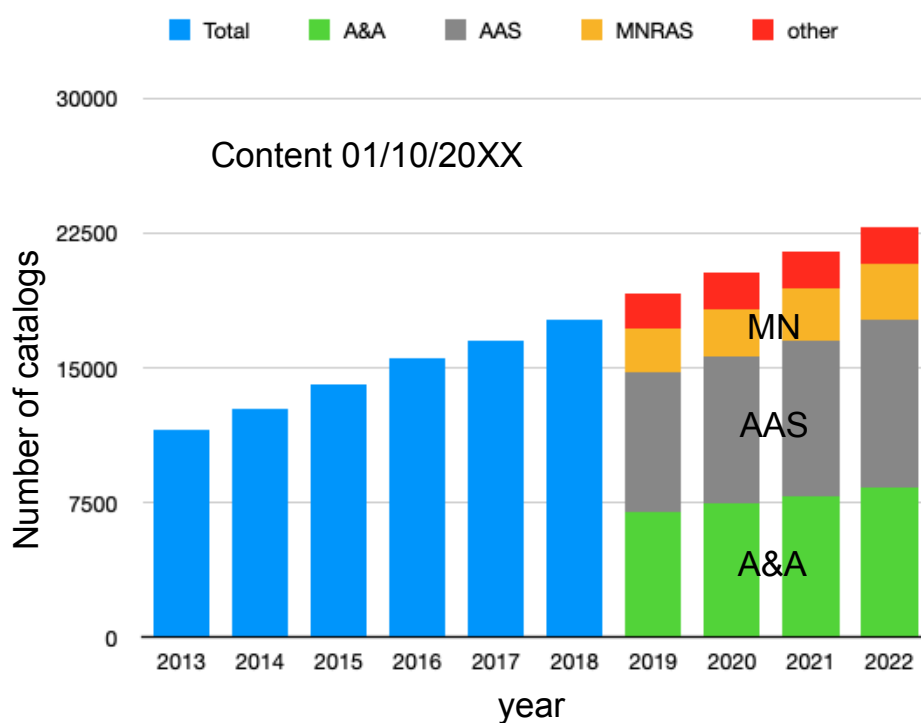
Mouse position:
Wavelength :
2.96e+3 μm
Frequency :
1.01e+2 GHz
Energy :
4.18e-4 eV
Flux density or F(v) :
5.70e+2 Jy
vF(v) :
5.77e-13 W.m⁻²
F(λ) :
1.95e+4 erg.s⁻¹.cm⁻².μm⁻¹



VizieR content - I

Ingestion statistics :

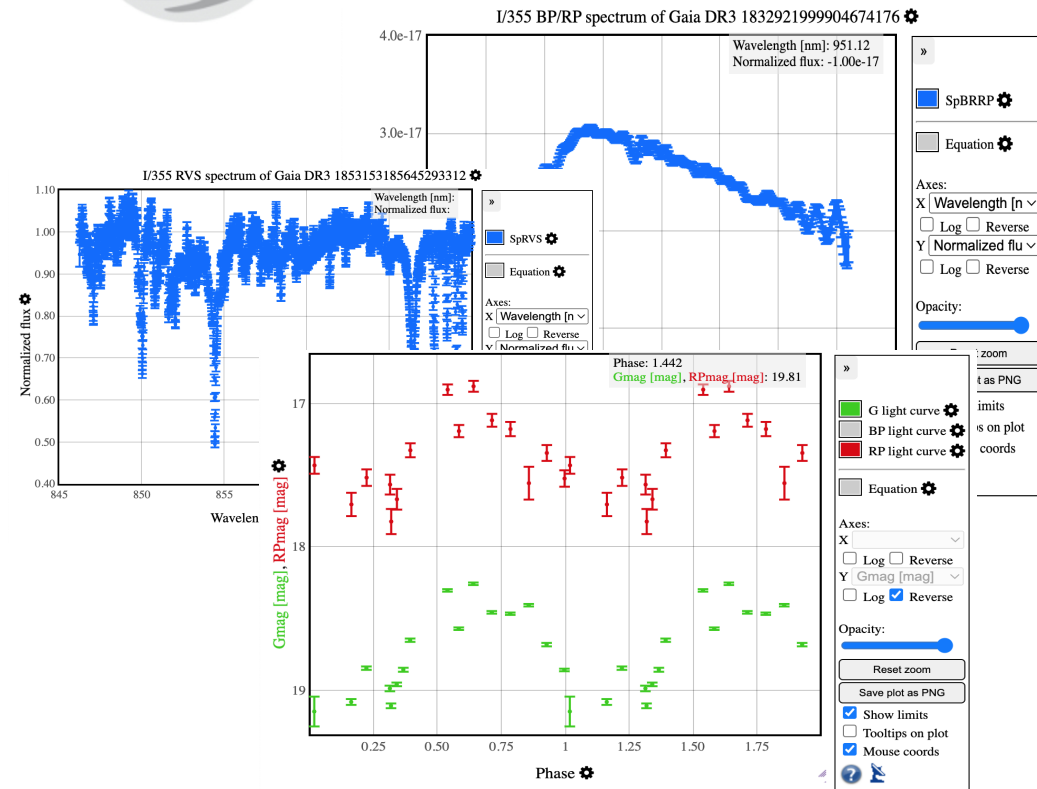
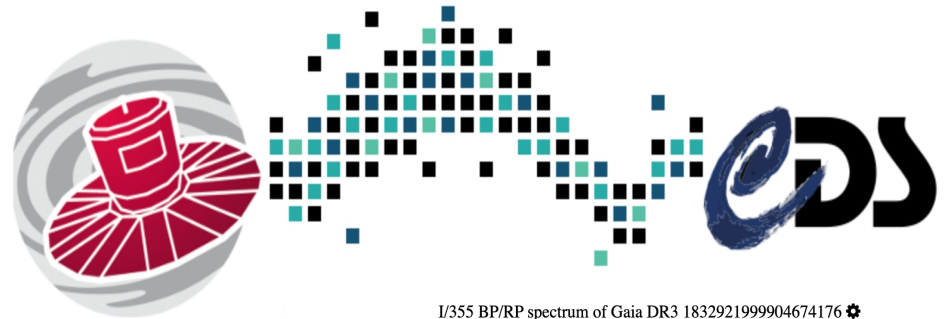
- A steadily increasing volumetry : +1440 in past year
 - Total (19/06/2023): 23 753 catalogues, >54k tables
- Dramatic increase of records : 80 billions records (+62%), 85.5TB (+60%) in 1 yr



VizieR content – II : Gaia DR3

Special operation for Gaia DR3

- 6 catalogs :
 - Main source
 - Extra-galactic
 - Non-single stars
 - Variability
 - Solar system
 - Perf. Verification
- ~70 tables
- including 11 large tables
- Max > 11 billion records
- Tight schedule !



Diversity of access points and uses

VizieR services and access modes: discovery, table access, visualization, photometry, associated data, astroquery, ...

VizieR provides access to the most complete library of astronomical catalogues and data tables available on line organized in a self-documented database. Query tools allow the user to select relevant data tables and to extract and format records matching given criteria. Currently, 15024 catalogues are available. more info

Free text search: catalogue name, author, ... Find catalogues

Position: position or object name 10 Find catalogues Photometry

Go to the classic form Advanced search

VizieR

- How to publish my catalog
- Help and tutorials
- View large catalogues
- Rules of usage
- Mirrors

Other related services

- TAPVizieR
- Photometry viewer
- CDS cross-match service
- VizieR images, spectra service
- VizieR using the batch mode

Simple browsing modes

- By hierarchical organisation
- By acronyms or abbreviations
- By popularity
- Recently entered into VizieR
- Catalogues having images, spectra...

VizieR

Search Criteria

Keywords: RA:2000, Dec:2000

Tables: RA:2000, Dec:2000

Columns: RA, Dec, ...

Tables

TAP

Search associated data using the TAP+ extension

Associated data

Photometry

Plot

Derived products provided in CDS or data available through software, API..



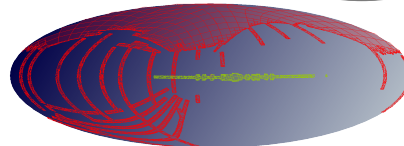
CDS X-Match Service

Choose tables to cross-match

VizieR SIMBAD X-Match ZMASC

Begin the X-Match

xmatch



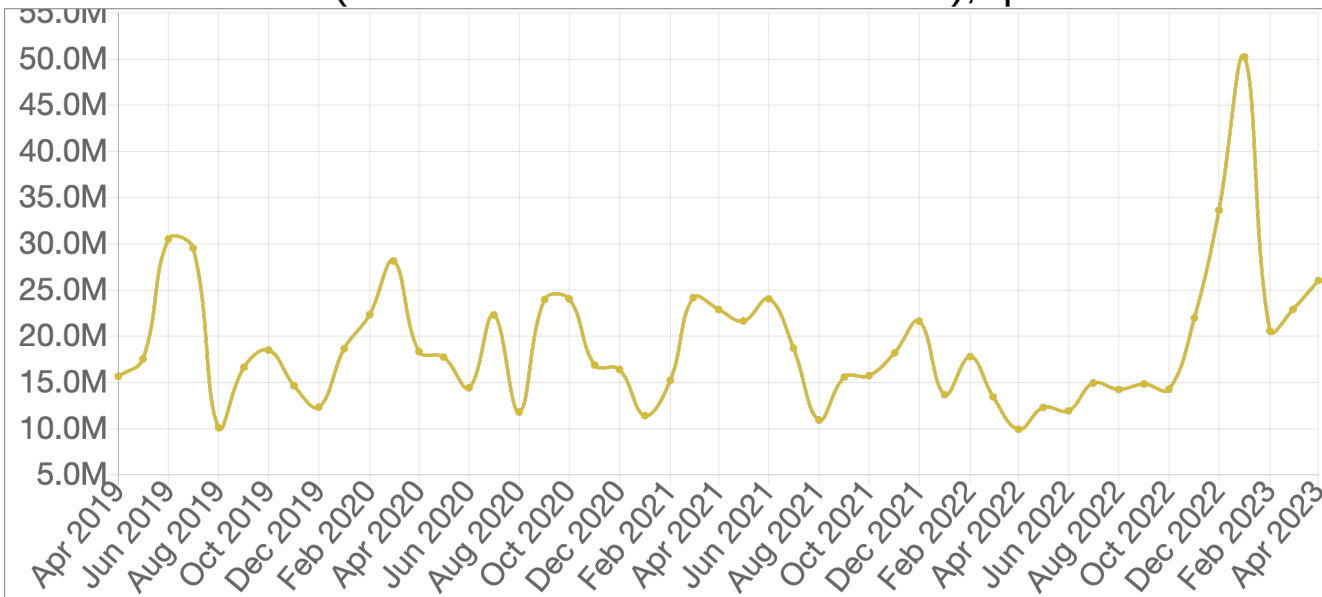
cassis

topcat

Aladin

VizieR usage statistics

VizieR statistics (from the CDS statistics collector), queries / month



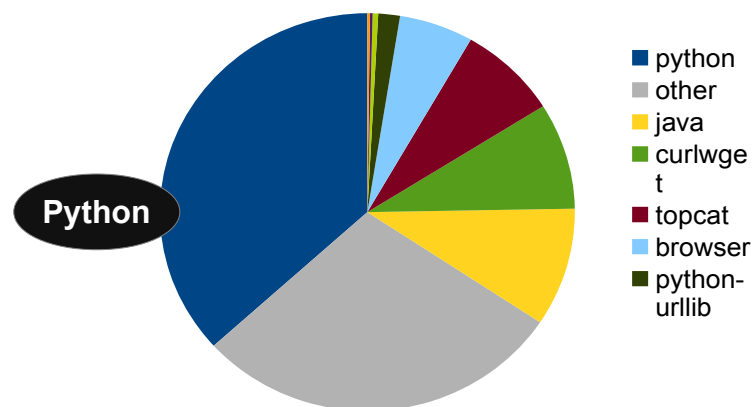
Total 2022: >500K queries/day

TAP : ~36.1K queries/day

Associated data
(spectra/images): ~900
queries/day

Importance of the Virtual
Observatory
(conesearch+VOtable)
~70% of the queries

Queries repartition by user-agent



Importance of Python(37%),
TOPcat (8%), curl+wget (9%)

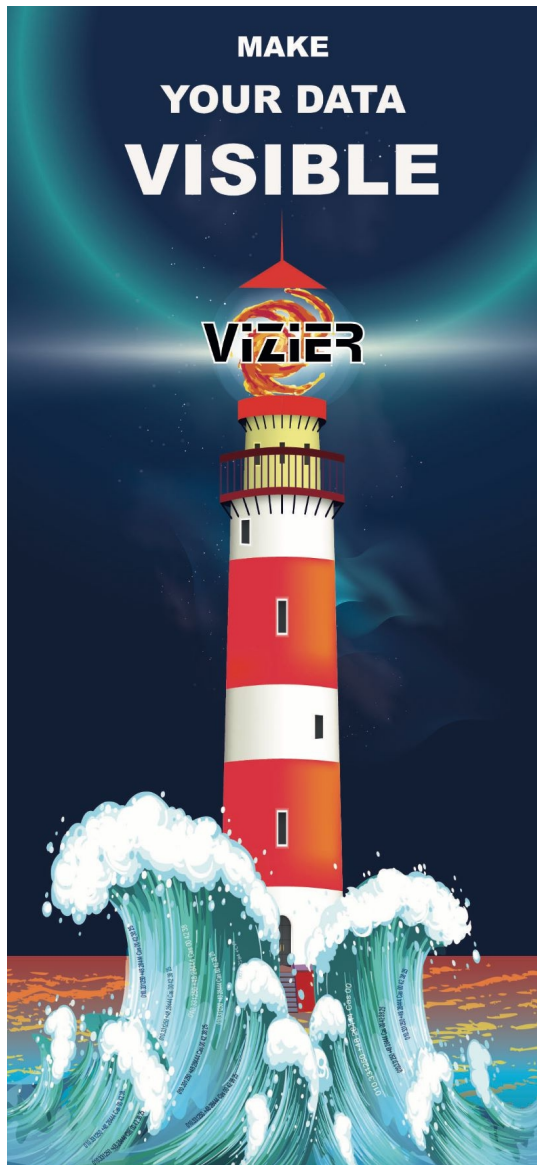
Astropy / astroquery / pyvo: see
Python for astronomy talk by M.
Marchand

Help CDS help you



- VizieR submit page: <https://cdsarc.unistra.fr/vizier.submit/>
- Check the 'make your data visible' brochure at CDS booth
- In general, a few simple rules to help smooth the process=> get your data online:
 - Avoid object names truncations
 - Provide coordinates, as often as possible.
 - Use existing names, use CDS dictionary: <https://cds.u-strasbg.fr/cgi-bin/Dic-Simbad>
 - One quantity per column: Don't mix:
 - Limits and errors
 - Different filters in same column
 - Different units

Help CDS help you










- Follow best practices (Chen et al. 2022)

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Best Practices for Data Publication in the Astronomical Literature

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Ohad Shemmer¹² , Alan Smale¹³ , Raymond Tam², Scott Terek¹, Doug Van Orsow^{13,14} ,
Patricia Vannier⁴, and Shin-Ywan Wang¹ — [Hide full author list](#)

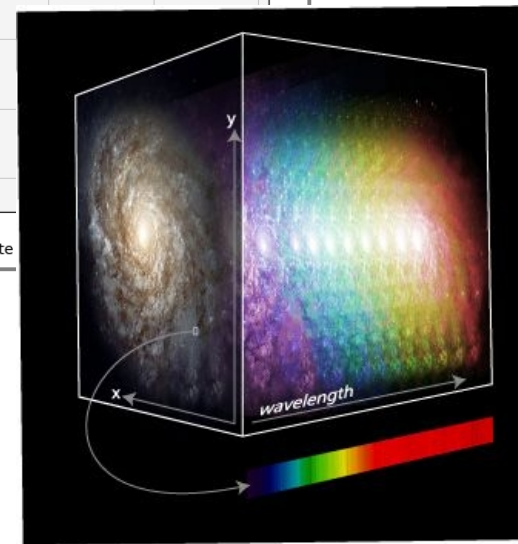
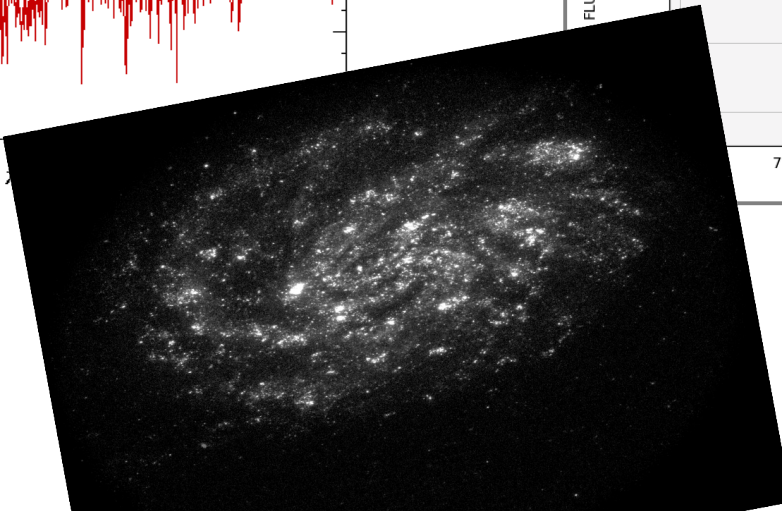
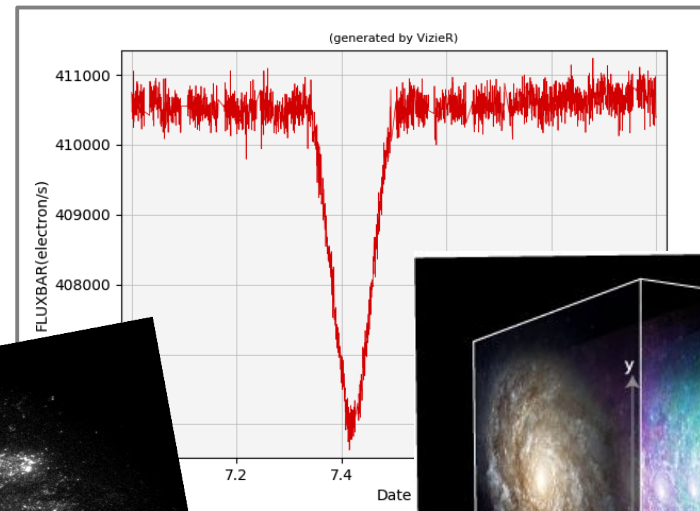
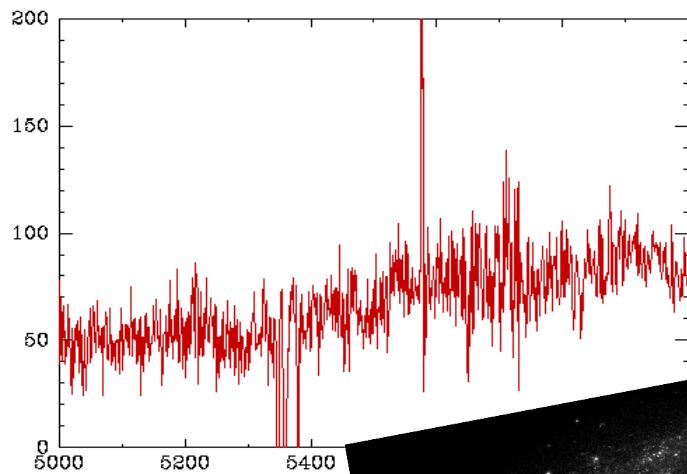
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FAIR Associated data publication

Data management plans increasingly require publication of the data used to produce the article tables: images, spectra, data cubes, time series...


Preferably in reduced form rather than raw (available at telescope archive).

Important aspect of results reproducibility and open science (FAIRness)



VizieR Associated data web page

Simple search [ObsTAP Query](#)


Search by position :  radius

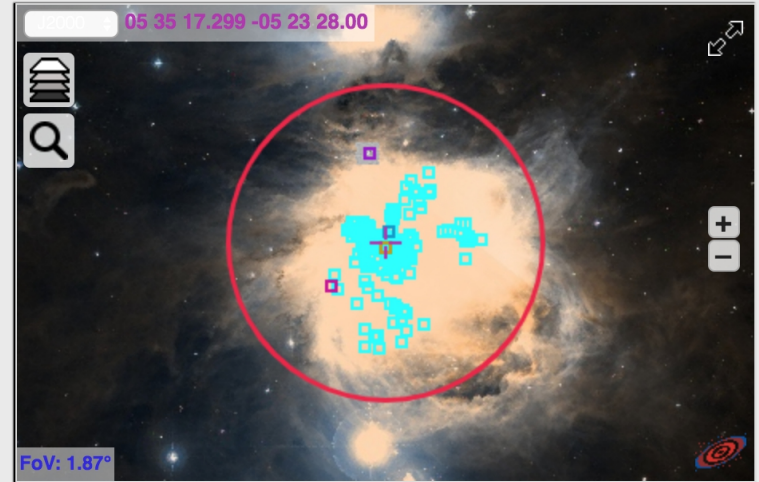
Search by spectral band :

Search by time data : (MJD)

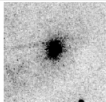



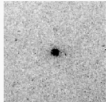



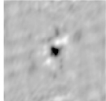



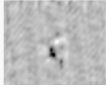



Search by catalog: Identifier:

Spectrum / Time series Image





500 entries

Preview	Target	Data collection	Ra	Dec	Band min (nm)	Band max (nm)	Begin time (MJD)	End time (MJD)	Facility	
		J/AJ/136/2136	83.807	-5.546	801.500	1,094.600			HST	  Header 
		J/AJ/136/2136	83.711	-5.216	801.500	1,094.600			HST	  Header 
	OMC2-FIR4	J/A+A/605/A57	83.862	-5.166	100,000.0000	10,000,000.0000			IRAM/NOEMA	  Header 
	OMC2-FIR4	J/A+A/605/A57	83.862	-5.166	100,000.0000	10,000,000.0000			IRAM/NOEMA	  Header 

Associated data : indexation, metadata

Indexation of the associated data

Improving the associated data visibility with indexation and meta-data based on the ObsCore Data model (VO).

Critical metadata (WCS mandatory)

- **Position RA, DEC**
 - **Spectral range**
 - **Time of observation**
 - **Target name ...**
- **FITS standard => metadata exists, but:**
 - **non-unique, ambiguous keywords**
 - **Can be inaccurate (tel positions, spectral coverage)**
- **=> Mapping supervised by authors and/or CDS staff**

Challenges and risks

Encouraging status of FAIR & Open Science in astronomy, but:

- Increasing numbers of publications (though evolving landscape)
- => increased cost of data indexation/curation
- Data complexity / heterogeneity (e.g. associated data)
- Data volumetry:
 - e.g. 'thin' catalogs (e.g. stellar parameters of full Gaia)
 - Upcoming very large datasets:
 - e.g. High Cadence large FoV surveys:
 - ESO Vista VVLS: ~140 billion records (~2 times VizieR)
 - LSST: 40 000 billion records (~ 500 times VizieR)
- Data access policy: Closed (e.g. LSST) versus fully open (Gaia)?

Summary : Open Science with VizieR

VizieR is a major infrastructure **enabling Open Science** in astronomy:

- VizieR helps making astronomical data **FAIR** thanks to:
 - Data **collection, indexation and curation** by CDS/VizieR staff
 - Distribution via a **diversity of access points** (html, python, ...)
- Important costs (~7FTE) but enormous benefits
- VizieR content and usage statistics show:
 - Culture/practice of **making data public** is strong
 - Culture/practice of **re-use of archival data** is strong
- => Rather encouraging state of things BUT **risks** and **challenges**
- **Data volumetry** (technical, but also political and scientific aspects)
- **Data access policy** (**closed** vs open, e.g. LSST vs Gaia)