A CATALOGUE OF QUASARS AND ACTIVE NUCLEI

(9th edition)

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1 Summary

Because of the fast increase in the number of known quasars, we have prepared an updated version of our catalogue of quasars and active nuclei (Véron-Cetty & Véron, 1998) which now contains 13 214 quasars, 462 BL Lac objects and 4 428 active galaxies (of which 1 711 are Seyfert 1). Like the eighth edition, it includes position and redshift as well as photometry (U, B, V) and 6 and 11 cm flux densities when available.
We also give a list of all known lensed and double quasars.

2 Introduction

The first catalogue of quasars was published in 1971 by De Veny et al. It contained 202 objects for which redshifts were published prior to june 1971. In the last 29 years, the number of known quasars has steadily increased to reach 13 214 in march 2000 (see table below).

This number is expected to increase dramatically in the near future as the "2DF QSO redshift survey" has already identified close to 8 000 QSOs (Smith et al. 1999) and the "Sloan Digital Sky Survey" should discover $\sim$ 100 000 QSOs when completed in about 2004 (Fan et al. 1999)

Table 0: Increase with time of the number of known QSOs, BL Lacs and Seyfert 1s

QSO	BL Lac	Seyfert 1	reference
202			De Veny et al. 1971
2 251		190	Véron-Cetty & Véron 1984
2 835	73	236	Véron-Cetty & Véron 1985
3 473	84	258	Véron-Cetty & Véron 1987
4 169	117	358	Véron-Cetty & Véron 1989
6 225	162	575	Véron-Cetty & Véron 1991
7 383	171	695	Véron-Cetty & Véron 1993
8 609	220	888	Véron-Cetty & Véron 1996
11 358	357	1 111	Véron-Cetty & Véron 1998
13 214	462	1 711	present edition

In the present edition of this catalogue containing quasars with measured redshift known to us prior to march 1, 2000, as in the first eight editions, we do not give any information about absorption lines or X-ray properties. But we give the absolute magnitude for each object and, when available, the 11 and 6 cm flux densities.

This catalogue should not be used for any statistical analysis as it is not complete in any sense, except that it is, hopefully, a complete survey of the literature.

3 Description of the catalogue

We have arbitrarily defined a quasar as a starlike object, or an object with a starlike nucleus with broad emission lines, brighter than absolute magnitude $M_B = -23$; only objects brighter than this limit appear in table 1.

In table 2, we list all confirmed, probable or possible BL Lac objects with or without a measured redshift, without consideration of their absolute magnitude. As better spectra are becoming available, broad emission lines have been detected in a number of objects formerly classified as BL Lac; they have usually been moved to table 1 (Véron-Cetty & Véron, 2000).

The Seyfert 1 galaxies have broad Balmer and other permitted lines; the Seyfert 2 galaxies have Balmer and forbidden lines of the same width. Osterbrock (1977; 1981) has divided the Seyfert galaxies showing broad Balmer lines (Seyfert 1) into five subgroups : Seyfert 1.0, 1.2, 1.5, 1.8 and 1.9 on the basis of the appearance of the Balmer lines. Seyfert 1.0s are "typical" members of the class, as described by Khachikian & Weedman (1971; 1974), while Seyfert 1.5s are objects intermediate between typical Seyfert 1 and Seyfert 2 galaxies, with an easily apparent narrow Hβ profile superimposed on broad wings. The classes Seyfert 1.2 or 1.8 are used to describe objects with relatively weaker and stronger narrow Hβ components, intermediate between Seyfert 1.0 and 1.5 and Seyfert 1.5 and 2 respectively. In Seyfert 1.9, although the broad Hα emission is clearly evident, broad Hβ cannot be detected with certainty by mere visual inspection of the spectra.

We have adopted the more quantitative classification introduced by Winkler (1992) :

S1.0	$5.0 < R$	
S1.2	$2.0 < R < 5.0$	
S1.5	$0.333 < R < 2.0$	
S1.8	$R < 0.333$	broad component visible in Hα and Hβ
S1.9		broad component visible in Hα but not in Hβ
S2		no broad component visible

where R is the ratio of the total Hβ to the [OIII]λ5007 fluxes.

Several objects have been found to show extreme spectral variability, changing from Seyfert 1.8 or 1.9 to Seyfert 1. In some cases these changes are consistent with changes in the reddening to the BLR while, in others, they are probably due to real changes in ionizing flux (Goodrich, 1989a; 1995; Tran et al. 1992b). In some Seyfert 2 galaxies, a broad Pa β line has been detected, indicating the presence of a highly reddened broad line region (Goodrich et al. 1994); we call these objects S1i. A number of Seyfert 2 galaxies have, in polarized light, the spectra of Seyfert 1s (Antonucci & Miller, 1985; Miller & Goodrich 1990; Tran et al. 1992a); we call them S1h. Typical full widths at half-maximum of the Balmer lines in Seyfert 1 galaxies lie in the range 2000-6000 km s^{-1}. However, there is a group of active galactic nuclei with all the properties of Seyfert 1 galaxies, but with unusually narrow Balmer lines (Osterbrock & Pogge, 1985; Goodrich, 1989b); they are defined as having the broad component of the Balmer lines narrower than 2000 km s^{-1} FWHM (Osterbrock, 1987); we call them S1n.

Table 3 lists "active galaxies" : Seyfert 1, 1.5, 1.8, 1.9, 1h, 1i, 1n, 2, and Liners (as defined by Heckman, 1980) fainter than the above quoted absolute magnitude. A number of galaxies with a nuclear HII region denoting a burst of star formation are also included, the reason being that they have been called Seyfert in the past and later reclassified; we consider it useful to keep trace of these reclassifications to avoid further confusion.

Table 4 lists the objects which once have been believed to be quasars or BL lac objects and are now known to be either stars or normal galaxies.

Table 1 contains 13 214 objects, table 2, 462 , table 3, 4 428 and table 4, 55.

The catalogue is believed to be complete for quasars, BL Lac objects and Seyfert 1 galaxies.

Since the discovery in 1979 by Walsh et al. of the first gravitationally lensed quasar, Q 0957+561, a number of such objects (40) and of physical pairs with separation less than 10" (10) have been found. They are listed in table 5. Mortlock et al. (1999) have stressed the difficulty sometimes encountered in distinguishing lensed quasars from physical pairs.

Table 6 gives the list of all the Markarian objects appearing in the catalogue :

col. 1 : Markarian number
col. 2 : Name under which the galaxy appears in the present catalogue when it is not the Markarian number
col. 3 : Short position
col. 4 : Table in which the object appears.

Tables 1, 2 and 3 give :

1) The most common name of the object. For the meaning and the sources of the designations see Hewitt & Burbidge (1987), Fernandez et al. (1983) and Kesteven & Bridle (1977). For the sources discovered by the ROSAT X-ray satellite, we have used the following acronyms : RXS for the sources appearing in the All-Sky Bright Source Catalogue (Voges et al. 1999), 1WGA for the sources published in the WGACAT catalogue (White et al. 1994) and RX for the others.

When the name is preceded by an *, the object has not been detected as a radio source, either because it has not been observed or because it is fainter than the sensitivity limit of the radio telescope used; there is no uniform upper limit to the flux density of the undetected objects.

2) The best available J2000 optical or radio coordinates; the J2000 positions have been converted from the B1950 positions using the matrix given by Aoki et al. (1983). No references are given for the sources of these positions. An O or an R following the coordinates means that the position given is either an optical or a radio position measured with an accuracy better than one arc sec. An A means that it is only an approximate position which may be wrong by several arc minutes. The availability of the Digitized Sky Survey (DSS) allows quick measurements of the optical position of any object brighter than $\approx$19.5 mag. It has already been used to measure the position of several hundred QSOs (Schneider et al. 1992; Bowen et al. 1994; Kirhakos et al. 1994; Véron-Cetty & Véron, 1996). Optical positions with an accuracy better than 2" have also been measured for the 19 369 galaxies in the Zwicky catalogue (Falco et al. 1999) and for the 12 921 UGC galaxies (Cotton et al. 1999).

3) The 6 and 11 cm flux densities (in Jy) with references to the literature. When several measurements are available we took arbitrarily one of them. When a reference is given for the 6 cm flux density but the value of the flux density itself is left blank and there is an * in column 1, only an upper limit is available and this upper limit is not much greater than 1 mJy; in case there is no * in column 1, the reference refers to a detection but at a wavelength other than 6 cm.

4) The redshift as published. An * in front of the redshift means that it has been estimated from a low dispersion slitless spectrum and is of lesser accuracy or even plainly wrong as the emission lines may easily be misidentified. We have given only those values which are described as probable in the original sources and not the possible values.

5) In this column an attempt has been made to classify the objects as follows :

S1 Seyfert 1 spectrum with broad permitted hydrogen emission lines, without sufficent information for a more detail classification.
S1.0, S1.2, S1.5, S1.8, S1.9, S1i, S1h, S1n (see above).
S2 Seyfert 2 spectrum defined as having a strong [O III]λ 5007 line compared with Hβ, together with a [NII]λ6584 line of strength comparable with that of Hα.
S3 Seyfert 3 or Liner as defined by Heckman (1980). Broad Balmer lines are observed in some Liners; they are called S3b.
S or S? These objects are probably or possibly Seyfert galaxies, but available data are insufficient for a more detailed classification.
H2 Nuclear HII region, *i.e.* nucleus of a galaxy with an emission line spectrum similar to that of an emission nebula ionized by hot stars.
HP A high degree of optical polarization ($>$ 3%) has been measured (see for instance :

Impey et al. 1991; Moore & Stockman, 1984).

Low redshift quasars are classified as S1 when a good spectrum shows that they are similar to Seyfert 1 galaxies.

In table 2, we find in this column :

BL	for a confirmed BL Lac object.
blank	for a probable BL Lac.
?	for a possible BL Lac.

6) The V, B−V and U−B photoelectric or photographic magnitude and colours, when available. (the survey of the literature for photographic colours may be incomplete) (an * in front of the magnitude indicates that the colours and the magnitude are photographic, while an R or an I indicates a red or an infrared magnitude). Maoz et al. (1993) have measured homogeneous V magnitudes for 354 QSOs with an accuracy of ±0.1 mag; they have been included. For a few objects, the O magnitude, measured on the blue Palomar Sky Survey plates, or the UK Science Research Council SRC-J Survey plates, believed to be accurate within ± 0.2 mag., has been extracted from the APS database (Pennington et al. 1993). For a number of objects we give the O magnitude, extracted from the USNO-A2 catalogue (Monet et al. 1996) or the Cambridge Automated Plate Measuring Machine (APM) catalogue (Irwin et al. 1994), recalibrated by E. Flesch (private communication); these magnitudes are flagged with an O. The O and Johnson B magnitudes are related by B−O = −(0.27± 0.06) (B−V) (Evans, 1989).

In the other cases, the magnitude given is an estimate as found in the original publications; these magnitudes are generally quite inaccurate and inhomogeneous; they are most often m_{pg} or B magnitudes instead of the Johnson V magnitude. Much care should be taken when using them for any purpose. Anyway, even when a photoelectric V magnitude is given, it is not very meaningful as most quasars are variable. On the other hand, the colours of quasars vary little, so the listed colours should be accurate. Again, it should be noted that some of the colours listed are photographic and, therefore, less accurate; moreover, in each catalogue of photoelectric measurements, the faintest objects measured are affected by relatively large errors; this too should not be overlooked. For the galaxies, in table 3, we have chosen the magnitudes and colours measured in the smallest possible diaphragm (preferentially 16 arcsec) as we are interested in the nucleus rather than in the galaxy itself.

7) The absolute magnitude M_B computed by assuming H_0=50 km s^{-1} Mpc^{-1}, q_0=0, and an optical spectral index α equal to 0.3 (defined as $S \propto \nu^{-\alpha}$) (Francis et al. 1991).

The absolute magnitude is computed as follows : M = m + 5 − 5 log D − k + Δ m(z) where m is the B magnitude, D = c/H_0 A, with A the photometric distance (Terrell, 1977) :

$$A = z[1 + \frac{z(1-q_0)}{(1+2q_0z)^{0.5} + 1 + q_0z}]$$

z is the redshift taken from column 5; k=−2.5 $\log(1+z)^{1-\alpha}$ is the k correction, Δm (z) is a correction to k taking into account the fact that the spectrum of quasars is not strictly a power law of the form S $\propto \nu^{-\alpha}$, but is affected by emission lines and by the Ly α forest depleting the continuum to the blue of Ly α. Assuming that the spectrum is a power law with α=0.3 may not give the best possible estimate of the k correction (Wisotzki 2000).

The column labelled "V" gives the V magnitude when B−V is also given in which case we have used B = V+(B−V). When B−V is not given, this column usually gives the B magnitude, unless it is preceded by an R or an I; the R magnitudes have been transformed into the B system by using an average <B−R>=0.57 and the I magnitudes by using <B−I>=1.1 for low z QSOs. When the reference for the magnitude is Maoz et al. (1993), the magnitude is V and we have used <B−V>=0.40.

We list in table 1 those objects which have an absolute magnitude M_B brighter than -23; clearly some objects would move from table 1 to table 3 and vice versa if other values for q_0 and the spectral index were used or if an accurate B apparent magnitude was available for all objects.The variability may have a similar effect, as well as the size of the diaphragm used for the measurement as the contribution of the underlying galaxy for weak quasars may not be negligible.

8) The next three columns give the reference for the finding chart, the photometry and the redshift respectively. In many cases, the last reference in table 3 is that of the classification of the object (as a Seyfert galaxy or otherwise); in these cases the redshift can usually be found in Palumbo et al. (1983).

9) The B1950 position.

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Table 5: Gravitationally lensed quasars and physical pairs. Col. 1 : name, col. 2 : short position, col. 3 : redshift of the quasar, col. 4 : redshift of the lens, col. 5 : separation in arcsec, col. 6 : references

Name	Position	z_{quasar}	z_{lens}	sep(")	Ref.
Lensed QSOs					
UM 673	0142−10	2.719		2.2	41
CTQ 414	0156−43	1.29		1.2	31
B2 0218+35	0218+35	0.936		0.33	10
HE 0230−2130	0230−21	2.162		2.0	50
Q J0240−343	0238−34	1.406		6.1	43
PKS 0411+05	0411+05	2.639	0.958	2.2	21,45
HE 0512−3329	0512−33	1.565	0.931	0.6	51
B 0712+472	0712+47	1.339		1.27	7
MG 0751+2716	0748+27	3.200	0.350		45
APM 08279+5255	0827+52	3.87		0.4	22
RX J0911.4+0551	0908+06	2.800		0.8	1
SBS 0909+532	0909+53	1.377	0.830	1.11	19,25
RX J0921+4529	0917+45	1.66	0.31	6.9	34
FBQS J0951+2635	0948+26	1.24		1.1	38
BRI 0952−01	0952−01	4.43		0.95	28
Q 0957+561	0957+56	1.414	0.355	6.1	9,46
Q 1009−0252	1009−02	2.74		1.55	14
J 13.03	1015−20	2.55		0.84	42
IRAS F10214+4724	1021+47	2.286			39
B 1030+074	1030+07	1.535		1.56	7
HE 1104−1805	1104−18	2.303		3.0	48
PG 1115+080	1115+08	1.722	0.311	2.3	44,47
UM 425	1120+01	1.465		6.5	29
TEX 1152+199	1152+19	1.019	0.439	1.6	35
Q 1208+1011	1208+10	3.803		0.45	27
87GB 1359+1527	1359+15	3.235		1.7	35
H 1413+117	1413+11	2.546		1.4	26
HST J14176+5226	1415+52	3.4		3.2	4
B 1422+231	1422+23	3.62	0.339	1.3	36,44
Q 1429−008	1429−00	2.076		5.1	13
SBS 1520+530	1520+53	1.855		1.6	3
Q 1600+434	1600+43	1.61		1.38	18
Q 1634.9+26.7	1634+26	1.961		3.8	40
MC 1830−211	1830−21	2.507	0.885	0.60	23,24
MG 2019+1127	2016+11	3.273		3.4	20
87GB 20451+2632	2045+26	1.28	0.867	1.9	8
Q 2138−431	2138−43	1.641		4.5	12
H 2149-2745	2149−27	2.033		1.7	49
Q 2237+0305	2237+03	1.695	0.039	1.8	17
Q 2345+007	2345+00	2.15		7.1	37
Double QSOs					
Q 0023+171	0023+17	0.945		4.8	16
PHL 1222	0151+04	1.91		3.3	30
CTQ 839	0250−33	2.24		2.1	32
Q 1145−071	1145−07	1.34		4.2	6
HS 1216+5032	1216+50	1.450		8.9	11
RRS IV 26,27	1343+26	2.030		9.5	5
RX J16290+3724	1627+37	0.923		4.3	52
Q J1643+31	1641+32	0.586		2.3	2
Q 2153−2056	2153−20	1.845		7.8	15
MGC 2214+3550	2212+35	0.877		3.0	33

(1) Bade et al. 1997
(2) Brotherton et al. 1999
(3) Chavushyan et al. 1997
(4) Crampton et al. 1996
(5) Crotts et al. 1994
(6) Djorgovski et al. 1987
(7) Fassnacht & Cohen, 1998
(8) Fassnacht et al. 1999
(10) Grundahl & Hjorth, 1995
(11) Hagen et al. 1996
(12) Hawkins et al. 1997
(13) Hewett et al. 1989
(14) Hewett et al. 1994
(15) Hewett et al. 1998
(16) Hewitt et al. 1987
(17) Huchra et al. 1985
(18) Jackson et al. 199
(19) Kochanek et al. 1997
(20) Lawrence et al. 1984
(21) Lawrence et al. 1995
(22) Ledoux et al. 1998
(23) Lidman et al. 1999
(24) Lowell et al. 1998
(25) Lubin et al. 2000
(26) Magain et al. 1988
(27) Magain et al. 1992
(28) McMahon et al 1992
(29) Meylan & Djorgovski 1989
(30) Meylan et al. 1990
(31) Morgan et al. 1999
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(37) Pello et al. 1996
(38) Schechter et al. 1998
(39) Serjeant et al. 1995
(40) Steidel & Sargent, 1991
(41) Surdej et al. 1987
(42) Surdej et al. 1997
(43) Tinney, 1995
(44) Tonry, 1998
(45) Tonry & Kochanek, 1999
(46) Tytler & Fan 1992
(47) Weymann et al. 1980
(48) Wisotzki et al. 1993
(49) Wisotzki et al. 1996
(50) Wisotzki et al. 1999
(51) Gregg et al. 2000
(52) Mason et al. 2000

Table 6:

Mark		Position	Table	Mark		Position	Table
1		0113+32	3	471		1420+33	3
3		0609+71	3	474		1433+48	3
6		0645+74	3	477		1439+53	3
9		0732+58	3	478		1440+35	1
10		0743+61	3	483		1528+34	3
25		1000+59	3	486		1535+54	3
34		1030+60	3	493		1557+35	3
35	NGC 3353	1042+56	3	501		1652+39	2
40		1122+54	3	504		1659+29	3
42		1151+46	3	506		1720+30	3
50		1220+02	3	507		1748+68	3
52		1223+00	3	509		2041−10	1
64		1304+34	3	516		2153+07	3
69		1343+29	3	520		2158+10	3
78		0737+65	3	522		2257+16	3
79		0738+49	3	530	NGC 7603	2316−00	3
106		0916+55	3	533	NGC 7674	2325+08	3
110		0921+52	3	534	NGC 7679	2326+03	3
124		0945+50	3	538	NGC 7714	2333+01	3
132		0958+55	1	539		2341+02	3
141		1015+64	3	540		2344−00	3
142		1022+51	3	541		2353+07	3
171		1125+58	3	543		2359+03	3
176		1129+53	3	549		0019−01	3
180		1133+70	2	556		0046+04	3
198		1206+47	3	565		0113+04	3
201		1211+54	3	567		0116+04	3
205		1219+75	3	573		0141+02	3
231		1254+57	3	577		0146+12	3
236		1258+61	3	584		0157+02	3
266		1336+48	3	585		0200+02	3
268		1338+30	3	586		0205+02	1
270		1339+67	3	590		0212−00	3
273		1342+56	3	595		0238+06	3
279		1351+69	3	596		0240+07	3
287		1435+73	3	607		0322−03	3
290		1534+58	3	609		0322−06	3
291		1552+19	3	612		0328−03	3
298		1603+17	3	617	NGC 1614	0431−08	3
304		2214+13	1	618		0434−10	3
308		2239+19	3	620		0645+60	3
309		2250+24	3	622		0804+39	3
313		2259+15	3	634		1055+20	3
315		2301+22	3	646		1203+35	3
316		2311+13	3	661		1329+27	3
321	NGC 7620	2317+33	3	662		1351+23	3
334		0000+21	3	663		1352+33	3
335		0003+19	3	668	OQ 208	1404+28	3
341		0034+23	3	670		1412+26	3
348		0046+31	3	673		1415+27	3
352		0057+31	3	679		1421+33	1
357	PG 0119+229	0119+22	3	684		1428+28	3
358		0123+31	3	686		1435+36	3
359		0124+18	3	699		1622+41	3
372		0246+19	3	700		1701+31	3
373		0650+50	3	703		0856+06	3
374		0655+54	3	704		0915+16	3
376		0710+45	3	705		0923+12	3
380		0713+74	1	707		0934+01	3
382		0752+39	3	715		1002+15	3
391		0851+39	3	716		1007+23	3
394	NGC 2824	0916+26	3	720		1015+07	3
403		0937+21	3	728		1058+11	3
417		1046+23	3	732		1111+09	3
421		1101+38	2	734		1119+12	3
461		1345+34	3	738		1133+28	3
463		1353+18	3	739		1133+21	3
464		1353+38	3	744		1137+32	3
469		1416+34	3	745		1137+17	3

Table 6: (end)

Mark		Position	Table
759		1208+16	3
764		1313+12	3
766		1215+30	3
769	NGC 4383	1222+16	3
771	ON 1542	1229+20	3
783		1300+16	3
789		1329+11	3
813		1425+20	1
816		1431+52	3
817		1434+59	3
822		1443+16	3
830		1449+58	3
833		1455+35	3
840		1502+14	1
841		1501+10	3
845		1506+51	3
848		1516+42	3
849		1517+28	3
854		1524+43	3
860		1537+25	3
864		1556+25	3
867		1600+26	3
871		1606+12	3
876		1613+65	1
877		1617+17	1
883		1627+24	3
885		1629+67	3
896		2043−02	3
897	II Zw 102	2105+03	3
915		2234−12	3
917		2238+31	3
926		2302−08	1
928	NGC 7592	2315−04	3
930		2329+28	3
937		0007−04	3
938		0008−12	3
940		0011+33	3
945		0023−03	3
948		0025+06	3
955		0035+00	3
957		0039+40	3
971		0101+35	3
975		0111+13	3
984		0116+12	3
991		0121+31	3
992		0121+31	1
993		0122+31	3
998		0130−02	3
1014		0157+00	1
1018		0203−00	3
1021	NGC 835	0206−10	3
1034	Akn 81	0220+31	3
1040		0225+31	3
1044		0227−09	3
1048	NGC 985	0232−09	3
1055		0245−09	3
1058		0246+34	3
1066		0256+36	3
1073		0311+41	3
1087	II Zw 23	0447+03	3
1095	Akn 120	0513−00	3
1098		1527+30	3
1102		1555+41	3
1103		1555+41	3
1126		2258−13	3
1127		2259+26	3
1133		2341+27	3
1143		0039+02	3
1144		0040+02	3
1146		0044+14	3
1147		0045+10	3
1148		0049+17	3
1149		0053−14	3
1152		0111−15	3
1157		0130+35	3
1158		0132+34	3
1179		0230+27	3
1187		0245+13	3
1193		0404−10	3
1210		0801+05	3
1211		0803+07	3
1212		0804+27	3
1218		0835+25	3
1220		0851+17	3
1239		0949−01	3
1243	NGC 3080	0957+13	3
1253		1017−03	3
1261		1041−01	3
1269		1052+40	3
1291	NGC 3660	1121−08	3
1298		1126−04	3
1308		1151+00	3
1310		1158−03	3
1320		1216−01	1
1325		1223+09	3
1330	NGC 4593	1237−05	3
1333	NGC 4628	1239−06	3
1344	NGC 4990	1306−05	3
1347		1320+08	3
1361		1344+11	3
1370		1405+07	3
1376	NGC 5506	1410−02	3
1383		1426+01	1
1388		1448+22	3
1392		1503+03	3
1393		1506−00	3
1395		1508+04	3
1400		0217+07	3
1408		0731+56	3
1413		0758+73	1
1414		0848−02	3
1419		0938+03	3
1447		1127+49	3
1457		1144+52	3
1459		1145+22	3
1469		1213+51	3
1490		1417+49	3
1494		1459+10	3
1498		1626+51	3
1501	III Zw 2	0007+10	3
1502	I Zw 1	0050+12	1
1503	II Zw 1	0119−01	3
1504	NGC 1144	0252−00	3
1505	NGC 1275	0316+41	3
1506	3C 120	0430+05	3
1509	NGC 5548	1415+25	3
1510		1415+26	3
1511	NGC 5940	1528+07	3
1512	NGC 5953	1532+15	3
1513	II Zw 136	2130+09	3
1514	NGC 7469	2300+08	3