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Optical linear polarization measurements of quasars obtained with the 3.6 m telescope at the La Silla Observatory[⋆,⋆⋆]

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ABSTRACT

We report 192 previously unpublished optical linear polarization measurements of quasars obtained in April 2003, April 2007, and October 2007 with the European Southern Observatory Faint Object Spectrograph and Camera (EFOSC2) instrument attached to the 3.6 m telescope at the La Silla Observatory. Each quasar was observed once. Among the 192 quasars, 89 have a polarization degree $p \geq 0.6\%$, 18 have $p \geq 2\%$, and two have $p \geq 10\%$.

Key words. quasars: general – polarization

1. Introduction

The linear polarization of optical light is an important feature in the study of quasars and other active galactic nuclei (AGN). Usually attributed to scattering, polarization is directly related to the object symmetry axis, and is at the heart of AGN unification models.

In the present paper, we report new optical linear polarization measurements of quasars obtained with EFOSC2, the European Southern Observatory (ESO) Faint Object Spectrograph and Camera instrument attached to the 3.6 m telescope at the La Silla Observatory. Although the observations were designed for various scientific goals, the quality of the data is homogeneous. In Sect. 2 we describe the observing procedure. Data reduction and measurements are summarized in Sect. 3. The table with the final measurements is outlined in Sect. 4.

2. Observations

The polarimetric observations were carried out in April 2003, April 2007, and October 2007 at the European Southern Observatory, La Silla, using the 3.6 m telescope equipped with EFOSC2 attached to the Cassegrain focus. Linear polarimetry is performed by inserting a Wollaston prism into the parallel beam, which splits the incoming light rays into two orthogonally polarized beams. Each object in the field has therefore two orthogonally polarized images on the charge-coupled device (CCD) detector, separated by 20″. To avoid image overlapping, one puts at the telescope focal plane a special mask made of alternating transparent and opaque parallel strips whose widths correspond to the splitting. The final CCD image then consists of alternate orthogonally polarized strips of the sky, two of them containing the polarized images of the object itself (di Serego Alighieri 1989, 1997; Lamy & Hutsemékers 1999). Since the two orthogonally polarized images of the object are simultaneously recorded, the polarization measurements do not depend on variable atmospheric transparency, or seeing. In order to derive the normalized Stokes parameters q and u, four frames are obtained with the half-wave plate (HWP) at four different position angles (0°, 22.5°, 45°, and 67.5°). While only two different orientations of the HWP are sufficient to measure the linear polarization, the two additional orientations allow us to remove most of the instrumental polarization (di Serego Alighieri 1989). Polarized and unpolarized standard stars were observed to unambiguously fix the zero-point of the polarization position angle, to estimate the instrumental polarization, and to check the whole observing and reduction process.

Most targets are quasars with redshifts between one and three, and V magnitudes between 17 and 19. They were mostly selected from amongst broad absorption line (BAL), radio-loud, or red quasars that are more likely to be significantly polarized. All observations but one were obtained through the Bessel V filter (ESO# 641), the Bessel R filter (ESO# 642), and the Gunn i filter (ESO# 705), with typical exposure times per frame ranging between one and ten minutes. One faint target was observed unfiltered (in "white light"). The CCD#40 mounted on EFOSC2 is a 2k × 2k CCD with a pixel size of 15 μm corresponding to 0.158″ on the sky in the 1 × 1 binning mode.

3. Data reduction and measurements

The q and u Stokes parameters are computed from the measurement of the integrated intensity ratios between the upper and lower orthogonally polarized images of the object, for the four different orientations of the half-wave plate. They are calculated

⋆ Based on observations made with the ESO 3.6 m Telescope at the La Silla Observatory under program ID 071.B-0460, 079.A-0625, 080.A-0017.
⋆⋆ Full Table 4 is only available at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5) or via http://cdsarc.u-strasbg.fr/viz-bin/qcat?J/A+A/606/A101
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Table 1. Observed standard stars.

Date yyyy-mm-dd	Polarized	Unpolarized
2003-04-04	HD 155197, HD 298383	HD 94851
2003-04-05	HD 155197	HD 64299
2003-04-06	HD 298383	HD 154892
2003-04-07	HD 126593	HD 64299
2003-04-08	HD 155197	
2007-04-22	HD 155197, Ve6−23	
2007-04-23	HD 155197	WD 1615−154
2007-10-04	HD 155197	
2007-10-05	BD−14°4922, NGC 2024−1, HD 316232	HD 64299, WD 1620−391
2007-10-06	HD 155197	WD 0310−688
2007-10-07	BD−14°4922, NGC 2024−1, BD−12°5133	HD 64299
2007-10-08	HD 316232, Ve6−23	WD 0310−688, WD 1620−391

References. Turnshek et al. (1990), Fossati et al. (2007).

Table 2. Residual polarization from field stars.

Observing run yyyy-mm	$\overline{q}_\star$ (%)	$\overline{u}_\star$ (%)	$\overline{\sigma}_\star$ (%)	$n_\star$
2003-04	−0.10	+0.10	0.14	64
2007-04	−0.11	+0.14	0.14	31
2007-10	+0.03	−0.12	0.14	86

Table 3. Polarization of distant stars.

Reference-number	RA h m s	Dec ° ′ ″	Distance kpc	Obs. date	q %	u %	p %	σ_p %	p_0 %	θ °	σ_θ °
Beers-891	12 47 17.77	−30 41 33.8	10.7	2007-04-23	−0.03	−0.16	0.16	0.14	0.10	129	40
Beers-923	13 01 06.56	+27 35 06.1	15.9	2007-04-23	+0.16	−0.11	0.19	0.15	0.14	163	31
Beers-1035	13 17 12.48	−05 04 52.2	10.8	2007-04-22	+0.01	+0.18	0.18	0.14	0.14	44	30
Beers-1670	21 31 54.40	−42 35 41.0	19.8	2007-10-06	+0.12	−0.19	0.22	0.15	0.18	152	24
Clewley-CMTF010	22 10 32.80	−16 12 09.8	22.4	2007-10-08	−0.23	+0.04	0.23	0.20	0.15	84	39

References. Beers et al. (2000), Clewley et al. (2004).

with respect to the instrumental reference frame according to

$$q = \frac{R_q - 1}{R_q + 1} \quad \text{where} \quad R_q^2 = \frac{I_0^{\mathrm{u}}/I_0^{\mathrm{l}}}{I_{45}^{\mathrm{u}}/I_{45}^{\mathrm{l}}}, \quad \text{and}$$
$$u = \frac{R_u - 1}{R_u + 1} \quad \text{where} \quad R_u^2 = \frac{I_{22.5}^{\mathrm{u}}/I_{22.5}^{\mathrm{l}}}{I_{67.5}^{\mathrm{u}}/I_{67.5}^{\mathrm{l}}}, \tag{1}$$

where I^{u} and I^{l} refer to the intensities (electron counts) integrated over the upper and lower images of the object, respectively. The photometric measurements were done using the procedures described in Lamy & Hutsemékers (1999) and Sluse et al. (2005). The positions of the upper and lower images are measured at subpixel precision by fitting two-dimensional Gaussian profiles. The intensities are then integrated in circles centered on the upper and lower images, and the Stokes parameters are computed for various values of the aperture radius. Since the Stokes parameters are found to be stable against radius changes, we adopt a fixed aperture radius of $3.0\times[(2\ln 2)^{-1/2}$ HWHM], where HWHM represents the mean half-width at half-maximum of the two-dimensional Gaussian profile. In a few cases, the Stokes parameters strongly fluctuate when changing the aperture radius, making their measurement unreliable. The combination of measurements using four frames obtained with different HWP orientations removes most of the instrumental polarization, and corrects the effects of image distortions introduced by the HWP (di Serego Alighieri 1989; Lamy & Hutsemékers 1999). The uncertainties σ_q and σ_u are evaluated by computing the errors on the intensities I^{u} and I^{l} from the read-out noise and the photon noise in the object and the sky background, and then by propagating these errors. Typical uncertainties are around 0.2% for either q or u.

A zero-point angle offset correction, filter dependent, is then applied to the quasar normalized Stokes parameters q and u in order to convert the polarization angle measured in the instrumental reference frame to the equatorial reference direction. This angle offset is determined using polarized standard stars observed every night in each filter (Table 1). For all stars observed during a given run and within a given filter, the values of the offset agree within 1°. The polarization of unpolarized standard stars

Table 4. Polarization of quasars.

Name	RA h m s	Dec ° ′ ″	z	Filter	Obs. date	q %	u %	p %	σ_p %	p_0 %	θ °	σ_θ °	
[HB89] 0219-164	02 22 00.72	−16 15 16.5	0.700000	V	2007-10-09	−3.07	−3.91	4.97	0.53	4.94	116	3	
[HB89] 1243-072	12 46 04.23	−07 30 46.6	1.286000	V	2007-04-23	8.35	−3.45	9.03	0.62	9.01	169	2	
WISE J125908.45-231038.6	12 59 08.46	−23 10 38.7	0.481000	V	2007-04-22	12.74	−8.99	15.59	0.21	15.59	162	1	
WISE J131250.90-042449.9	13 12 50.90	−04 24 49.9	0.824900	V	2007-04-23	0.13	8.70	8.70	0.51	8.69	45	2	
PKS 1420-27	14 22 49.23	−27 27 55.9	0.985000	V	2007-04-22	−0.14	0.04	0.15	0.19	0.00	999	999	
[HB89] 1424-118	14 27 38.10	−12 03 50.0	0.802945	V	2007-04-23	−0.96	−0.34	1.02	0.18	1.00	100	5	C?
SDSS J145603.07+011445.4	14 56 03.08	+01 14 45.5	2.363504	W	2003-04-08	−7.74	−5.23	9.34	0.55	9.32	107	2	
PKS 2140-43	21 43 33.39	−43 12 47.9	0.650000	V	2007-10-09	−5.19	2.52	5.77	0.17	5.77	77	1	
[HB89] 2155-152	21 58 06.28	−15 01 09.3	0.672000	V	2007-04-22	−3.56	17.14	17.51	0.51	17.50	51	1	
SDSS J232550.73-002200.3	23 25 50.73	−00 22 00.4	1.010857	V	2007-10-08	1.96	−4.00	4.45	0.22	4.44	148	1	

Notes. This table shows the polarization measurements for 10 quasars. It includes the eight objects with $p \geq 3\%$. The complete table is available at the CDS.

(Table 1) is typically around 0.10 ± 0.05% for all runs indicating that the instrumental polarization is small and essentially removed by the observing procedure.

Since on most frames field stars are simultaneously recorded, one can use them to estimate the residual instrumental polarization and/or interstellar polarization. While a frame-by-frame correction of the quasar Stokes parameters is in principle possible, it is hazardous since we are never sure that the polarization of field stars correctly represents the interstellar polarization that could affect distant quasars. Moreover, the field stars can be fainter than the quasar so that a frame-by-frame correction would introduce uncertainties on the quasar polarization larger than the residual polarization itself. We then compute the weighted average ($\overline{q}_\star$ and $\overline{u}_\star$) and dispersion ($\overline{\sigma}_\star$) of the normalized Stokes parameters of field stars, considering the $n_\star$ frames with suitable field stars obtained during a given run. These values are given in Table 2. Frames centered on quasars and distant stars (Table 3) are considered. We usually measure a single field star per frame; in some cases this star is made up of the combination of two to three fainter stars observed on the same frame. Only stellar polarizations with uncertainties σ_q and σ_u better than 0.3% are used in the average. The small values and dispersions of the average Stokes parameters reported in Table 2 confirm the low level of uncorrected instrumental polarization.

In order to minimize systematic errors in the sample, we conservatively take this residual instrumental and/or averaged interstellar polarization into account by subtracting the systematic $\overline{q}_\star$ and $\overline{u}_\star$ from the measured q and u, and by adding quadratically $\overline{\sigma}_\star$ to their errors. Then, from the corrected q and u values, the polarization degree is evaluated using $p = (q^2 + u^2)^{1/2}$ and the associated error using $\sigma_p \simeq \sigma_q \simeq \sigma_u$. In addition, p must be corrected for the statistical bias inherent to the fact that p is always a positive quantity. The debiased value p_0 of the polarization degree is obtained by using the Wardle & Kronberg (1974) estimator, which was found to be a reasonably good estimator of the true polarization degree (Simmons & Stewart 1985). The polarization position angle θ is obtained by solving the equations $q = p\cos 2\theta$ and $u = p\sin 2\theta$. The uncertainty of the polarization position angle θ is estimated from the standard Serkowski (1962) formula, where the debiased value p_0 is conservatively used instead of p, that is, $\sigma_\theta = 28.^\circ65\,\sigma_p/p_0$ (see also Wardle & Kronberg 1974). Due to the HWP chromatism over broad-band filters, an additional error $\lesssim$2–3° on θ should be accounted for (cf. the wavelength dependence of the polarization position angle offset in di Serego Alighieri 1997).

These procedures, the values of the residual polarization, and the distribution of field star polarization are similar to those reported in Sluse et al. (2005). We refer to that paper for more details and an exhaustive discussion of the effect of the various corrections. As a conclusion, the polarization of field stars is most often $\lesssim$0.3% so that virtually every quasar with a polarization degree higher than 0.6% is intrinsically polarized, in agreement with previous studies (Berriman et al. 1990; Lamy & Hutsemékers 2000).

Since the distance of field stars in unknown, we have measured the V-band polarization of a few very distant stars ($d >$ 10 kpc) to further check the amount of interstellar polarization in the direction of our targets. These measurements are reported in Table 3. All these stars appear to have low polarization. Although the sample is small, this confirms that, on average, contamination by interstellar polarization should be unimportant for quasars at high galactic latitudes ($|b_{\rm II}| > 30°$) and with polarization degrees higher than 0.6%.

4. Polarization data

The full Table 4, available at the Strasbourg astronomical data center (CDS), summarizes the polarization measurements obtained for 192 different quasars (72 in April 2003, 28 in April 2007, and 92 in October 2007). Unreliable measurements were discarded. Eighty-nine quasars have $p \geq 0.6\%$, 18 have $p \geq 2\%$, and two have $p \geq 10\%$. Column (1) gives the quasar name from the NASA/IPAC extragalactic database (NED), Cols. (2) and (3) the equatorial coordinates (J2000), Col. (4) the redshift z, Col. (5) the filter used (V, R, i, and W for no filter), and Col. (6) the date of observation (year-month-day). Columns (7) and (8) give the normalized Stokes parameters q and u in percent corrected for the systematic residual polarization given in Table 2. The normalized Stokes parameters are given in the equatorial reference frame. Columns (9) and (10) give the polarization degree p and its error $\sigma_{\rm p}$ in percent. Column (11) gives the debiased polarization degree p_0 in percent. Columns (12) and (13) give the polarization position angle θ east-of-north and its error σ_θ, in degrees. When $p < \sigma_{\rm p}$, the polarization angle is undefined and its value put to 999. Finally "C?" in Col. (14) indicate quasars with $p > 0.6\%$ and for which the polarization of the field stars is comparable or higher, that is objects whose polarization has possibly been contaminated by interstellar polarization.

Among the eight objects with $p \geq 3\%$ reported in Table 4, three of them were already known for their high linear polarization: [HB89] 0219-164 (Mead et al. 1990), WISE J125908.45-231038.6 (Sluse et al. 2005), and [HB89] 2155-152 (Wardle et al. 1984). Moreover, the linear polarization of WISE J125908.45-231038.6 and [HB89] 2155-152, uncorrected for the systematic polarization given in Table 2, has been discussed in Hutsemékers et al. (2010) together with circular polarization measurements. Among the five remaining objects with first-time polarization measurements, two are BAL quasars: SDSS J145603.07+011445.4 (Hall et al. 2002) and SDSS J232550.73-002200.3 (Trump et al. 2006). [HB89] 1243-072, WISE J131250.90-042449.9 and PKS 2140-43 are Parkes radio sources, the first two also belonging to the *Fermi* Gamma-ray Space Telescope source catalog (Nolan et al. 2012).

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Material in Electronic Form at the CDS

J/A+A/606/A101 Polarization of quasars (Hutsemekers+, 2017)

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Optical linear polarization measurements of quasars obtained with the 3.6m telescope at the La Silla Observatory.

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=2017A&A...606A.101H (SIMBAD/NED BibCode)

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ADC_Keywords: QSOs ; Polarization
Keywords: quasars: general - polarization

Abstract:

We report 192 previously unpublished optical linear polarization measurements of quasars obtained in April 2003, April 2007, and October 2007 with the European Southern Observatory Faint Object Spectrograph and Camera (EFOSC2) instrument attached to the 3.6m telescope at the La Silla Observatory. Each quasar was observed once. Among the 192 quasars, 89 have a polarization degree p>=0.6%, 18 have p>=2%, and two have p>=10%.

Description:

This Table contains optical linear polarization measurements of 192 quasars obtained in April 2003, April 2007, and October 2007 with the ESO Faint Object Spectrograph and Camera (EFOSC2) instrument attached to the 3.6m telescope at the La Silla Observatory.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table4.dat	139	192	Polarization data

See also:

- J/A+A/332/410 : Quasar polarization (Hutsemekers 1998)
- J/A+A/340/371 : Quasar polarization (Hutsemekers+ 1998)
- J/A+AS/142/451 : Polarization of 47 quasi-stellar objects (Lamy+ 2000)
- J/A+A/433/757 : Optical polarization of 203 QSOs (Sluse+, 2005)

Byte-by-byte Description of file: table4.dat

Bytes	Format	Units	Label	Explanations
1- 29	A29	---	Name	Object name (from NED)
32- 33	I2	h	RAh	Right ascension (J2000)
35- 36	I2	min	RAm	Right ascension (J2000)
38- 42	F5.2	s	RAs	Right ascension (J2000)
44	A1	---	DE-	Declination sign (J2000)
45- 46	I2	deg	DEd	Declination (J2000)
48- 49	I2	arcmin	DEm	Declination (J2000)
51- 54	F4.1	arcsec	DEs	Declination (J2000)
58- 65	F8.6	---	z	Redshift
69	A1	---	Filter	[RVWi] Filter
73- 82	A10	"date"	Date	Date of observation (YYYY-MM-DD)
85- 90	F6.2	%	q	Normalized Stokes parameter (NSP) q
93- 98	F6.2	%	u	Normalized Stokes parameter (NSP) u
102-106	F5.2	%	Pol	Polarization degree
111-114	F4.2	%	e_Pol	Uncertainty of polarization degree
118-122	F5.2	%	p0	Debiased polarization degree
127-129	I3	deg	PA	?=999 Polarization position angle
133-135	I3	deg	e_PA	?=999 Uncertainty of PA
138-139	A2	---	Remark	Remark (1)

Note (1): Remarks are coded as follows:
C? = polarization measurement possibly contaminated by interstellar polarization

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(End) Patricia Vannier [CDS] 31-Aug-2017

[HB89] 2358-161	00 01 05.33 -15 51 07.1	2.044000	V	2007-10-06	-0.17	0.14	0.22	0.21	0.09	70	67
[HB89] 0005-239	00 08 00.37 -23 39 18.2	1.412000	V	2007-10-06	-0.41	0.37	0.55	0.18	0.52	69	10
PKS 0013-14	00 16 19.95 -14 30 10.8	0.768288	V	2007-10-06	0.08	-0.51	0.51	0.20	0.47	140	12
PKS 0027+056	00 29 45.90 +05 54 40.7	1.317000	V	2007-10-08	0.14	0.01	0.14	0.45	0.00	999	999
[HB89] 0029-414	00 31 28.04 -41 08 16.0	0.896000	V	2007-10-06	-0.57	-0.66	0.87	0.28	0.83	114	10
4C +12.05	00 38 18.01 +12 27 31.3	1.395000	V	2007-10-08	-0.28	0.00	0.28	0.19	0.23	90	24
UM 275	00 46 13.54 +01 04 25.7	2.149246	V	2007-10-05	0.10	-0.01	0.10	0.21	0.00	999	999
SDSS J005408.46-094638.1	00 54 08.46 -09 46 38.3	2.123327	V	2007-10-05	0.28	0.56	0.63	0.19	0.60	32	9
[HB89] 0104-275	01 06 26.08 -27 18 11.8	2.487000	V	2007-10-09	-0.15	-1.46	1.46	0.25	1.44	132	5
UM 305	01 08 26.84 -00 37 24.2	1.374626	V	2007-10-08	-0.63	0.14	0.64	0.20	0.61	84	9
SDSS J010859.52-105757.7	01 08 59.53 -10 57 57.9	1.829426	V	2007-10-07	-1.34	0.16	1.35	0.23	1.33	86	5
SDSS J013245.30-004609.9	01 32 45.30 -00 46 10.0	1.474366	V	2007-10-08	2.15	-0.65	2.25	0.25	2.24	172	3
SDSS J013656.30-004623.7	01 36 56.31 -00 46 23.8	1.716482	V	2007-10-05	-0.22	0.22	0.31	0.21	0.25	67	24
2MASX J01455068-3520497	01 45 50.70 -35 20 49.0	0.446000	V	2007-10-05	-1.30	0.85	1.55	0.20	1.54	73	4
SDSS J014950.95-010314.1	01 49 50.96 -01 03 14.2	1.076119	V	2007-10-06	-0.08	-0.24	0.25	0.21	0.17	126	35
SDSS J020006.31-003709.9	02 00 06.31 -00 37 09.8	2.142194	V	2007-10-05	-0.79	0.58	0.98	0.24	0.95	72	7
SDSS J020105.14+000617.9	02 01 05.15 +00 06 17.9	1.216798	V	2007-10-06	-0.31	-0.44	0.53	0.24	0.48	117	14
SDSS J021119.12-075722.5	02 11 19.13 -07 57 22.5	1.861868	V	2007-10-07	-1.40	-0.69	1.56	0.20	1.55	103	4
PKS 0214-330	02 16 48.19 -32 47 40.9	1.331000	V	2007-10-09	-0.09	-0.24	0.25	0.25	0.00	999	999
SDSS J021818.14-092153.4	02 18 18.14 -09 21 53.5	1.883946	V	2007-10-07	1.04	0.85	1.35	0.22	1.33	20	5
SDSS J022036.27-081242.8	02 20 36.28 -08 12 42.9	2.009454	V	2007-10-05	0.36	-0.51	0.62	0.24	0.58	153	12
[HB89] 0219-164	02 22 00.72 -16 15 16.5	0.700000	V	2007-10-09	-3.07	-3.91	4.97	0.53	4.94	116	3
[HB89] 0234-301	02 36 31.17 -29 53 55.5	2.103400	V	2007-10-05	0.29	-0.16	0.33	0.25	0.25	166	28
GALEXASC J033208.65-274734.3	03 32 08.66 -27 47 34.6	0.544000	V	2007-10-07	0.17	-1.06	1.07	0.20	1.05	140	5
GALEX J033226.49-274034.6	03 32 26.48 -27 40 35.9	1.031000	V	2007-10-06	-0.34	-1.42	1.46	0.35	1.42	128	7
IRAS F03539-5500	03 55 13.31 -54 51 57.5	0.267000	V	2007-10-08	-0.17	-0.13	0.21	0.16	0.16	108	29
[HB89] 0450-299	04 52 30.10 -29 53 35.3	0.246570	V	2007-10-08	0.65	0.00	0.65	0.14	0.64	0	6
SDSS J094745.26-004113.2	09 47 45.27 -00 41 13.3	2.833732	i	2003-04-06	-2.17	-1.07	2.42	0.29	2.40	103	3
SDSS J095540.18+004842.1	09 55 40.19 +00 48 42.2	2.020699	V	2003-04-05	-1.07	0.48	1.17	0.25	1.14	78	6
SDSS J1004+0018	10 04 28.43 +00 18 25.7	3.054663	i	2003-04-06	0.16	-0.30	0.34	0.25	0.27	149	27
LBQS 1018-0005	10 20 59.57 -00 20 26.4	2.604268	i	2003-04-08	-0.12	-0.03	0.12	0.21	0.00	999	999
SDSS J102121.93-003442.3	10 21 21.94 -00 34 42.4	2.071431	R	2003-04-04	0.43	-0.90	1.00	0.19	0.98	148	6
SDSS J102258.15-004052.1	10 22 58.15 -00 40 52.1	1.750000	V	2003-04-05	0.13	-0.68	0.69	0.24	0.65	141	11
SDSS J102517.57+003422.0	10 25 17.58 +00 34 22.0	1.894055	V	2003-04-07	1.00	0.31	1.05	0.20	1.03	9	6
SDSS J102527.42-000519.0	10 25 27.43 -00 05 19.1	1.899648	V	2003-04-05	0.91	0.03	0.91	0.21	0.89	1	7
SDSS J103204.74-001119.1	10 32 04.74 -00 11 19.2	1.881975	V	2003-04-04	-0.78	-0.62	0.99	0.29	0.95	109	9
SDSS J103544.95-002924.7	10 35 44.96 -00 29 24.8	2.075593	R	2003-04-06	0.98	-0.43	1.07	0.24	1.04	168	7
SDSS J104152.61-001102.1	10 41 52.62 -00 11 02.2	1.699070	V	2003-04-05	0.85	0.32	0.91	0.21	0.89	10	7
[HB89] 1039+012 NED02	10 42 33.86 +01 02 06.2	2.117471	R	2003-04-08	-0.27	-1.67	1.69	0.21	1.68	130	4
SDSS J104721.83-010708.8	10 47 21.84 -01 07 09.0	2.188514	R	2003-04-05	0.05	-0.20	0.20	0.19	0.08	142	64
SDSS J104828.80-005747.0	10 48 28.81 -00 57 47.1	1.749589	V	2003-04-07	0.37	0.21	0.43	0.19	0.39	15	14
SDSS J104841.02+000042.8	10 48 41.02 +00 00 42.9	2.026283	V	2003-04-06	-0.02	-0.13	0.13	0.20	0.00	999	999
SDSS J105239.38-003707.3	10 52 39.39 -00 37 07.3	2.266347	R	2003-04-07	0.44	-0.19	0.48	0.18	0.45	169	12
SDSS J105808.47+003930.5	10 58 08.48 +00 39 30.6	2.821698	i	2003-04-08	0.17	-0.20	0.26	0.30	0.00	999	999
SDSS J105953.99+004647.6	10 59 54.00 +00 46 47.7	2.012388	V	2003-04-04	-0.07	0.19	0.21	0.20	0.09	55	66
SDSS J110008.50+005027.6	11 00 08.51 +00 50 27.8	2.135080	R	2003-04-08	0.09	0.00	0.09	0.25	0.00	999	999
SDSS J110041.19+003631.9	11 00 41.19 +00 36 32.0	2.019794	V	2003-04-05	1.26	-0.12	1.27	0.19	1.26	177	4
SDSS J110533.17-005848.0	11 05 33.18 -00 58 48.1	1.745760	V	2003-04-07	0.07	-0.23	0.24	0.21	0.15	144	40
SDSS J110658.21-002443.5	11 06 58.22 -00 24 43.6	1.923455	V	2003-04-04	0.26	-0.18	0.32	0.26	0.23	163	33
SDSS J110736.67+000329.4	11 07 36.68 +00 03 29.5	1.731876	V	2003-04-07	1.23	0.41	1.30	0.20	1.28	9	4
SDSS J110838.76-005533.7	11 08 38.76 -00 55 33.7	1.815312	V	2003-04-06	0.20	-0.20	0.28	0.18	0.23	158	22
SDSS J112506.75-000800.0	11 25 06.75 -00 08 00.1	1.912816	V	2003-04-07	0.02	-0.13	0.13	0.20	0.00	999	999
SDSS J112526.12+002901.3	11 25 26.13 +00 29 01.3	0.865400	V	2007-04-23	-0.79	1.95	2.11	0.24	2.10	56	3
SDSS J113621.04+005021.2	11 36 21.05 +00 50 21.3	3.433939	i	2003-04-06	-0.80	-0.24	0.83	0.19	0.81	98	7
SDSS J1136+0242	11 36 58.37 +02 42 20.2	2.491700	i	2003-04-05	0.45	-0.53	0.69	0.38	0.60	155	18
SDSS J120142.24-001639.8	12 01 42.25 -00 16 39.9	1.992877	V	2003-04-06	-0.12	-0.10	0.15	0.20	0.00	999	999
[HB89] 1202-262	12 05 33.21 -26 34 04.5	0.789000	V	2007-04-23	0.32	-0.17	0.36	0.20	0.31	166	18
SDSS J120627.62+002335.3	12 06 27.63 +00 23 35.4	1.136880	V	2007-04-23	-0.37	-1.65	1.69	0.36	1.65	129	6
SDSS J120834.84+002047.7	12 08 34.84 +00 20 47.8	2.698790	i	2003-04-08	0.21	0.13	0.25	0.21	0.17	16	35
SDSS J120957.18-002301.9	12 09 57.19 -00 23 02.0	1.850216	V	2003-04-06	0.71	-0.76	1.04	0.22	1.02	157	6
SDSS J121224.81+000426.5	12 12 24.81 +00 04 26.6	1.751713	V	2003-04-07	-0.41	0.49	0.64	0.21	0.61	65	10
SDSS J121432.97+092602.5	12 14 32.98 +09 26 02.5	1.376538	V	2007-04-23	0.73	-0.38	0.82	0.21	0.79	166	8
UM 485	12 15 49.80 -00 34 31.8	2.698689	i	2003-04-04	-0.57	0.63	0.85	0.19	0.83	66	7
UM 486	12 16 55.39 +00 14 15.3	1.881065	V	2003-04-08	0.21	0.27	0.35	0.19	0.31	26	18
SDSS J122447.64-000712.5	12 24 47.65 -00 07 12.6	2.067527	R	2003-04-08	0.21	-0.20	0.29	0.17	0.25	159	20
WISE J122501.32-293819.6	12 25 01.22 -29 38 16.7	0.816000	V	2007-04-23	-0.25	-0.18	0.31	0.20	0.26	108	22
GALEXASC J122844.58-300238.3	12 28 44.52 -30 02 38.7	0.749000	V	2007-04-23	-0.15	0.14	0.21	0.17	0.15	68	32
SDSS J122848.21-010414.4	12 28 48.22 -01 04 14.5	2.653750	i	2003-04-08	1.84	1.16	2.18	0.18	2.17	16	2
SDSS J123056.57-005306.3	12 30 56.58 -00 53 06.4	2.165257	R	2003-04-07	-0.16	-0.65	0.66	0.19	0.63	128	9
SDSS J123401.04+010849.3	12 34 01.05 +01 08 49.4	1.856067	V	2003-04-04	-0.08	-0.03	0.08	0.21	0.00	999	999
[HB89] 1232-002	12 35 05.92 -00 30 22.4	1.892958	V	2003-04-05	0.15	-0.36	0.39	0.18	0.35	147	15
SDSS J123729.74+005433.5	12 37 29.75 +00 54 33.6	3.280732	i	2003-04-07	0.27	0.90	0.94	0.22	0.91	37	7
LBQS 1236-0043	12 38 56.10 -00 59 30.8	1.847458	V	2003-04-04	0.01	0.14	0.14	0.19	0.00	999	999
LBQS 1236+0128	12 39 11.49 +01 12 13.9	1.263702	V	2007-04-23	0.14	0.09	0.17	0.19	0.00	999	999
LBQS 1239-0231	12 41 57.32 -02 47 31.4	1.240144	V	2007-04-22	-0.16	0.14	0.22	0.18	0.16	69	33
LBQS 1239+0028	12 42 02.65 +00 12 29.0	1.217243	V	2007-04-22	0.61	-0.39	0.72	0.20	0.69	164	8
[HB89] 1240-294	12 43 10.66 -29 43 22.5	1.135000	V	2007-04-23	-0.06	-0.09	0.11	0.17	0.00	999	999
LBQS 1243+0121	12 45 51.45 +01 05 05.0	2.806753	i	2003-04-08	0.79	-1.85	2.01	0.19	2.00	147	3
[HB89] 1243-072	12 46 04.23 -07 30 46.6	1.286000	V	2007-04-23	8.35	-3.45	9.03	0.62	9.01	169	2
LBQS 1246+0032	12 48 59.67 +00 15 45.5	2.317924	R	2003-04-07	-0.12	-0.87	0.87	0.19	0.85	131	6
SDSS J125257.12+011040.2	12 52 57.14 +01 10 40.3	2.179835	R	2003-04-07	0.38	0.01	0.38	0.22	0.33	1	19
FBQS J125807.4+232921	12 58 07.46 +23 29 21.6	0.259000	V	2007-04-23	-1.21	-0.10	1.22	0.18	1.21	92	4
WISE J125908.45-231038.6	12 59 08.46 -23 10 38.7	0.481000	V	2007-04-22	12.74	-8.99	15.59	0.21	15.59	162	1
SDSS J130019.99+002641.3	13 00 20.00 +00 26 41.4	1.754626	V	2003-04-05	0.37	-0.19	0.42	0.23	0.37	167	18
SDSS J130424.00-003757.1	13 04 24.00 -00 37 57.2	3.027297	i	2003-04-06	0.23	-1.55	1.56	0.19	1.55	139	4
UM 545	13 08 01.36 -00 04 56.7	2.060289	R	2003-04-04	0.18	0.17	0.25	0.19	0.19	22	28
SDSS J130813.24-004236.9	13 08 13.24 -00 42 37.0	2.019852	V	2003-04-08	-0.48	0.02	0.48	0.21	0.44	89	14
WISE J131250.90-042449.9	13 12 50.90 -04 24 49.9	0.824900	V	2007-04-23	0.13	8.70	8.70	0.51	8.69	45	2
LBQS 1314+0116	13 17 14.22 +01 00 13.1	2.696083	i	2003-04-07	0.28	-2.41	2.42	0.19	2.41	138	2
SDSS J131853.45+002211.4	13 18 53.45 +00 22 11.6	2.068858	R	2003-04-04	0.18	0.13	0.23	0.20	0.15	18	39
LBQS 1326-0249	13 28 50.01 -03 04 50.6	1.413728	V	2007-04-23	0.37	0.42	0.56	0.28	0.50	24	16
[HB89] 1327-206	13 30 07.70 -20 56 16.2	1.169000	V	2007-04-23	0.31	0.19	0.36	0.17	0.32	16	15
[HB89] 1327-311	13 30 19.08 -31 22 59.1	1.326000	V	2007-04-23	-0.53	0.31	0.62	0.30	0.55	75	16
[HB89] 1328-263	13 31 11.69 -26 39 09.6	0.883000	V	2007-04-22	0.14	0.10	0.17	0.21	0.00	999	999
LBQS 1334-0033	13 36 47.15 -00 48 57.2	2.816370	i	2003-04-04	0.01	0.14	0.14	0.19	0.00	999	999
SDSS J133844.92-002147.3	13 38 44.92 -00 21 47.4	1.772113	V	2003-04-04	-0.33	0.06	0.33	0.23	0.27	84	25
SDSS J134450.16-015843.0	13 44 50.15 -01 58 43.0	0.958424	V	2007-04-23	-0.54	-0.06	0.55	0.23	0.50	93	13
SDSS J135559.03-002413.5	13 55 59.04 -00 24 13.7	2.333468	R	2003-04-07	0.20	-0.15	0.25	0.19	0.19	162	28
SDSS J135721.77+005501.1	13 57 21.77 +00 55 01.1	2.008054	V	2003-04-05	-0.05	0.51	0.52	0.19	0.49	48	11
SDSS J140025.53-012957.0	14 00 25.54 -01 29 57.0	0.583603	V	2007-04-22	0.31	-0.51	0.59	0.26	0.54	151	14
2MASSi J1401492-245530	14 01 49.20 -24 55 30.0	0.500000	V	2007-04-22	-0.06	0.52	0.53	0.17	0.50	48	10
UM 629	14 03 23.39 -00 06 06.9	2.471325	R	2003-04-05	-0.11	-0.14	0.17	0.19	0.00	999	999
[HB89] 1405-287	14 08 49.61 -29 00 23.6	0.575000	V	2007-04-22	-0.11	0.12	0.17	0.19	0.00	999	999
SDSS J142033.24-003233.3	14 20 33.26 -00 32 33.4	2.698349	i	2003-04-07	0.32	-0.34	0.47	0.31	0.39	157	23
PKS 1420-27	14 22 49.23 -27 27 55.9	0.985000	V	2007-04-22	-0.14	0.04	0.15	0.19	0.00	999	999

[HB89] 1424-118	14 27 38.10 -12 03 50.0	0.802945	V	2007-04-23	-0.96	-0.34	1.02	0.18	1.00	100	5	C?
SDSS J142755.84-002951.0	14 27 55.86 -00 29 51.1	3.374736	i	2003-04-06	-0.54	0.81	0.98	0.19	0.96	62	6	
SDSS J143255.35-003109.2	14 32 55.36 -00 31 09.3	2.072706	R	2003-04-06	-0.16	-0.12	0.20	0.19	0.08	108	64	
SDSS J143641.24+001558.8	14 36 41.24 +00 15 58.9	1.869309	V	2003-04-08	1.19	-0.04	1.19	0.19	1.17	179	5	
SDSS J143819.76-000241.0	14 38 19.76 -00 02 41.1	2.850558	i	2003-04-06	-0.13	-0.30	0.32	0.23	0.26	123	26	
SDSS J144256.86-004500.9	14 42 56.87 -00 45 01.0	2.225955	R	2003-04-07	-0.26	0.61	0.67	0.21	0.64	56	9	C?
LBQS 1443-0004	14 45 44.62 -00 17 15.0	1.789808	V	2003-04-04	-0.33	-0.12	0.35	0.21	0.30	100	20	
SDSS J145045.42-004400.2	14 50 45.42 -00 44 00.3	2.066223	R	2003-04-06	0.13	0.63	0.65	0.21	0.62	39	10	
SDSS J145155.23+000521.9	14 51 55.24 +00 05 22.0	2.020003	V	2003-04-08	-0.23	-0.24	0.33	0.20	0.28	113	20	
SDSS J145603.07+011445.4	14 56 03.08 +01 14 45.5	2.363504	W	2003-04-08	-7.74	-5.23	9.34	0.55	9.32	107	2	
SDSS J145754.03+003639.0	14 57 54.04 +00 36 39.0	2.771629	i	2003-04-08	-0.39	-0.10	0.40	0.31	0.30	97	29	
SDSS J145914.50+000648.7	14 59 14.51 +00 06 48.8	1.900745	V	2003-04-04	0.03	0.51	0.51	0.25	0.46	43	16	
SDSS J150033.52+003353.6	15 00 33.53 +00 33 53.7	2.439423	R	2003-04-05	-1.22	-0.25	1.24	0.21	1.22	96	5	
SDSS J150206.65-003606.9	15 02 06.66 -00 36 07.0	2.201689	R	2003-04-04	-0.13	0.37	0.39	0.21	0.34	54	18	
SDSS J150314.57-000905.8	15 03 14.58 -00 09 06.0	1.703108	V	2003-04-05	-0.35	-0.04	0.35	0.25	0.28	93	26	
SDSS J152348.99-004701.7	15 23 48.99 -00 47 01.9	3.297404	i	2003-04-07	-0.50	-1.33	1.42	0.26	1.40	125	5	
SDSS J152816.42-003302.4	15 28 16.43 -00 33 02.5	1.795282	V	2003-04-05	-0.87	0.26	0.91	0.19	0.89	82	6	C?
SDSS J152913.85-001013.7	15 29 13.86 -00 10 13.8	2.077010	R	2003-04-08	-0.46	0.01	0.46	0.19	0.42	89	13	
FBQS J2124-0722	21 24 10.26 -07 22 20.8	1.772216	V	2007-10-05	-0.18	-1.64	1.65	0.19	1.64	132	3	
SDSS J212449.41+094855.8	21 24 49.42 +09 48 55.9	2.055587	V	2007-10-07	0.73	0.25	0.77	0.23	0.74	10	9	
PKS 2123-463	21 26 30.70 -46 05 47.9	1.670000	V	2007-10-09	-0.28	-0.91	0.95	0.20	0.93	126	6	
SDSS J212926.55-002237.7	21 29 26.56 -00 22 37.8	2.130619	V	2007-10-06	0.20	-0.19	0.27	0.24	0.16	159	43	
SDSS J213722.35-080706.4	21 37 22.35 -08 07 06.5	2.131538	V	2007-10-07	-0.45	0.32	0.55	0.27	0.49	72	16	
SDSS J214016.74-071011.9	21 40 16.75 -07 10 12.0	1.825698	V	2007-10-05	-0.50	0.48	0.69	0.24	0.65	68	11	
SDSS J214113.05-003545.8	21 41 13.05 -00 35 45.9	2.236056	V	2007-10-07	-0.45	-0.15	0.47	0.25	0.41	99	17	
LBQS 2140-4552	21 43 29.21 -45 38 51.8	1.688000	V	2007-04-23	0.09	-0.31	0.32	0.23	0.26	143	26	
PKS 2140-43	21 43 33.39 -43 12 47.9	0.650000	V	2007-10-09	-5.19	2.52	5.77	0.17	5.77	77	1	
SDSS J214502.56-075805.6	21 45 02.57 -07 58 05.7	2.151276	V	2007-10-07	0.97	-0.07	0.97	0.21	0.95	178	6	
SDSS J214611.79-085857.4	21 46 11.80 -08 58 57.4	2.182235	V	2007-10-05	0.87	-1.48	1.71	0.21	1.70	150	4	
2MASSi J2149245-334131	21 49 24.50 -33 41 31.0	2.500000	V	2007-10-06	0.12	0.38	0.40	0.23	0.34	36	19	
FBQS J2149-0811	21 49 48.18 -08 11 16.6	2.130000	V	2007-10-06	0.02	-0.24	0.24	0.21	0.15	138	40	
[HB89] 2149-307	21 51 55.52 -30 27 53.7	2.345000	V	2007-10-06	0.38	0.82	0.91	0.19	0.89	33	6	
SDSS J215250.62+110001.8	21 52 50.63 +11 00 01.8	2.016927	V	2007-10-06	-0.80	-0.61	1.00	0.27	0.96	109	8	
[VCV96] Q 2153-2005	21 56 28.90 -19 50 54.0	2.270000	V	2007-04-23	0.21	0.30	0.37	0.34	0.19	28	50	
[HB89] 2154-325	21 57 37.71 -32 19 23.7	1.812000	V	2007-04-22	0.09	-0.25	0.26	0.26	0.00	999	999	
GALEXASC J215754.06-342100.4	21 57 54.03 -34 20 59.8	1.880000	V	2007-10-09	-0.48	0.48	0.68	0.19	0.65	67	8	
[HB89] 2155-152	21 58 06.28 -15 01 09.3	0.672000	V	2007-04-22	-3.56	17.14	17.51	0.51	17.50	51	1	
GALEXASC J215954.53-354250.5	21 59 54.49 -35 42 50.3	1.800000	V	2007-10-09	-0.13	-0.66	0.67	0.22	0.64	130	10	
SDSS J220119.62-083911.5	22 01 19.63 -08 39 11.7	2.183030	V	2007-10-05	0.92	-0.14	0.93	0.21	0.91	176	7	
GALEXASC J220215.05-330321.4	22 02 15.09 -33 03 21.5	0.402275	V	2007-10-09	-0.12	0.37	0.39	0.24	0.33	54	21	
[HB89] 2200-238	22 02 56.00 -23 35 10.2	2.118000	V	2007-10-08	-0.55	0.19	0.58	0.18	0.55	80	9	
FBQS J2204+0031	22 04 45.27 +00 31 41.8	1.353453	V	2007-10-08	-0.18	0.00	0.18	0.23	0.00	999	999	
SDSS J220909.69+004508.0	22 09 09.70 +00 45 08.0	1.424701	V	2007-10-08	-0.06	0.18	0.19	0.30	0.00	999	999	
[HB89] 2210-257	22 13 02.50 -25 29 30.1	1.833000	V	2007-10-08	-0.75	2.42	2.54	0.26	2.53	54	3	
LBQS 2210-1751	22 13 09.66 -17 37 01.8	1.557000	V	2007-10-07	-0.12	0.27	0.30	0.19	0.25	57	22	
[HB89] 2212-199	22 14 51.10 -19 43 00.0	2.050000	V	2007-10-06	0.28	0.60	0.67	0.26	0.62	32	12	
SDSS J221511.93-004549.9	22 15 11.94 -00 45 50.0	1.475500	V	2007-10-08	-0.54	0.29	0.61	0.17	0.59	76	8	
[HB89] 2212-299	22 15 16.03 -29 44 23.3	2.703664	V	2007-10-09	0.24	-0.01	0.24	0.17	0.19	179	25	
LBQS 2212-1759	22 15 31.60 -17 44 08.0	2.217000	V	2007-10-05	0.00	0.11	0.11	0.15	0.00	999	999	
[XH2014] J334.4300-20.3808	22 17 43.34 -20 22 51.3	2.316000	V	2007-10-08	-0.18	0.30	0.35	0.42	0.00	999	999	
2MASSi J2220067-280323	22 20 06.70 -28 03 23.0	2.406000	V	2007-10-06	0.06	0.14	0.16	0.17	0.00	999	999	
[HB89] 2217-385	22 20 39.40 -38 15 27.0	1.510000	V	2007-10-09	-2.22	0.58	2.29	0.21	2.28	83	3	
[VCV96] Q 2218-3710	22 21 05.60 -36 55 17.0	2.190000	V	2007-10-06	0.18	-0.40	0.44	0.23	0.39	147	17	
SDSS J222107.29+125627.2	22 21 07.29 +12 56 27.2	1.735893	V	2007-10-06	1.68	-1.18	2.05	0.27	2.03	162	4	
SDSS J222505.28-084542.7	22 25 05.29 -08 45 42.8	2.085152	V	2007-10-07	-0.19	-0.64	0.66	0.24	0.62	127	11	
[HB89] 2222+051	22 25 14.66 +05 27 09.4	2.323000	V	2007-10-05	0.42	-2.19	2.23	0.20	2.22	140	3	
[VCV96] Q 2222-3819	22 25 32.95 -38 04 14.2	1.520000	V	2007-10-09	0.15	0.23	0.28	0.19	0.23	28	24	
SDSS J222624.70-094615.8	22 26 24.70 -09 46 15.9	1.917269	V	2007-10-08	0.13	-0.55	0.56	0.19	0.53	142	10	
SDSS J223934.45-004707.2	22 39 34.46 -00 47 07.2	2.219988	V	2007-10-06	0.15	-0.59	0.60	0.23	0.56	142	12	
LBQS 2239+0007	22 41 47.34 +00 22 54.7	1.444888	V	2007-10-08	-0.35	-0.07	0.35	0.21	0.30	95	20	
LBQS 2244-0105	22 46 49.30 -00 49 54.4	2.036585	V	2007-10-06	-0.52	-1.31	1.40	0.19	1.39	124	4	
[HB89] 2244-372	22 47 03.92 -36 57 46.3	2.252000	V	2007-10-06	-0.61	0.34	0.70	0.37	0.62	75	17	
SDSS J224830.21-091807.1	22 48 30.22 -09 18 07.1	1.880656	V	2007-10-05	0.97	-1.04	1.42	0.22	1.40	157	4	
[HB89] 2246-309	22 49 19.04 -30 39 12.6	1.305360	V	2007-10-09	-0.04	0.10	0.11	0.21	0.00	999	999	
FBQS J2251-0840	22 51 21.37 -08 40 34.7	1.945800	V	2007-10-07	-0.23	-0.33	0.40	0.19	0.36	118	15	
SDSS J225130.28+134714.9	22 51 30.29 +13 47 14.9	1.861835	V	2007-10-06	-0.33	0.24	0.41	0.21	0.36	72	17	
SDSS J225257.62-084141.2	22 52 57.63 -08 41 41.3	2.171229	V	2007-10-07	0.46	-1.28	1.36	0.48	1.28	145	11	
PKS 2251-418	22 54 36.73 -41 39 39.9	1.765000	V	2007-10-09	0.22	0.18	0.29	0.27	0.14	20	54	
PKS 2253-278	22 56 00.16 -27 35 56.1	1.751000	V	2007-10-08	0.52	0.44	0.69	0.24	0.65	20	11	
SDSS J225719.04-100104.7	22 57 19.04 -10 01 04.7	2.075062	V	2007-10-07	0.04	-0.05	0.06	0.21	0.00	999	999	
FBQS J2300-1021	23 00 11.74 -10 21 44.5	2.306749	V	2007-10-05	0.10	-0.10	0.14	0.21	0.00	999	999	
SDSS J230544.15-002532.1	23 05 44.20 -00 25 32.1	1.374329	V	2007-10-08	-0.64	-0.62	0.89	0.27	0.85	112	9	
PKS 2306-312	23 09 14.33 -30 59 12.6	1.380000	V	2007-10-09	-0.16	-0.50	0.52	0.64	0.00	999	999	
SDSS J231314.60-082912.5	23 13 14.61 -08 29 12.6	1.784730	V	2007-10-07	0.49	0.34	0.60	0.23	0.56	18	12	
SDSS J231324.45+003444.5	23 13 24.46 +00 34 44.5	2.087347	V	2007-10-07	-0.80	-0.22	0.83	0.16	0.81	98	6	
SDSS J231340.08-082817.2	23 13 40.08 -08 28 17.3	2.197614	V	2007-10-07	-0.08	-0.43	0.43	0.25	0.37	130	19	
PKS 2311-373	23 13 59.71 -37 04 46.2	2.476000	V	2007-10-09	-0.21	-0.24	0.31	0.24	0.23	114	29	
SDSS J231958.69-002449.2	23 19 58.70 -00 24 49.3	1.896617	V	2007-10-05	0.55	-1.28	1.39	0.22	1.37	147	5	
[HB89] 2320+079	23 22 36.09 +08 12 01.6	2.090000	V	2007-10-05	-0.13	0.11	0.17	0.21	0.00	999	999	
SDSS J232550.73-002200.3	23 25 50.73 -00 22 00.4	1.010857	V	2007-10-08	1.96	-4.00	4.45	0.22	4.44	148	1	
[HB89] 2325-150	23 27 47.96 -14 47 55.8	2.465000	V	2007-10-05	-0.40	0.04	0.40	0.26	0.33	87	22	
PKS 2329-415	23 32 19.10 -41 18 37.0	0.671000	V	2007-10-09	0.23	0.39	0.46	0.46	0.00	999	999	
FBQS J2336-0954	23 36 11.65 -09 54 27.4	1.784096	V	2007-10-07	0.23	-0.39	0.45	0.25	0.39	150	18	
SDSS J234157.23-094616.9	23 41 57.24 -09 46 16.9	1.339506	V	2007-10-08	0.04	0.53	0.54	0.29	0.47	43	18	
FBQS J2347-1037	23 47 11.45 -10 37 42.5	1.818946	V	2007-10-05	-0.67	-0.84	1.07	0.18	1.05	116	5	
[HB89] 2352-342	23 55 25.80 -33 57 55.2	0.706389	V	2007-10-09	-0.20	-0.19	0.27	0.17	0.23	112	21	
[HB89] 2353+154	23 55 53.53 +15 41 26.1	1.803967	V	2007-10-06	-0.59	-0.03	0.59	0.21	0.55	91	11	