THE LINEAR POLARIZATION OF RADIO SOURCES BETWEEN 11 AND 20 CM WAVELENGTH

I. OBSERVATIONS

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Summary

Observations are presented of the linear polarization of 366 sources observed with the Parkes 210 ft telescope at frequencies of 2650, 1660, and 1410 MHz. Parameters derived from the results, namely rotation measure, intrinsic polarization angle, and depolarization, are tabulated together with other pertinent physical properties. The source list includes 64 quasars, 119 radio or normal spiral galaxies, and 31 galactic objects; the remainder are unidentified objects or doubtful identifications.

I. Introduction

During the last few years, several investigations of the linear polarization of discrete radio sources have been carried out with the Parkes 210 ft reflector. They range from the initial limited 20 cm observations of Gardner and Whiteoak (1962) to an extensive survey at wavelengths between 11 and 74 cm (Gardner and Davies 1966). The need for more observations to fainter flux limits became apparent with the discovery that the galactic distribution of the Faraday rotation of polarization reflected the distribution of line-of-sight components of the galactic magnetic field (Gardner and Whiteoak 1963). In addition, a considerable number of the faint sources at decimetre wavelengths are quasars; a comparison of their polarization properties with those of radio galaxies has some bearing on the validity of the unified theory of source evolution proposed by Heeschen (1966) and Ryle and Longair (1967).

The present survey provides polarization data at 11, 18, and 20 cm for 366 sources with declinations less than +27°. In addition to data for sources hitherto unobserved for polarization, the results include the more reliable observations of previous investigations at Parkes and new observations to improve the previous data of lesser quality. Of the sources, 64 are quasars, 119 are associated with radio or normal spiral galaxies, 31 are galactic objects, and the remainder (152) have doubtful or unknown identifications.

In this paper the observations are presented together with associated source properties; interpretation of the results will be discussed elsewhere (Part II, present issue pp. 107–19; Gardner, Morris, and Whiteoak, unpublished data).

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II. Observational Details

The main characteristics of the receiving systems are listed in Table 1. At 2650 MHz, the feed system had a greater illumination taper and a more circular beam than that used by Gardner and Davies (1966), and the secondary beamwidth was consequently greater than their value (7′·5 by 7′·2). At 1660 MHz the polarized radiation was measured by switching between orthogonal polarizations (Gardner, McGee, and Robinson 1967) at a rate of 140 Hz while the feed system and receiver front end was rotated through 360°. The source intensity was given by the total power output; the relative gains of switched and total power channels were established by means of a calibration signal from an argon discharge tube that was injected in series with one probe.

Table 1

GENERAL CHARACTERISTICS OF THE RECEIVERS

Central Frequency (MHz)	I.F. Bandwidth (MHz)	System Noise Temperature (°K)	Feed System	Beamwidth (′)
2650	50	180	Flared circular horn with choke rings	8·3
1660	10*	400	Dual-mode circular horn	12·0
1410	10	150	Double-dipole unit	14·1

* Double sideband receiver with passband centres 20 MHz apart.

The general details of the techniques of polarization measurement have been given by Gardner and Davies (1966). The basic differences for the observations under discussion were as follows:

(1) Full 360° rotations of the linearly polarized feed system were made in all cases to facilitate the removal of any spurious variation with a 360° period. The receiver output was recorded on paper tape at 5° intervals of rotation and, by means of a CDC 3200 computer, a sinusoid of period 180° was fitted to the results. At 2650 and 1410 MHz rotating joints were incorporated and feed rotations were carried out in only one sense. At 1660 MHz, because of the necessity for cable connections to the rotating package, forward and reverse rotations were made at each telescope position.

(2) With the improved feed system at 2650 MHz, correction for the variation of gain with rotation was unnecessary, since the effect was less than 0·3% compared with the value of 1·3% that previously existed.

(3) At 1410 and 1660 MHz the principal source of error was due to galactic background variation. To minimize this effect, the source polarization was determined relative to adjacent positions $\pm 20'$ from the source in declination and $\pm 2^{m}$ (or $2^{m} \sec\delta$ for Dec. δ less than $-45°$) from the source in right ascension. The sequence of observations was such as to minimize the variation in zenith angle during a set of "on-source" and comparison "off-source" observations. This technique reduced the errors from galactic background polarization

considerably below those of Gardner and Davies (1966), who used off-source positions $\pm 4^{\mathrm{m}}$ from the source in right ascension. Prior to each polarization observation, the telescope was pointed at the source by determining the direction of maximum source intensity to an accuracy of a few tenths of a minute of arc. Therefore, for small diameter sources no spurious polarization could result from the source being observed off-axis.

The observations were obtained during a period of moderate and increasing solar activity, and at the lower frequencies, particularly for daytime observations, it was found necessary to correct for the Faraday rotation produced by the terrestrial ionosphere. The rotation Ω was calculated from the formula for a thin plane ionosphere located 400 km above the Earth, namely

$$\Omega = -0\cdot 33\, B_{\mathrm{L}} \lambda^2 t \sec z\, (f_0 F_2)^2 \qquad \text{radians}.$$

Here B_{L} is the line-of-sight magnetic field (in gauss) in the direction of the source, λ is wavelength in metres, z is the zenith angle, t is the thickness in units of 1000 km, and $f_0 F_2$ is the ionospheric critical frequency in megahertz. Values of B_{L} and the diurnal and seasonal variations of t were obtained from satellite observations.* The values of $f_0 F_2$ were taken from the Series D publication of the Australian Ionospheric Prediction Service.

The observed sources generally had flux densities exceeding 1·5 f.u. at 2650 MHz or 2·5 f.u. at 1410 MHz. For declinations south of +20°, they were mostly selected from the Parkes catalogue (Bolton, Gardner, and Mackey 1964; Price and Milne 1965; Day *et al.* 1966; Shimmins *et al.* 1966). Additional sources were chosen from other catalogues of regions not observed at Parkes, e.g. near the galactic equator, and from some hitherto unpublished Parkes data.

III. Results

The observations are listed in Table 2. Column 1 contains the catalogue numbers as they appear in the Parkes Catalogue of Radio Sources (1969). Apart from individual components of a single source which are grouped together, the listing is in order of increasing right ascension. The new galactic coordinates of the sources are given in columns 2 and 3. The remaining ten columns show for each of the three frequencies of observation: the percentage polarization (P); the direction of polarization ($P.A.$), i.e. the position angle of the electric vector measured east of north; and the peak flux density (S) that was observed during the polarization measurement. An additional column (7) is shown for the 1660 MHz data, because several sources with high Faraday rotation were also observed at nearby frequencies f to eliminate ambiguities of rotation measure. The flux densities are on the scale adopted by Kellermann (1964). The asterisks appearing with the polarization data at 1410 MHz indicate that the variation of background polarization near the sources may have resulted in an incorrect source polarization.

A comparison of polarization results for sources observed both at Parkes and by investigators at the California Institute of Technology (Morris and Berge 1964;

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TABLE 2

LINEAR POLARIZATION VALUES BETWEEN 11 AND 20 CM

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PKS Source No.	Galactic Coordinates l^{II} (°)	b^{II} (°)	2650 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)	*f* (MHz)	~1660 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)	1410 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)
0003−00	99	−61	<1·0		2·6					<1		3·7
0008−42	330	−73	0·6±0·6	89±40	3·0					0·2±0·3	89±15	5·4
0017+15	112	−47	12·0±1·0	17± 3	1·2	1660	6·5±1·1	173± 6	2·0	7·0±1·1	152± 3	2·1
						1690	4·9±0·4	172± 7	2·0			
0019−00	107	−62	<1·0		1·9							
0021−29	13	−84	4·0±0·6	108± 5	1·6					1·6±0·8	128±10	2·6
0023−26	42	−84	<1·0		6·0	1640	0·7±0·2	96± 4	8·4	1·8±1·1	110±10	8·6
0034−01	115	−64	6·0±0·5	42± 3	2·5	1660	4·3±1·0	33± 5	3·8	4·4±0·5	15± 3	4·1
0035−02	115	−65	1·3±0·3	2± 8	3·9					0·5±0·7	4±30	6·1
0038+09	119	−53	1·2±0·5	87±10	2·8	1690	1·3±0·6	72±15	4·5	1·6±1·0	118± 9	4·7
0039−44	308	−73	4·3±1·5	70±10	2·0	1660	2·8±0·7	44± 9	3·1	0·9±0·5	28± 6	3·8
0042−35	312	−82	1·2±0·4	87± 9	1·4					1·5±1·0	85±15	2·3
0043−42	307	−75	10·1±0·7	139± 3	4·9	1640	8·4±0·7	140± 3	8·0	10·4±0·6	140± 3	8·1
						1660	11·8±1·2	138± 3	7·3			
0045−25	97	−88	<0·7		3·5					<0·7		6·0
0049−43	302	−74	4·5±1·5	164± 7	1·6	1640	3·8±0·8	157± 3	2·7	3·5±0·8	151± 8	2·7
						1660	4·5±2·0	153±10				
0051−03	125	−66	1·4±1·4	105±30	1·1				2·1			
0053−01	126	−64	2·8±2·0	22±20	0·9					1·7± 3	176±40	2·2
0055−01	126	−64	10·8±0·7	159± 2	3·7	1640	11·7±0·3	160± 2	4·2	9·4±0·3	163± 2	5·4
						1680	11·4±0·5	160± 2	4·2			
0056−00	127	−63	4·7±1·5	81± 8	1·9	1640	4·7±0·4	83±12	2·2	4·1±0·8	78± 6	2·4
0105−16	143	−78	2·4±0·8	43±15	2·3					0·9±0·6	170±20	3·8
0106+01	132	−61	4·7±1·0	110± 8	1·1					8·0±1·5	81± 5	1·3
0106+13	129	−49	7·3±0·3	81± 2	6·7	1660	6·5±0·5	69± 3	11·8	8·2±0·3	58± 3	14·7
0114−47	291	−69	7·6±1·5	140± 6	0·7							2·1
0114−21	167	−81	<1		2·4					0·7±0·7	70±10	4·1
0117−15	154	−76	2·0±0·7	112± 7	2·9					0·5±0·9	115±50	4·7
0123−01	142	−63	<1·5		2·2					1·5±1·0	173±15	5·2
0125−14	158	−74	3·6±0·6	39± 7	1·5					1·4±0·8	55±15	2·5

0131−367	262	−77	19·0±2·0	108± 3	3·4					10·0±1·0	124± 4	6·9
0131−366	262	−77	4·2±2·0	174±20	2·2							
0133+20	136	−41	2·1±0·8	37± 8	2·1	1660	3·2±1·0	173±15	2·9	2·5±0·5	2±10	3·6
0138+13	141	−47	0·2±1·0	35±20	1·7							2·9
0148−29	226	−77	6·6±1·0	100± 5	1·5	1660	5·4±0·8	98± 4	2·3	4·7±1·5	103± 4	2·9
0157−31	231	−75	3·9±0·7	72± 7	2·2	1690	0·8±0·4	100±30	3·4	2·6±1·4	105± 6	3·6
0159−11	173	−67	2·0±0·7	40± 8	2·0	1640	1·5±1·0	60±25	2·6	2·9±1·0	40± 8	3·1
0201−44	266	−68	6·0±0·5	107± 8	1·7					1·0±0·3	145±10	2·8
0202+14	148	−44	0·4±1·0	69±30	3·1							3·7
0213−132	181	−66	7·2±0·8	91± 5	2·9	1690	5·1±0·6	110± 3	4·5	5·3±0·7	124± 4	4·8
0213−135	181	−66								13·0±4·0	110±10	0·9
0218−02	167	−57	7·2±0·6	36± 3	1·7	1660	4·7±1·0	60±10	3·0	2·0±0·5	51± 4	
						1690	3·5±0·3	41± 4				
0219+08	158	−48	5·5±1·0	19± 4	1·4	1660	4·7±2·0	5± 9	2·1	5·2±0·6	6± 4	2·5
0235−19	201	−65	7·9±0·6	174± 4	2·4	1660	3·9±0·6	3± 8	3·3	4·2±0·7	12± 3	4·4
0237−23	207	−65	3·4±0·5	143± 4	4·9	1660	1·7±0·4	167± 4	6·7	1·8±0·4	172± 5	6·7
0240−00	172	−52	0·3±0·3	105±20	3·3					0·3±0·5	6±30	5·1
0241−51	269	−58	7·0±2·0	86±18	1·0	1660	4·1±2·0	87±12	2·2	2·4±0·4	103± 6	2·7
0252−71	290	−43	0·2±0·4	105±35	3·2					1·0±0·7	148±15	5·9
0255+05	170	−45	2·1±0·6	29± 5	3·5					0·2±0·6	50±30	6·0
0300+16	163	−36	14·1±1·0	97± 3	1·9	1660	13·5±1·5	82± 4	2·6	12·7±0·5	61± 2	3·1
0305+03	175	−45	3·0±0·5	98± 6	5·0	1680	1·9±0·4	110± 7	7·3	2·6±1·0	124±10	7·8
0307+16	164	−34	7·8±0·4	12± 3	2·6	1660	6·1±0·9	00± 4	4·4	6·9±0·5	159± 3	4·9
						1690	5·9±0·8	177± 5				
0316+16	167	−34	1·8±0·6	52± 9	4·7					0·3±0·3	1±10	8·3
0319−45	254	−55	6·5±1·3	73± 8	1·6	1660	3·4±0·8	76± 8	2·7	4·4±0·4	75± 3	3·0
0319−37	240	−57	14·6±1·1	64± 2	10·6					12·3±0·5	61± 3	
0322−37	240	−56	7·2±0·7	110± 3	6·3					10·2±1·0	101± 3	
0320+05	177	−41	1·8±1·5	91±20	1·6					0·9±0·5	174± 9	3·1
0325+02	181	−42	5·2±0·6	101± 5	2·9	1660	5·1±1·0	128± 5	4·2	4·1±0·5	140± 3	4·7
0331−01	186	−43	1·5±0·7	67±20	1·4					0·2±0·8	50±50	2·8
0336−01	188	−42	2·0±1·0	154± 6	2·4	1660	3·7±1·3	3± 7	1·9	2·0±1·0	16±15	1·7
0340+04	182	−38	6·7±1·4	148± 7	1·7	1660	2·3±0·8	151± 5	2·5	2·7±0·4	162± 5	2·8
0344−34	235	−52	4·0±0·8	157± 5	1·8	1660	4·9±0·4	3± 7	2·6	5·4±0·4	16± 3	3·1
0347+05	182	−36	3·1±0·6	89± 9	2·0	1660	3·0±1·5	115±12	2·8	2·9±0·4	137± 8	3·1
0349−14	205	−45	1·5±0·5	132±10	1·4					1·2±1·2	66±20	2·8
0349−27	225	−50	0·5±0·5	44±30	2·9					2·5±0·9	177± 6	5·3
0350−07	197	−43	8·1±1·0	21± 4	1·7	1660	8·5±1·3	50± 6	2·3	8·5±0·5	62± 3	2·7

TABLE 2 (*Continued*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PKS Source No.	Galactic Coordinates l^{II} (°)	b^{II} (°)	2650 MHz P (%)	$P.A.$ (°)	S (f.u.)	~1660 MHz f (MHz)	P (%)	$P.A.$ (°)	S (f.u.)	1410 MHz P (%)	$P.A.$ (°)	S (f.u.)
0356+10	180	−31	5·9±0·6	99± 2	6·1	1640	4·9±0·3	19± 3	9·0	6·0±0·6	74± 5	11·1
						1660	4·5±0·5	9± 4				
						1690	4·9±0·1	11± 4				
0403−13	206	−43	2·4±1·0	12±10	3·0	1660	2·2±0·2	24± 5	3·9	1·8±0·6	19± 7	4·0
0404+03	188	−34	3·8±0·8	2± 6	3·3	1660	4·0±0·7	105± 6	5·0	4·3±0·6	60± 4	5·1
0405−12	205	−42	1·2±0·6	155±10	2·6					<1·5		3·2
0408−65	277	−42	0·4±0·4	60±30	6·6	1680	0·6±0·3	60± 8	13·6	<0·4		14·4
0410−75	289	−36	0·1±0·4		8·1					<0·2		13·0
0410+11	182	−28	3·1±0·6	46± 4	2·6	1660	4·9±1·2	32± 5	3·5	5·5±1·0	19± 3	3·9
0411+14	179	−26	6·6±0·8	163± 8	1·5	1660	8·0±1·0	96± 8	2·0	9·0±2·0	61±10	2·2
0420−62	273	−41	<1·0		1·7					<1·5		3·0
0427−53	262	−42	3·0±0·8	157± 7	2·9					0·7±0·7	12±20	5·6
0430+05	190	−27	5·1±1·0	167± 3	3·3	1660	4·0±1·0	173± 6	3·7	3·3±0·4	9± 4	3·8
						1690	3·4±0·3	174± 5				
0438−43	248	−42	0·7±0·3	73±10	6·5					1·0±0·5	103±10	6·2
0440−00	197	−28	0·8±1·0	88±30	3·6					0·2±0·3	17±12	3·3
0442−28	228	−39	1·0±0·3	104± 4	3·7	1660	1·5±0·4	66±10	6·0	3·1±0·8	103± 3	6·9
						1690	1·6±0·4	78±12				
0451−28	229	−37	1·5±0·9	121±11	2·2							2·5
0453−20	220	−34	2·7±0·5	117± 4	3·2					0·9±0·7	169±16	4·7
0453−30	232	−37	6·6±0·8	100± 3	1·9	1660	7·3±1·5	105± 7	2·4	4·9±1·0	91± 5	3·2
0453+22	179	−13	6·2±0·5	168± 3	2·1					2·6±1·3	112±15	3·3
0454−46	252	−39	3·5±0·8	30±10	1·8					5·6±0·8	45± 3	2·3
0456−30	232	−36	7·0±1·1	113± 8	1·5	1660	7·9±1·2	40± 8	2·2	5·1±1·8	136± 8	2·6
0459+25	178	−10	2·6±0·4	135± 4	3·6					2·3±0·6	119± 4	5·7
0506−61	270	−36	4·6±1·3	59± 5	1·3					1·8±0·8	50±10	2·0
0511+00	200	−21	3·8±0·9	120±12	1·6					2·8±0·5	13±15	2·9
0511−48	255	−36	9·6±0·4	169± 3	1·8	1660	8·3±1·4	28± 3	3·2	8·3±0·5	49± 3	3·6
0511−30	233	−33	8·5±1·5	163± 3	1·4	1660	9·8±0·8	162± 3	2·4	7·8±0·7	168± 2	2·6
0512+24	182	−8	10·0±0·6	167± 2	1·5					8·2±1·2	26± 5	2·9
0518+16	187	−11	8·5±0·2	169± 2	6·3	1660	6·6±0·4	167± 3	8·2	6·8±0·5	169± 4	9·2

0518−45	252	−35	2·9±0·3	132± 3	29	1660	3·0±0·3	19± 4	52	3·1±0·4	50± 5	66
0521−36	241	−33	4·1±0·3	76± 2	12·5	1660	2·4±0·4	81± 4	15	3·0±0·6	87± 4	16·3
0525−66	276	−33	<2									
0528+06	197	−14	5·0±1·0	105± 6	2·0	1660	4·5±1·8	14±10	2·6	3·3±0·6	83± 6	3·1
0531+22	185	−6	3·8±0·5	132± 5		1660	2·2±0·2	102± 3	750	1·6±0·1	86± 2	
0531+19	187	−7	1·2±0·8	166±15	4·2	1660	2·0±0·5	133±10	5·5	1·2±0·5	125± 9	6·0
0532−05	209	−19	0·1±0·4				<0·3			0·3±0·2		
0539−69	279	−32	0·1±0·4		24·0					0·1±0·1		37
0539−01	206	−16	0·2±0·2	30±10	57							
0547−40	246	−28	9·1±1·3	148± 5	1·5	1660	10·4±1·4	18± 3	2·3	10·0±1·0	59± 4	2·6
0602−31	238	−23	2·3±0·9	72± 7	2·1					0·6±0·8	29±15	3·0
0604−20	227	−19	1·4±1·0	83±17	2·0					0·9±1·2	31±25	3·2
0605−06	214	−13								0·6±0·4	113±15	4·5
0605−08	216	−14	1·6±0·5	76± 4	2·9					3·0±1·5	20±12	2·3
0607−15	223	−16	3·3±1·0	16±10	2·2					2·5±1·0	140±13	2·1
0610+26	186	+4	1·5±0·7	9± 6	3·1					1·5±1·3	132±15	4·7
0614−34	242	−22	1·1±0·6	100±12	2·0					2·1±1·7	85±10	2·7
0618−37	245	−22	8·7±0·7	67± 3	1·8					11·0±1·5	71± 3	2·7
0620−52	261	−26	2·7±0·6	97± 8	2·4					1·3±0·8	30±12	3·5
0624−05	215	−8	10·1±0·2	173± 2	11·3	1660	8·8±0·3	124± 3	16·8	6·0±0·2	23± 2	18·5
0625−53	262	−25	2·7±0·5	134± 4	3·6					0·4±0·9	55±35	6·6
0625−35	243	−20	3·6±0·6	14± 7	2·9					0·5±0·3	8±15	4·4
0625−54	262	−55	<1·0		1·8					2·6±0·6*	170± 4*	3·2
0634−205	230	−12	7·0±1·2	116± 7	2·4 }	1660	5·3±1·3	181± 6	4·7	7·7±1·0	21±10	6·0
0634−206	230	−12	17·2±1·5	141± 2	2·9 }							
0637−75	286	−27	2·6±0·5	13± 4	5·0	1660	4·3±0·4	37± 5	4·7	3·6±0·3	59± 3	5·8
0646−39	249	−17	5·7±1·3	83± 8	1·5	1660	4·6±0·4	121± 9	2·4	4·5±0·5	177± 4	2·6
0656−24	235	−9	14·0±0·8	175± 3	1·4					4·9±0·6	47± 6	3·0
0659+25	191	+13	7·6±2·0	110± 3	1·7	1660	6·8±2·0	130± 8	2·2	7·0±1·3	145± 3	2·7
0702−10	224	−2								<1·5		2·2
0704−23	235	−7	1·7±0·9	137±10	2·5					<1·1		3·3
0707−18	231	−5	0·5±1·0	138±30	2·3					<1·5		
0710+11	205	+10	3·5±0·7	12± 5	1·3	1660	3·0±1·5	15±20	2·1	3·0±1·0	50±20	2·5
0715−25	238	−6	3·1±0·5	111± 4	2·7	1640	2·5±0·2	129± 3	3·8	2·7±1·0	46± 3	4·2
						1660	2·3±1·0	125±10				
						1690	3·4±0·4	101± 6				
0716−13	228	0								1·5±1·0	23±20	2·6

* Doubtful due to variation of background polarization.

TABLE 2 (*Continued*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PKS Source No.	Galactic Coordinates l^{II} (°)	b^{II} (°)	2650 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)	*f* (MHz)	~1660 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)	1410 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)
0719−55	267	−18								0·7±0·6	140±25	2·1
0727−11	227	+3	1·7±1·7	101±30	1·9							
0735+17	202	+18	2·9±0·5	7± 7	2·0	1660	4·0±1·0	35±10	1·9	3·2±0·6	31± 5	2·0
0736+01	217	+11	5·5±0·9	75± 8	1·9	1660	4·9±1·5	131± 8	2·2	5·2±0·5	125± 3	2·2
						1690	4·0±0·6	123±20				
0741−06	225	−6	0·4±1·0	156±30	4·7					<0·5		7·8
0744−67	279	−20	1·7±0·6	97±15	2·8	1660	2·8±0·8	86±12	3·6	5·5±1·0	57± 3	3·9
0750−26	243	0	0·7±0·3	27±15	7·4					0·6±0·4	96± 5	11·3
0758+14	208	+22	3·1±1·1	43±20	1·4					1·0±1·0	35±30	2·6
0802+24	197	+27	4·6±0·5	89± 5	3·3	1660	2·9±0·5	114±10	4·3	2·2±0·8	133±10	4·9
0806−10	231	+12	2·3±1·4	72±12	2·8					1·0±0·6	14± 7	4·0
0819−30	250	+4	2·8±0·8	94± 8	1·6	1660	1·6±0·9	173±10	2·7	<0·8		3·1
0822−42	261	−3	1·8±0·5	17±10						<0·4		23
0825−20	242	+10	4·2±0·5	53± 5	2·1					4·5±0·4	55± 6	3·7
0834−20	244	+12	0·8±0·6	45±20	3·2					1·2±0·6	141±14	3·3
0834−19	243	+13	1·8±1·8	95±25	2·7					1·5±0·2	0± 7	4·6
0838+13	213	+30	3·4±1·4	52± 6	1·7					1·8±0·8	93±13	2·8
0842−75	289	−20	4·6±1·3	156± 5	2·4					2·6±0·8	175± 5	3·8
0843−33	256	+6	19·0±0·8	28± 3	1·5	1640	19·2±1·7	107± 3	1·9	13·9±1·2	155± 3	2·2
						1690	17·1±2·0	103± 2				
0850+14	214	+34	<1·0		1·1					0·9±0·7	170±15	2·4
0855+14	214	+34	<0·5		1·4					<1·0		2·8
0857−47	270	−1	0·4±0·2	77±12	180							
0857−43	265	+2	0·5±0·3	80±25	24					0·2±0·1	152±15	26
0859−25	260	+13	5·5±0·7	78± 6	2·9	1640	2·3±0·3	153± 8	5·1	2·6±0·4	25± 4	5·9
						1660	1·4±0·7	166±20				
0859−14	242	+21	2·9±1·0	88±10	2·7					2·7±0·6	102± 7	3·2
0902−38	262	+5								1·9±1·2	47±10	10·0
0903−57	276	−7	5·5±1·5	16± 5	1·6					2·8±0·8	177± 7	2·3
0915−11	243	+25	<0·2		23·5	1660	<0·25		36	<0·1		43·5
0916−54	275	−4	1·8±0·5	119± 4	1·9					2·2±0·4	142± 8	3·0

0939+140	220	+44	3·4±0·6	92±15	1·8	1660	<1·3		3·7	1·5±0·5	44± 8	4·1
0941−08	244	+32	1·3±0·3	57± 7	1·8					1·4±1·4	140±30	2·7
0945+07	229	+42	5·4±0·8	152± 9	4·1					5·5±0·4	136± 3	7·1
0947+14	220	+46	7·0±0·9	106± 5	1·9	1660	5·8±1·2	121± 6	3·1	2·7±0·7	124± 6	3·5
0949+00	237	+39	5·5±0·8	67± 6	1·4	1660	<1·8		2·9	1·4±0·6	31± 7	3·2
1005+07	232	+47	0·5±0·7	43±45	4·0					<0·4		6·6
1008+06	234	+47	2·0±0·7	125± 8	1·4	1660	2·3±0·8	154±10	2·7	1·2±0·5	10±15	2·8
1015−31	269	+21	<0·7		2·4					1·1±1·8	38±22	3·5
1018−42	276	+12	4·0±0·8	89±12	2·2	1660	2·6±0·6	37± 6	3·5	3·5±0·5	25± 7	4·5
1039+02	246	+51	<1·5		1·6					1·6±0·8	25±15	2·6
1040+12	233	+56	10·3±0·7	43± 4	2·0	1660	6·7±0·8	74± 7	2·6	4·7±0·7	102± 4	3·7
1055+01	251	+53	3·8±1·0	62±10	3·1					4·6±0·6	1± 5	3·6
1059−01	256	+51	8·5±1·3	40± 6	1·5	1640	6·0±0·7	60± 3	2·5	5·6±0·5	75± 5	2·7
						1690	4·1±2·0	34±20				
1116−46	287	+13	4·1±1·5	177±10	1·7					5·4±4·0	2±25	2·0
1116+12	242	+64	2·6±1·3	103±10	1·7					1·1±1·5	91±35	2·3
1123−35	284	+24	3·1±1·5	82±15	1·4					3·1±1·2	67± 8	2·2
1127−14	275	+44	1·9±0·7	4±10	6·4					2·0±0·5	60± 3	6·4
1136−67	296	−6	10·7±0·9	63± 2	1·7					8·0±0·8	54±12	3·2
1136−13	278	+45	2·5±0·8	30±12	2·7	1660	5·6±1·5	169±20	3·5	3·5±0·4	168± 7	4·2
1138+01	267	+59	1·7±1·1	112±12	1·5							
1139−28	285	+32	8·0±1·5	59± 5	1·4	1660	4·2±1·0	169± 9	2·2	3·4±0·8	120± 4	2·4
1140+22	228	+73	2·0±0·4	102± 5	1·7					0·5±1·0	135±40	2·9
1142+19	236	+73	2·3±0·4	139± 5	3·1					0·6±0·7	3±25	5·6
1143−48	292	+13	1·7±0·9	0±30	1·7							
1147+13	255	+70	4·6±0·8	149± 8	1·5					4·0±0·4	156± 6	2·4
1148−00	273	+59	3·6±0·7	159± 8	2·7					2·1±0·6	159± 6	3·1
1151−34	290	+26	1·6±0·8	165±10	4·4					2·4±2·0	139±30	6·1
1209−52 } 1209−51 }	296	+10	15–25		30					15–25		62
1215−45	297	+16	1·6±0·7	14±12	3·3					0·9±0·8	153±12	4·6
1216−10	290	+52	6·4±0·6	116± 3	1·5	1660	(4·9)	(100)	2·2	6·6±1·0	104± 4	2·5
1216+06	282	+67	10·4±0·5	104± 3	9·8	1660	9·0±0·6	117± 4	14·9	8·4±0·5	120± 2	17·2
						1690	8·5±0·2	118± 2				
1222+13	278	+74	5·7±0·4	145± 3	4·2	1640	3·4±0·2	130± 3	6·3	2·4±0·9	136± 8	6·0
1226+02	290	+64	2·6±0·2	156± 1	40					2·1±0·3	157± 3	42
1228+12	284	+74	0·1±0·2	85±45	120	1640	0·8±0·1	124± 5	168	0·6±0·2	147± 8	220
						1660	0·9±0·1	116± 5				
1229−02	293	+60	<2		1·3					1·6±0·5	24± 8	1·9

TABLE 2 (*Continued*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PKS Source No.	Galactic Coordinates		2650 MHz			~1660 MHz				1410 MHz		
	l^{II} (°)	b^{II} (°)	*P* (%)	*P.A.* (°)	*S* (f.u.)	*f* (MHz)	*P* (%)	*P.A.* (°)	*S* (f.u.)	*P* (%)	*P.A.* (°)	*S* (f.u.)
1232+21	271	+83	9·4±1·0	160± 4	1·6					13·4±0·6	153± 2	2·8
1237−10	298	+52	5·7±0·8	35± 6	1·4					3·6±0·8	69± 7	1·8
1239−04	299	+58	1·5±0·7	77±15	2·0					0·4±0·8	152±40	3·4
1240−20	300	+42	3±3	143±25	0·9							
1241+16	293	+79	3·0±1·0	130± 6	1·5					2·3±0·6	95± 5	2·9
1245−19	302	+43	0·7±0·8	101±35	3·7					<0·6		4·9
1245−41	302	+22	0·6±0·4	99±15	2·4					1·3±1·2	117± 9	3·7
1252−12	304	+50	6·1±0·2	2± 3	4·4	1690	4·1±0·6	162± 3	6·2	5·1±0·5	163± 3	6·8
1253−05	305	+57	3·2±0·2	102± 4	12·0					3·6±0·2	148± 4	10·7
1302−49	305	+13	0·1±0·5		5·0					<0·4		6·6
1306−09	310	+53	0·8±0·6	159±25	2·9					0·7±0·8	83±30	4·3
1309−22	309	+40	<1·0		2·4					1·0±0·7	138±20	5·3
1315−46	308	+16	3·8±1·5	120±20								
1318+11	328	+73	5·4±0·6	76±12	1·3					4·6±1·0	69± 4	2·4
1322−428	310	+19	3·3±0·7	5± 4	128					7·5	175± 3	
1322−427	310	+19	16·8±0·5	95± 2								
1323−61	307	+1	6·9±0·7	150± 4	6·2	1640	4·0±0·3	11± 3	8·6	3·6±0·5	119± 5	8·3
						1660	4·3±0·7	2± 2				
						1690	3·8±0·3	170± 2				
1328+25·4	23	+81	3·4±0·4	110± 3	4·2					0·5±0·5	2±15	7·0
1330+02	326	+63	2·4±0·6	146± 8	1·8					4·2±0·4	148± 5	2·8
1332−33	332	+28	7·3±1·0	93± 3	2·7							
1333−33	332	+28	20·8±1·0	103± 2	2·8							
1334−33	332	+28	24·0±1·5	94± 2	2·0							
1334−29	315	+32	1·0±0·8	130±25	1·3					0·6±2·0	61±35	2·6
1335−06	323	+55	3·5±0·7	149± 8	2·0					1·0±0·8	125±25	3·0
1343−60	310	+2	2·3±0·3	40± 4	29·0	1660	<0·2		59	1·3±0·3	3± 5	79
1345+12	347	+70	0·6±0·3	87±20	3·7					0·3±0·6	170±40	5·3
1354−17	324	+42	4·0±1·2	3± 8	1·4					0·7±1·2	131±40	1·9
1354+19	9	+73	8·5±1·2	68± 3	1·5	1660	6·8±1·5	80± 5	2·1	8·0±0·6	81± 3	2·3

1355−41	316	+19	3·9±0·5	57± 8	2·4	1640	3·2±0·2	22± 6	4·2	4·7±1·0	5± 6	4·4
						1690	3·4±0·4	25± 9				
1414+11	358	+64	11·0±1·5	37± 5	2·3	1660	11·8±1·5	28± 5	3·2	10·2±0·3	30± 2	4·2
1416+06	352	+61	1·6±1·0	124±15	2·8					<0·7		6·3
1420−27	327	+31	2·3±0·6	60±15	1·4	1660	3·8±1·5	14±12	2·0	3·1±0·8	10± 8	2·2
1420+19	18	+68	2·0±1·0	85±30	2·0					2±1	81±20	3·6
1424−41	321	+17	2·0±0·6	111±10	2·6	1660	2·5±1·0	61± 9	3·0	4·1±5·5	105± 5	2·8
1425−01	346	+53	1·9±1·0	11±15	1·6					<1·0		3·0
1434+03	354	+55	1·7±0·7	173±15	1·9					0·9±0·4	125±30	3·0
1437−62	315	−2	4·8±1·2	21± 5	3·4	1660	2·4±0·7	105±10	4·9	2·9±0·5	155± 4	7·1
1441−62	316	−2								1·7±0·5	126± 5	5·2
1451−36	329	+20	6·8±2·0	70±10	1·3	1660	8·7±1·7	65± 8	2·1	6·4±0·7	70± 8	2·6
1453−10	345	+41	1·2±0·7	56±14	2·4					1·3±1·4	175±15	3·9
1459−41	327	+15	14·5±2·5	152± 5						7·0±1·5	142± 5	4·2
1502+26	39	+60	2·7±0·3	38± 6	2·9					<0·4		7·2
1504−167	344	+35	1·0±0·8	96±12	2·3							
1508−05	354	+43	2·8±0·3	59± 3	2·9	1640	1·7±0·7	42± 6	3·6	2·7±0·5	8± 5	3·9
1508+08	9	+52	2·2±0·5	16± 6	1·9					2·1±1·0	37±11	3·7
1510−08	351	+40	5·6±1·5	53± 3	2·8					3·5±1	35± 6	3·3
1511+26	39	+58	5·8±0·8	116± 5	2·2	1660	5·5±1·0	103± 5	3·7	4·2±0·3	116± 3	4·4
						1690	4·4±1·0	114± 5				
1514+00	2	+46	6·1±0·8	154± 6	1·7	1660	6·3±2·0	138± 7	2·5	8·0±1·5	133± 5	2·5
1514+07	9	+50	0·6±0·6	130±20	2·3					1·4±0·8	69±15	5·8
1514−24	341	+28	4·4±1·0	37± 4	2·0	1660	4·9±0·3	9± 3	1·9	5·7±1·0	2± 6	2·1
1518+047	7	+48	<0·7		2·3					<1·0		4·5
1524−13	350	+34	1·8±1·8	140±25	1·7							
1526−42	332	+11	1·8±0·7	82± 4	2·6					1·5±0·8	120±15	4·9
1529+24	37	+54	7·2±0·7	4± 3	2·0					7·7±0·7	27± 6	3·5
1545+21	32	+49	4·4±0·8	141± 4	1·5					3·8±1·8	178±12	2·4
1547+21	35	+49	5·7±0·8	0± 3	1·4							
1547−79	311	−20	10·5±0·5	147± 2	2·7	1660	7·1±0·5	16± 3	3·7	7·1±0·9	43± 3	4·0
1548−56	326	−2	0·8±0·5	38±25	18·0					0·3±0·3	87±25	54
1549−79	311	−19	1·1±0·4	155± 7	5·0					0·5±0·5	109±25	5·8
1550+20	33	+48	7·6±1·5	30±10	1·0					7·4±0·5	74± 5	2·3
1553+20	33	+47	4·0±1·0	23±10	1·3					1·2±0·8	129±10	2·4
1559+02	12	+38	5·1±0·5	163± 3	4·7					4·7±0·5	5± 3	8·5
1602+01	12	+37	<1·3		2·1					1·0±1·0	167±30	4·2
1602−63	323	−8	9·2±0·5	146± 2	1·9	1640	3·7±0·5	34± 6	4·5	1·4±0·3	6± 5	5·2

TABLE 2 (*Continued*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PKS Source No.	Galactic Coordinates l^{II} (°)	b^{II} (°)	2650 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)	~1660 MHz *f* (MHz)	*P* (%)	*P.A.* (°)	*S* (f.u.)	1410 MHz *P* (%)	*P.A.* (°)	*S* (f.u.)
1602−09	2	+30	9·7±1·0	19± 2	1·8	1640	8·5±2·0	9± 3	3·0	9·4±1·5	8± 2	3·2
						1660	7·1±2·0	33±12				
						1690	6·7±1·4	14± 2				
1603+00	11	+36	5·1±1·0	94± 8	1·5					4·2±0·6	129± 6	2·1
1607+26	43	+46	<1·0		3·0					<1·0	174±18	4·5
1610−608	325	−7	2·8±0·5	93± 7	16·8					0·5±0·3	47±10	43
1610−605	325	−7	2·8±1·4	82± 8	2·3							
1610−77	313	−19	3·5±1·0	164± 7	3·8					2·9±0·4	170± 9	4·6
1614+21	37	+43	2·9±0·6	94± 5	0·9					3·8±1·0	111± 8	1·8
1618−49	334	0	0·6±0·5	27±30						0·3±0·3	118±20	83
1619−49	334	0	<1·6		2·5					1·2±1·0	59±0·5	6·0
1621−11	3	+25	2·1±0·8	138±10	1·4					3·4±0·4*	147± 4*	2·3
1622+23	40	+42	4·5±0·6	156± 3	1·4					2·2±1·0	34±14	2·5
1630−47	337	0	1·0±0·5	61±12	32					0·6±0·2	83± 5	87
1636−46	338	0								0·2±0·1	23±10	53
1637−77	314	−20	1·3±0·8	160±15	3·8					1·9±0·5	73± 6	5·8
1641+17	35	+36	3·0±0·8	137± 6	2·2					0·8±0·6	69±20	3·8
1644−10	7	+21	4·4±0·6	64± 4	1·5					3·3±1·0	157± 6	2·2
1648+05	23	+29	5·3±0·2	37± 2	23	1640	1·5±0·1	49± 3	38	1·0±0·1	45± 3	47
1717−00	23	+21	6·6±0·2	114± 2	34	1660	2·7±0·2	162± 3	51	2·9±0·3	167± 2	54
1722−02	20	+18	4·4±0·8	121± 5	1·4					2·6±0·8	52±15	2·4
1727−21	5	+7	0·4±0·4	65±30	10·1							
1730−13	12	+11	3·9±1·2	25± 8	4·3	1660	3·6±0·3	149± 4	5·0	3·2±0·2	109± 3	5·2
1732−09	16	+12	7·7±2·5	28±12	1·4	1660	8·3±0·5	91± 2	2·0	10·9±2·0	136± 5	2·1
1733−56	335	−13	0·5±0·5	30±30	4·4					1·9±0·5	169± 5	7·4
1737−30	358	0	0·5±0·2	70±12	18·5					0·8±0·5	61± 5	35
1737−60	332	−16	5·6±1·4	72±10	2·0	1660	6·0±1·5	59± 2	2·5	5·9±0·4	61± 5	2·9
1754−59	334	−17	1·5±0·8	65±20	1·4					2·6±0·8	71± 7	3·4
1814−51	342	−16	<1·0		1·6					0·7±1·0	170±40	3·5
1813−24	8	−4	14·5±4·0	127± 6	1·3					3·0±0·7	119± 8	3·6
1814−24	8	−4	7·5±2·0	75±10	1·2							

1814−63	331	−21	<1·0		7·4					2·6±2·1	134± 5	12·5
1817−16	15	−1	0·4±0·4	170±30	350							
1817−64	320	−20	11·3±1·4	22± 3	1·5	1660	7·6±0·5	104± 2	2·3	6·6±0·5	160± 5	2·6
1819−67	327	−22	8·6±1·3	50± 5	1·8	1660	9·1±1·0	53± 2	2·2	7·8±0·5	62± 6	2·1
1821−12	19	0	0·7±0·6	159±20	6·1					0·3±0·2	128±20	15·1
1827−36	358	−12	0·5±0·5	88±25	2·9					1·5±0·9	25± 8	7·4
1830−21	12	−6	0·5±0·2	136±20	9·3					1·0±0·5	137±10	
1836+17	47	+11	1·2±0·6	103±15	4·2	1660	1·8±0·8	21± 7	5·8	3·4±0·4	58± 4	7·1
1839−48	347	−19	1·6±0·8	174±15	2·0							
1840−40	356	−16	4·8±1·2	66± 8	1·4					1·0±0·7	29±10	2·8
1846−00	34	+1	0·4±0·4	144±25	11·6					0·2±0·4	14±50	17·8
1850+01	34	0	0·2±0·3	1± 3	13·2							
1859−23	13	−12	0·8±1·5	120±30	1·8							
1901+05	38	0	1·6±0·3	21± 3	9·1					0·7±0·4	170±15	15·3
1905+07	41	−1	0·8±0·4	115±30	10·9	1660	0·7±0·2	45± 8	16·5			
1922−62	334	−28	8·4±0·8	168± 6	1·2	1660	7·0±1·2	32± 8	1·7	8·2±1·4	66± 3	1·9
1932−46	352	−27	1·1±0·6	11±25	6·5					0·6±0·3	77± 3	12·6
1933−58	339	−27	1·7±0·6	27±15	1·7							
1934−63	333	−29	<0·3		11·5	1660	0·4±0·3		14·9	<0·2		16·4
1938−15	24	−18	6·2±0·8	176± 3	4·0	1640	3·7±0·6	86± 3	6·2	4·1±0·5	34± 3	7·0
						1660	3·4±0·6	88± 4				
						1690	2·1±1·0	94± 8				
1949+02	42	−12	5·4±0·7	15± 6	3·5	1660	2·1±0·5	145± 7	5·5	4·0±0·8	124± 5	5·8
1953−42	357	−30	<1·0		1·9					2·6±1·0*	124± 6*	3·2
1954−55	343	−31	7·7±0·4	127± 2	4·3	1660	1·4±0·6	110±15	5·7	1·0±0·8	92±12	7·0
1955−35	5	−28	7·2±0·6	3± 5	1·1					7·0±1·0	39± 7	1·8
2012+23	63	−6	<0·5		6·4					0·6±0·7	131±40	11·6
2019+09	53	−15	3·6±1·2	87±10	1·9	1640	2·6±0·7	122±10	2·9	2·1±0·3	55± 4	3·3
						1660	2·1±1·4	92±20				
						1680	2·0±0·5	141±10				
2020−57	340	−35	5·9±1·0	148± 7	1·8	1660	3·6±2·0	166±10	3·0	1·9±0·5*	178± 4*	3·5
2030−23	22	−32	6·8±1·5	139± 6	1·5	1640	8·2±0·8	103± 2	2·4	6·7±0·6	85± 4	2·5
						1660	2·9±1·0	106± 6				
						1690	3·2±0·7	124± 3				
2032−35	8	−36	7·0±1·0	90± 4	3·4	1660	5·2±0·4	97± 4	5·2	8·0±0·8	99± 3	5·7
						1690	5·0±0·2	95± 5				
2040−26	19	−35	5·3±1·0	149±10	1·3	1660	3·1±1·3	120± 8	2·0	4·3±0·7	111± 5	2·3

* Doubtful due to variation of background polarization.

TABLE 2 (*Continued*)

(1) PKS Source No.	(2) Galactic Coordinates l^{II} (°)	(3) Galactic Coordinates b^{II} (°)	(4) 2650 MHz *P* (%)	(5) 2650 MHz *P.A.* (°)	(6) 2650 MHz *S* (f.u.)	(7) ~1660 MHz *f* (MHz)	(8) ~1660 MHz *P* (%)	(9) ~1660 MHz *P.A.* (°)	(10) ~1660 MHz *S* (f.u.)	(11) 1410 MHz *P* (%)	(12) 1410 MHz *P.A.* (°)	(13) 1410 MHz *S* (f.u.)
2041−60	337	−37	2·5±0·5	38±15	1·0							
2044−02	45	−27	0·8±0·4	152±10	1·5	1660	(1·0)	(170)	2·1	1·4±0·7	100±20	2·3
2045+06	54	−22	2·9±0·8	44± 9	1·3					3·8±1·0*	106±10*	2·4
2052−47	352	−40	3·6±0·8	22± 5	3·0	1660	3·7±0·7	71±10	3·0	4·4±0·8*	86± 7*	3·0
2053−20	27	−36	1·0±0·6	125±15	1·6					1·3±0·5	117±10	2·6
2058−28	18	−40	1·7±0·7	67± 8	3·1	1640	1·2±0·2	101±11	6·0			
2104−25	21	−40	2·0±0·3	29± 6	6·2	1660	1·6±0·6	173±10	9·5	1·4±0·3	12± 4	11·2
2111−25	22	−42	1·4±0·5	85± 5	1·3					3·1±1·6	147±20	2·1
2113−21	28	−41	11·0±1·5	64± 3	1·4	1660	10·4±1·4	35± 3	2·5	9·0±1·5	21± 7	2·7
2115−30	16	−43	4·8±0·5	102± 4	1·4	1660	4·0±1·4	146± 5	2·4	4·1±0·4	154± 4	2·5
2121+24	74	−18	6·0±0·4	111± 3	6·9	1640	4·4±0·4	22± 3	10·9	5·2±0·3	146± 5	12·0
						1660	4·7±0·4	28± 4				
2126+07	61	−30	1·5±1·5	130±30	0·9							
2127+04	59	−32	0·7±0·6	106±14	2·9							
2128−12	41	−41	2·3±0·5	145± 6	1·9							
2135−14	38	−43	6·5±1·0	22± 5	2·1	1660	7·7±0·5	41± 3	3·3	7·5±0·7	59± 3	3·6
2140−43	357	−49	5·4±1·0	99± 5	1·7	1690	3·8±1·2	89± 8	2·8	4·3±0·5	101± 3	3·2
2141−81	310	−33	9·2±1·5	91± 4	1·7	1660	10·4±1·4	33± 3	2·6	7·8±0·4	125± 3	2·9
2144+15	71	−28	3·6±1·0	49± 7	1·6	1660	3·7±1·2	22± 8	2·4	7·0±1·0	14± 4	2·9
2145+06	64	−34	0·4±0·6	15±30	3·3							
2147+14	71	−29	2·2±1·3	125±25	1·4	1660	2·3±1·8	111±12	2·0	0·5±0·7	20±30	2·3
2148+14	71	−29	2·5±0·4	122±10	1·3					4·5±2·0	90± 6	2·0
2149−28	20	−50	5·5±0·8	103± 5	2·0	1660	5·0±1·1	55±12	2·5	4·4±0·8	30± 6	2·8
2150−52	344	−49	<1·0	64± 7	2·1					0·9±0·9	112± 7	3·5
2152−69	321	−41	4·3±0·3	56± 3	17·9	1660	3·2±0·4	93± 5	28	2·5±0·2	118± 3	30
2154−18	36	−49	5·9±1·0	66±10	1·1	1640	3·1±0·9	100± 6	3·2	6·8±1·0	94± 5	2·2
						1690	3·1±0·4	87± 6				
2203−18	37	−51	0·5±0·4	104±30	5·2					0·8±0·6	75± 8	6·6
2204−54	338	−49	0·6±0·6	91±30	2·2							
2209+08	69	−38	5·8±1·5	92± 9	1·6	1660	5·5±1·5	66±10	1·9	5·1±2·0	40± 6	2·0
2210+01	64	−42	0·6±0·6	120±40	1·7	1660	2·6±2·0	19±15	2·8	1·1±0·7	130±15	2·9

2211−17	40	−52	1·1±0·5	3± 8	4·6					1·3±0·5	178± 8	8·6
2212+13	75	−34	5·5±0·7	134± 7	1·4	1640	3·0±0·9	87± 9	2·8	4·1±0·6	63± 6	3·6
						1660	6·8±2·0	102± 8				
2216−28	23	−56								1·5±1·0*	112±20*	2·1
2221−02	62	−47	6·5±1·0	120± 5	2·3	1660	6·0±1·2	117± 8	4·3	4·5±0·4	132± 3	5·1
2223−05	59	−49	6·5±0·7	160± 4	4·7	1660	5·4±0·5	146± 6	5·5	5·1±0·6	112± 3	6·2
2223−52	340	−53	2·0±1·0	100±25	1·3					1·0±0·8	174±12	2·5
2226−41	359	−58	1·8±0·7	97±11	1·8	1660	1·1±0·8	98±30	2·7	1·1±0·7	67±20	3·1
2230+11	77	−39	5·3±0·6	16± 2	5·4	1640	4·3±0·6	142± 6	6·4	5·2±0·4	110± 2	6·9
						1660	5·5±0·5	135± 3				
2247+11	81	−41	6·3±0·7	35± 4	1·4	1660	4·3±1·0	10±12	2·1	4·6±0·4	2± 5	2·4
2247+14	84	−39	2·2±1·0	115±20	1·5					5·4±1·4*	177± 8*	2·3
2249+18	88	−36	6·2±1·5	50± 7	1·2	1640	6·0±2·0	108±15	1·9	2·0±0·6	62±10	2·2
						1660	8·2±1·5	110±15				
						1690	4·9±0·6	126±11				
2250−41	356	−62	4·1±0·7	74± 5	2·5	1690	2·9±0·6	96±20	4·7	1·6±0·5	104± 4	4·5
2251+15	86	−38	5·6±0·2	160± 2	10·2	1660	6·8±0·2	100± 3	11·2	7·1±0·2	62± 3	12·2
2252+12	84	−41	3·0±1·0	143±15	1·5	1660	0·8±0·7	130±30	2·3	1·6±0·8	167±12	2·8
2252−53	335	−56	4·6±0·6	50± 8	1·8	1660	3·2±1·7	48±11	2·4	1·4±0·7	33±10	3·2
2253−52	335	−56	5·8±1·0	131±10	1·3	1660	1·6±1·6	28±30	2·2	1·2±1·0	17±30	2·5
2259−37	3	−65	1·1±1·0	4±30	1·5					<1·0		2·7
2309+09	86	−46	2·1±0·7	27± 8	1·3	1660	<1·5		2·3	1·6±0·9	34±15	2·5
2310+05	83	−50	5·0±2·0	39±10	1·5	1690	2·2±0·6	35±14	2·8	3·2±0·7	39± 6	2·9
2313+03	83	−51	4·0±0·6	165± 4	2·6	1690	2·2±0·8	168± 4	4·3	2·9±0·8	179± 5	4·3
2317−27	28	−69	11·7±1·0	100± 5	1·8	1660	11·3±0·6	110± 3	2·7	12·6±0·6	115± 3	2·9
2323−40	352	−68	13·7±1·0	160± 3	1·8	1640	3·3±0·5	36± 7	3·0	2·6±0·4	22± 4	3·4
						1660	4·1±1·2	24±10				
						1690	3·0±1·4	34± 8				
2324−02	80	−58	3·8+1·2	173±12	1·5					5·2±1·5	149± 4	2·3
2331−41	346	−69	1·3±0·6	10±25	3·0					0·7±0·7	40±25	5·2
2335+26	103	−33	3·7±0·5	84± 4	3·4					<0·3		7·3
2338−58	320	−57	2·8±0·6	86± 6	1·6	1660	2·0±0·8	107±20	2·4	2·0±0·8	87±10	2·8
2338−16	63	−70	2·2±2·0	138±40	0·8					3·0±2·0	36±30	1·4
2354−11	81	−70	1·2±0·5	98± 7	1·8					0·9±1·2	65±40	2·2
2356−61	314	−55	4·5±0·5	24± 4	12·0	1640	5·0±0·2	55± 2	19	4·9±0·3	66± 2	22
						1660	4·8±0·3	52± 2				
						1690	5·1±0·2	53± 2				

* Doubtful due to variation of background polarization.

Maltby and Seielstad 1966) and at the U.S. Naval Research Laboratory (Bologna *et al.* 1965) is shown in Figure 1. The results of the comparison are listed in Table 3. At 1410 MHz, the median values of the position angle differences may result from the absence of corrections for ionospheric rotation in the CIT and NRL data. At 2650 MHz, however, the value must be due to some other systematic effect. The asymmetry in the distribution of $\Delta P.A.$ for the (NRL–Parkes) comparison may be due to a residual instrumental polarization, presumably in the NRL transit observations with the 300 ft telescope, since the presence of this effect in the 210 ft observations would mainly be reflected in an increased scatter in the comparison plot.

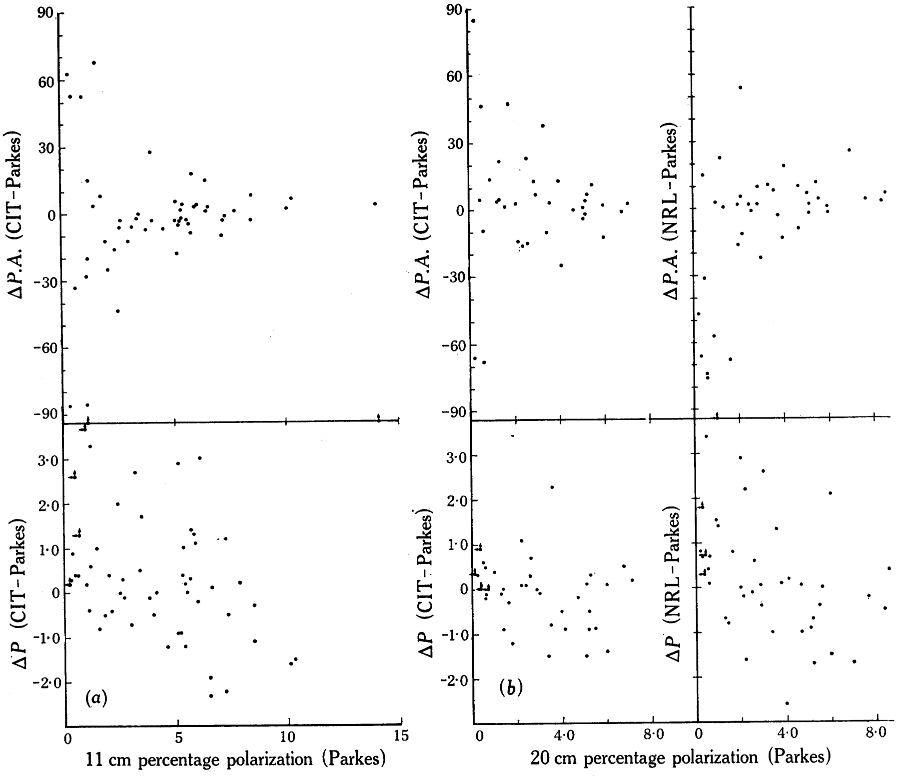

Fig. 1.—Comparisons between California Institute of Technology (CIT) and U.S. Naval Research Laboratory (NRL) observations with Parkes observations of (*a*) 11 cm and (*b*) 20 cm polarizations.

Quantities derived from the observations together with other pertinent source properties are listed in Table 4. Columns (2)–(5) concern the polarization observations. The polarization ratio D (column 2) is $P(1410)/P(2650)$; the values in parentheses are considered somewhat doubtful and are not used in analyses of the results. For column 3, the rotation measure R_M (Gardner and Whiteoak 1963) is the rate of change of position angle of polarization with (wavelength)^2 between 11 and 20 cm. For isolated cases, the 5000 MHz observations of Morris and Whiteoak (1968) were used to remove ambiguities. In column 4, the intrinsic direction of polarization θ_0 is given by extrapolation of the Faraday rotation curve to zero wavelength. The numbers 1, 1—, and 2 in column 5 indicate the reliability of the corresponding values of R_M and θ_0; high reliability is designated "1". An asterisk shows that only two frequencies were used for the Faraday rotation curve and that the listed value of R_M was numerically the smallest possible. For sources more than 30° from the galactic plane the results are probably unambiguous.

Columns 6 and 7 contain spectral data. The spectral index α is defined by the relation flux density $\propto$ (frequency)$^{-\alpha}$. For the calculation of $\alpha(408, 1410)$, the spectral index between 408 and 1410 MHz, flux densities at 408 MHz were generally obtained from the Parkes catalogue. The spectral curvature C (column 7) is defined as $\alpha(1410, 2650) - \alpha(408, 1410)$. It is positive for a spectrum that steepens with frequency (on a log{flux density}–log{frequency} basis). In determining spectral indices the flux densities of sources moderately extended compared with the 2650 MHz beam have been corrected for the effect of partial resolution. For more extended objects, it was felt that integrated flux densities could not be calculated with sufficient accuracy, and no spectral indices were derived. Spurious positive curvature would result if resolution corrections were neglected.

Table 3

COMPARISON OF POLARIZATION OBSERVATIONS

Comparison	f (MHz)	$\Delta P.A.$ (°) Median	Lower Quartile	Upper Quartile	ΔP (%) Median	Lower Quartile	Upper Quartile
CIT–Parkes	2650	−2	−8	4	0·2	−0·5	1·1
CIT–Parkes	1410	2	−7	12	0·0	−0·5	0·3
NRL–Parkes	1410	2	−13	7	0·1	−0·7	0·4

Columns 8–14 refer to source characteristics that may be related to polarization. Columns 8 and 9 show source dimensions in minutes of arc and the corresponding reference number to the source of information given in the footnote to the table. Values derived from studies of interplanetary scintillation (such as for PKS 0003−00) are usually shown at the fraction of the total intensity I that is contained within a specified angular size. The letters "H" and "C" are associated with halo and core dimensions respectively; values in parentheses refer to the position angles at which the listed dimensions were determined. A considerable proportion of the sources appear to be double in nature. They are described as follows: angular dimension(s) of one component, angular dimension(s) of the other, component separation (sep), direction of major axis (p.a.). Various forms of this nomenclature arise depending on whether the components are considered to be elongated, of the same size, or of undetermined size. Alternatively, the source may have been observed only at a single position angle so that the direction of the major axis is unknown. For sources comprising three or more major components only the maximum separation (max. sep.) is generally quoted. The appropriate references are listed in the footnote to the table; many of them comprise compilations of data and are not necessarily the original investigations.

TABLE 4

POLARIZATION AND OTHER CHARACTERISTICS OF OBSERVED SOURCES

(1) PKS Source No.	(2) D	(3) R_M	(4) θ_0	(5) Class	(6) α(408, 1410)	(7) C	(8) Dimensions (′)	(9) Ref.† (Dim.)	(10) Ident.	(11) Ref.† (Ident.)	(12) z	(13) Ref.† (z)	(14) Scint.
0003−00					0·67	−0·15	0·6*I* in 0·002	14	19·4 QSO	10	1·037	10	sc.
0008−42					0·12	0·81	<0·4 (5), <0·3 (90)	15, 17	III				n
0017+15	0·58	−25	39	1	0·87	0·06	sep. 0·13	22	18·2 QSO	10	2·012	10	(n)
0019−00					0·18	0·64			III				sc.
0021−29	0·40	+22	92	2*	0·91	−0·06	<0·3 (90)	17	19 QSO	29			n
0023−26					0·59	−0·02	<0·3	15, 17	III				sc.
0034−01	0·73	−13	51	1	0·72	0·07	0·15 H, <0·03 C (68)	2	16 E1	11	0·0733	11	n
0035−02	0·38	+1	1	2*	0·76	−0·06	0·20 H, <0·03 C (68)	2	19 E	5	0·2201	28	n
0038+09	1·30	+16	74	1−	0·70	0·13	0·17 H, <0·03 C (67)	2	18·5 g				n
0039−44	0·21	−22	86	1	0·94	0·08	<0·3 (90)	17	III				n
0042−35	(1·25)	−1	88	1*	0·76	0·03	<0·3 (90)	17	III				n
0043−42	1·03	+1	139	1	0·77	0·03	1·0×0·5, sep. 1·8, p.a. 136	15	18 E	3			n
0045−25					0·74	0·11	7·0 H, 0·7 C, p.a. 70	15, 18	7·0 Sc.	3	0·0011	25	n
0049−43	0·78	−8	170	1	0·81	0·03	0·4 (90)	17	III				n
0051−03					0·94	0·06	<0·3 (90)	17	19 E	5	0·2106	28	
0053−01					1·24	0·18	1·3, sep. 6·0 (90)	17	III				
0055−01	0·87	+2	157	1	0·65	−0·05	1·1 (90)	17	14·1 E0	27	0·0450	27	
0056−00	0·87	−1	83	1	0·39	−0·02			18 QSO	5	0·72		
0105−16	0·37	−21	53	2	0·90	−0·10	<0·6, sep. 0·7 (90)	17	III				n
0106+01	1·70	−16	122	1*	0·73	−0·56			18·4 QSO	10	2·107	10	
0106+13	1·12	−11	88	1	0·79		sep. 3′·8, p.a. 20	20	15·6 D	12	0·0600	28	n
0114−47					1·26		2·3, sep. 7·8, p.a. 153	15	16·5 E	15			
0114−21					0·74	0·11	<0·4	15	19 db	3			sc.
0117−15	0·25				0·80	−0·03	0·05, sep. 0·13 (67)	2	III				n
0123−01					0·93		sep. 5·7, p.a. 129	20	13 db	5	0·0177	21	n
0125−14	0·39	+8	32	2*	1·02	−0·21	<0·3 (90)	17	g				n
0131−36	0·83	+5	105	1	0·70		3·5×2·5, sep. 8·0, p.a. 92	15	14·2 SO	3	0·0297		n
0133+20	1·18	−17	38	1−	0·90	−0·05	0·18, sep. 1·03, p.a. 30	24	18·1 QSO	10	0·425	10	(n)
0138+13					0·70	0·15	<0·03 (66)	2	III				(sc.)
0148−29	0·71	0	100	1			<1·0 (90)	17	III				n
0157−31	0·66	−20	57	1−	0·75	0·04	<0·3 (90)	17	19 QSO	3			n
0159−11	1·45	+4	41	1	0·61	0·09	<0·03 (65)	2	16·4 QSO	10	0·68	10	n
0201−44	0·17	+20	93	1−*	0·58	0·22	<0·3 (90)	17	III				sc.
0202+14					0·08	0·20	<0·0008	23	III				sc.
0213−132	0·74	+18	77	1	0·73	0·19	<0·6, sep. 0·9 (90)	17	18·5 E0	5			n
0213−135							2·7 (90)	17					
0218−02	0·28	+8	29	1	1·02	0·13	<0·3 (90)	17	19·5 E	5			n
0219+08	0·95	−7	22	1	0·44	0·48	0·7, sep. 2·3 (90)	17	19·5 g	4			n

0235−19	0·53	+9	166	1	0·96	0·00	0·6 (90)	17	III				n
0237−23	0·53	+18	131	1					16·6 QSO	10	2·223	10	sc.?
0240−00					0·70	−0·01	0·2 H, <0·005 C	2, 14	9·8 Sey.	5	0·0037	21	(n)
0241−51	0·34	+8	79	1	1·19		0·5, sep. 9·0, p.a. 146	15					n
0252−71					0·70	0·27	<0·4	15					
0255+05	0·09				0·73	0·12	1·2×0·2, sep. 2·8, p.a. 47	20	14·8 db	21	0·0217	21	n
0300+16	0·90	−17	111	1	0·44	0·34	sep. 1·0, p.a. 120	32	14·8 E2	27	0·0326	11	n
0305+03	0·87	+12	88	1	0·46	0·24	0·3 H, <0·03 C (65)	2	14·7 D	12	0·0289	28	n
0307+16	0·89	−15	23	1	0·80	0·22	<0·7 (0); <0·5, sep. 0·9 (90)	17, 20	18·6 N	26	0·2561	28	n
0316+16	0·17				−0·05	0·95	<0·0008	14	III				sc.
0319−45	0·68	0	74	1	0·93	0·07	3·3 (90)	17					n
0319−37	0·84	−2·8	66	1 }			sep. 32, p.a. 103		10 SO	3	0·0058	21	n
0322−37	1·4	−3·5	112	1 }									
0320+05	(0·50)				0·58	0·48	<0·3 (90)	17	20 g	12			sc.
0325+02	0·79	+21	85	1	0·62	0·14	1·7 (0); 0·7, 1·4, sep. 2·3 (90)	17, 20	15 D	12	0·0302	28	n
0331−01	0·13				1·17	−0·07	<0·6, sep. 0·8 (90)	17	18·5 D	5			n
0336−01	1·00	+23	138	1	0·59	−1·10	<0·3 (90)	17	18·4 QSO	10			
0340+04	0·40				0·80	0	0·3 (90)	17	18·1 QSO	10			n
0344−34	1·35	+21	141	1	0·93	−0·07	1·6, sep. 3·2, p.a. 100	15	17·4 E	3			n
0347+05	0·93	+24	71	1	0·79	−0·09	0·1*I* in 0·008	14	III				sc.
0349−14	0·80				1·15	−0·06	0·5 (90)	17	16·2 QSO	10	0·614	10	n
0349−27	>2·5				0·88	0·08	1·8×1·5, sep. 4·2, p.a. 53	15	16·8 E	3			n
0350−07	1·05	+23	5	1	1·05	−0·31	<0·3 (90)	17	17·5 QSO	10	0·962	10	sc.
0356+10	1·02	+82	39	1	0·66		sep. 3·4, p.a. 25	20	15·0 E	12	0·0306	28	n
0403−13	0·75	+4	11	1	0·63	−0·18	<0·0008	23	18 QSO	10	0·571	10	sc.
0404+03	1·13	−66	48	1	0·61		5·1 H, 0·04 C	2, 20	III				(n)
0405−12					0·78	−0·45	0·5 (13); <0·3 (96)	15	(16) QSO	10	0·574	10	n
0408−65					0·92	0·33	<0·3	15	QSO				sc.
0410−75					0·85	−0·10	<0·4	15					sc.
0410+11	1·77	−12	54	1	0·82	−0·20	<1·0 (0); <0·6, sep. 0·7 (90)	17, 20	17·8 N	26	0·3056	11	n
0411+14	1·35	−54	20	1	0·54	0·07	0·9 (90)	17	IV				n
0420−62					0·89	−0·07							sc.
0427−53	0·23				0·78		3·0, 1·3×0·5, sep. 3·8, p.a. 74	15	13·2 db	15	0·0392		
0430+05	0·65	+8	163	1	0·24	−0·02	⩽0·0008	23	15·0 Sey.	11	0·0333	11	sc.
0438−43		(+17)	59	1−	0·30	−0·40	<0·4	15	III				sc.?
0440−00					−0·09	−0·05	<0·0008	23	18·5 QSO	6			
0442−28	3·1	(+86)	66	2	0·94	0·04	1·5 (0); 0·7 (90)	17, 20	18·2 E	3			
0451−28					0·75	−0·54	<0·3 (90)	17	19 QSO	3			
0453−20	0·33				0·60	0	<0·6	15, 17	14 E	3	0·0151		n
0453−30	0·74	−3	100	1	0·81	0·02	(0·8×<0·3, p.a. 168)	15	19 E				n
0453+22	0·42	−29	9	1*	0·79	−0·06	sep. 0·50, p.a. 165	31	19 g	8			n
0454−46	1·60	+8	25	1−*	0·56	−0·16	<0·3 (90)	17					n
0456−30	0·73	+3	123	1	0·71	0·16	2·0×2·0	15	17·6 E3				n
0459+25	0·88	−9	142	1*	0·69	0·14	sep. 0·19, p.a. 98	32	III–IV				
0506−61	0·39	−4	62	1−*	0·90	−0·21							n

* Only two frequencies were used for the Faraday rotation curve and the value of R_M given is the smallest possible one.

† For references see corresponding footnote at end of table.

TABLE 4 (*Continued*)

(1) PKS Source No.	(2) D	(3) R_M	(4) θ_0	(5) Class	(6) α(408, 1410)	(7) C	(8) Dimensions (′)	(9) Ref.† (Dim.)	(10) Ident.	(11) Ref.† (Ident.)	(12) z	(13) Ref.† (z)	(14) Scint.
0511+00	0·74	+47	85	1—*	0·76	0·18	1·3, <0·5, sep. 1·5 (90)	17	17·1 N	26	0·1270	7	n
0511−48	0·86	+33	146	1	1·05	0·05	1·0, 1·0, 1·0, max. sep. 2·9 (90)	17	17 E				
0511−30	0·92	+3	160	1	0·99	−0·01	3·5×1·8, sep. 6·5, p.a. 30	15	17 E	3			
0512+24	0·82	+21	151	1*	0·94	0·10			17 D	8			
0518+16	0·80	0	168	1	0·45	0·15	0·8*I* in 0·002	14	18·8 QSO	10	0·760	10	sc.
0518−45	1·07	+47	109	1	0·75		3·0×1·5, sep. 4·1, p.a. 105	15	15·7 D	15	0·0342	28	n
0521−36	0·73	+6	72	1	0·66	−0·24	0·5×<0·3, p.a. 100	15	16·8 N	3	0·061		n
0525−66							0·5		S.N. rem.				
0528+06	0·66	+84	42	1	0·90	−0·20	0·5 (90)	17	III				n
0531+22	0·42	−25	150	1	0·27	0	3·5	20	Crab Neb.				n
0531+19	(1·00)	−22	179	1—					17·7 E	12			sc.
0532−05					0	0	4·5	20	Orion Neb.				
0539−69									30 Dor. (LMC)				
0539−01					−0·23	0			HII				n
0547−40	1·10	+49	111	1	0·95	−0·08	0·5 (90)	17					n
0602−31	0·26	−23	89	2*	0·63	−0·07	<0·3 (90)	17	III				n
0604−20	(0·65)	−28	104	2*	0·83	−0·08	<0·4 (90)	17	III				n
0605−06					−0·32	−0·04			HII				n
0605−08	1·88	−30	97	1—*	0·34	−0·71			III				
0607−15	0·76	−30	38	2*	0·14	−0·23			III				
0610+26	1·00				0·80	−0·12	<0·5	20, 17	III–IV				
0614−34		−8	5	1—*	0·35	0·12	<0·4	15	19 db	3			n
0618−37	1·27	+1	66	1	0·67	−0·02	0·7×0·5, sep. 1·2, p.a. 84	15	16·6 db	3			
0620−52	0·48	−36	122	1—*	0·79	−0·19							n
0624−05	0·60	+111	93	1	0·64	0·15	<0·03 (67)	2	III				sc.
0625−53					1·00	−0·04	1·4×0·6, p.a. 0	15					
0625−35	0·14				0·66	0	1·3×0·6, p.a. 110	15	17·6 db	3			
0625−54													
0634−20	0·64	+41	102	1			4·5×<0·7, sep. 10·5, p.a. 0	15	16·8 E	3			n
0637−75	1·39	+25	174	1	0·31	−0·08	<0·3	15					n
0646−39	0·79	+48	43	1	0·80	0·07	0·5 (90)	17	III				
0656−24	0·35	+28	154	1*	1·18	0·03	0·6, sep. 1·1 (90)	17	III				n
0659+25	0·92	+19	96	1	0·88	−0·14	<1·2, sep. 1·5 (0)	20	17·2 QSO	10			(n)
0702−10									HII				
0704−23					0·64	0·80	<0·3 (90)	17	III				
0707−18									HII				
0710+11	0·86	+15	1	1	0·93	0·10	0·8 (90)	17	17·5 QSO	10	0·768	10	n
0715−25	0·87	+158	178	1	0·71	−0·01	<0·3	15, 17	III				n
0716−13									HII				
0719−55					0·83	0·06							

0727−11									III				
0735+17	1·10	+10	6	1	−0·46	0·46	0·6*I* in <0·003	14	III				(sc.)
0736+01	0·95	+27	64	1−	0·17	0·07	<0·3 (90)	17	18 QSO	10	0·191	10	sc.?
0741−06									III				sc.
0744−67	3·22	−20	116	1−	0·89	−0·37							
0750−26					0·34		9·0 (90)	17	HII				n
0758+14	0·33	−5	47	2*	0·98	0	0·3*I* in <0·003	14	17·5 QSO	10			sc.
0802+24	0·48	+23	72	1	0·74		2·9, p.a. 125	32	15·4 E0	25	0·0599	25	
0806−10	0·43	−31	94	1−*	0·99	−0·45	1·5 (0); 0·6 (90)	20, 17	18·8 E	5	(0·107)	21	n
0819−30	<0·29				0·68		2·0×0·6, sep. 4·2, p.a. 132	15	18·2 E3				n
0822−42	<0·22						>18	20	S.N. rem.				
0825−20	1·07	+1	52	1*	0·93	−0·03	<0·3 (90)	17	18 QSO	10			n
0834−20	(1·5)	+51	7	2*	−0·06	0·11	<0·0008	23	19 QSO				sc.
0834−19	(0·83)	+47	61	2*	0·78	0·06			III				n
0838+13	0·53	+22	36	1−*	0·70	0·10	0·08, sep. 0·09 (67)	2	18·2 QSO	10	0·684	10	n
0842−75	0·57	+9	171	1	0·88	−0·15	<0·6	15					
0843−33	0·71	+68	159	1	0·52	0·09	4·0×2·0 H, 0·8 C, p.a. 170	15	12·3 E3	3			n
0850+14					(1·23)	(0·01)	0·3*I* in <0·005	14	17·4 QSO	10	1·110	10}	
0855+14					0·67	0·43	0·05, sep. 0·30 (67)	2	20·5 N				sc.
0857−47							10	20	HII				
0857−43							3·2 (90)	17	HII				
0859−25	0·47	+69	27	1	0·82	0·31	<0·7 (0); 0·6 (90)	20, 17	III				sc.
0859−14	0·93	+8	82	1*	0·42	−0·14			17·8 QSO	10	1·327	10	n
0902−38									S.N. rem.				
0903−57	0·51	−11	24	1−*	0·61	−0·04	<0·4	15	III				
0915−11					0·90	0·08	4·0 H, 0·4 C (90)	17	14·8 D	5	0·053	21	n
0916−54	1·22	+12	110	1*	0·39	0·34							
0939+140	0·44	−27	111	1−*	0·87		<0·5, <0·5, sep. 6·2, p.a. 165	19	III				sc.
0941−08	(1·08)				0·72	−0·07			19 D	6			sc?.
0945+07	1·02	−7	158	1	0·95	−0·08	sep. 2·1, p.a. 90	20	16·3 N	27	0·0855	27	n
0947+14	0·39	+10	100	1	0·81	0·15	0·8 (0); <0·3 (90)	20, 17	18 QSO	12			n
0949+00	0·25	−19	81	2*	1·07	0·25	0·3*I* in <0·003	14	17·5 QSO	10			sc.
1005+07					0·67	0·13	⩽0·003	14	19·5 g	4			sc.
1008+06	0·60	+34	98	1	1·12	−0·02	0·3*I* in <0·003	14					sc.
1015−31					0·59	0·01	<0·3	15					sc.
1018−42	0·87	−33	107	1			<0·4	15					
1039+02					0·76	0·02	<0·3 (90)	17	III				n
1040+12	0·46	+31	19	1	0·52	0·46	0·3*I* in <0·0008	14	17·3 QSO	10	1·029	10	sc.
1055+01	1·21	−33	87	1	0·25	−0·01	<0·0008	23	18·3 QSO				sc.
1059−01	0·66	+18	26	1	0·89	0·03	0·3*I* in <0·005	14	III				(sc.)
1116−46	(1·3)				0·90	−0·64	<0·4 (0); 0·5 (96)	15	III				
1116+12	(0·42)	−7	108	2*	0·65	−0·18	<0·002	22	19·3 QSO	10	2·118	10	sc.
1123−35	1·00	−8	87	1−*	0·91	−0·19	1·7×1·7	15	16·0 E3	3			n
1127−14	1·05	+31	160	1−	−0·19	0·19	⩽0·0002	9	16·9 QSO	10	1·187	10	sc.
1136−67	0·75	−5	66	1*	0·59	0·41							

* Only two frequencies were used for the Faraday rotation curve and the value of R_M given is the smallest possible one.

† For references see corresponding footnote at end of table.

TABLE 4 (*Continued*)

(1) PKS Source No.	(2) *D*	(3) R_M	(4) θ_0	(5) Class	(6) α(408, 1410)	(7) *C*	(8) Dimensions (′)	(9) Ref.† (Dim.)	(10) Ident.	(11) Ref.† (Ident.)	(12) *z*	(13) Ref.† (*z*)	(14) Scint.
1136−13	1·40	−22	43	1	0·98	−0·27	0·4 (90)	17	17·8 QSO	5	0·554	10	sc.
1138+01					0·89	−0·28	<0·3 (90)	17	III				n
1139−28	0·42	−64	105	1	0·97	−0·12	<0·3 (90)	17	III				
1140+22	0·25				1·00	−0·15	0·3*I* in <0·003	14	III				sc.
1142+19	0·26				0·93	0	2·0, 0·7, sep. 2·0 (90)	17	13 E	12	0·0206	28	
1143−48					0·84	0·21	<0·3 (90)	17	III				
1147+13	0·87	+3	146	1*	0·78	−0·03	<0·5, sep. 0·6, p.a. 73	19	III				sc.
1148−00	0·58	0	159	1*	0·11	0·11	<0·0008	23	17·6 QSO	10	1·982	10	sc.
1151−34	(1·5)	−13	174	2*	0·38	0·14	<0·4	15	III				sc.
1209−52 }	(1)	−9	80	1 }	0·52	0	90		S.N. rem.				
1209−51 }	(1)	+27	110	1 }									
1215−45	(0·56)				0·63	0·04	0·4	15	III				
1216−10	1·03	−7	121	1	0·91	−0·21	2·2 H, <0·3 C (90)	17	III				n
1216+06	0·80	+10	100	1	0·65		2·7, sep. 4·7, p.a. 85	20	12·0 E	12	0·0037	21	n
1222+13	0·42	−5	146	1	0·63	−0·07	0·6 (90)	17	9·3 E	12	0·0037	21	n
1226+02	0·81	+1	155	1	0·15	−0·08	<0·0003	9	12·8 QSO	10	0·158	10	sc.
1228+12					0·71		6·5 H, <0·0008 C	20, 23	9·9 E2	12	0·0037	21	n
1229−02	(>0·8)	+19	154	1—*	0·71	−0·11			16·8 QSO	10	0·388	10	sc.
1232+21	1·43	−3	162	1*	(0·85)	(0·03)	1·0, 0·9, sep. 1·8 (90)	17	III				(n)
1237−10	0·63	+18	22	1*	−0·08	0·48			18·2 QSO	10			sc.
1239−04	0·26				0·98	−0·14	0·13 H, <0·03 C (68)	2	III				sc.
1240−20					0·41	(0·69)			III				
1241+16	0·77	−18	143	1*	0·89	0·16	0·05	2	19·0 QSO	10	0·557	10	n
1245−19					0·38	0·06	<0·0008	23	III				sc.
1245−41					0·88	−0·20	<0·5	15, 17	12·2 Sc.	3	0·0086	30	n
1252−12	0·84	−12	10	1	0·76	−0·07	1·3, 0·7, sep. 1·6 (90)	17	13 db	5	0·0143	21	n
1253−05	1·13	+24	84	1	0·19	−0·38	⩽0·0003	13	17·8 QSO	10	0·540	10	sc.
1302−49					0·61	(−0·18)	9·0×4·5 H, <0·5 C, p.a. 34	15	9·2 Sc.				
1306−09					0·66	−0·04	<0·3 (90); <0·7 (176)	17, 15	18·5 D	5			sc.
1309−22					1·11	0·15	0·01	1	20 g				sc.
1315−46													
1318+11	0·85	−3	78	1*	0·58	0·39	0·1*I* in <0·005	14	19 g				sc.
1322−428 } 1322−427 }	0·79	−60	147	1	0·6		3·8×2·0, sep. 7·1, p.a. 47	20	6·1 SO	3	0·0019	16	n
1323−61	0·52	+176	23	1									
1328+254	0·15	(−67)	(150)	2	0·55	0·26	<0·0008	23	17·7 QSO	10	1·055	10	(sc.)
1330+02	1·75	+2	145	1*	0·66	0·04	2·0 H, <0·3 C (90)	17	18·3 N	25	0·2156	25	n
1332−33 } 1333−33 } 1334−33 }		−32	122				max. sep. 28, p.a. 126		11·9 E	3	0·0123	30	n

1334−29					0·96	(0·14)	7·0 H, <1·0 C	15	8·0 Sc.	3			n
1335−06	0·28	−13	158	2*	0·89	−0·24	<0·5	15, 17	17·7 QSO	10	0·625	10	n
1343−60	0·57	+72	173	1			10		galactic?	18			
1345+12					0·34	0·23	<0·003	14	17·0 SO	12			sc.
1354−17	0·17				0·64	−0·16			III				sc.?
1354+19	0·94	+7	65	1	0·70	−0·03	⩽0·3 (90)	17	16·0 QSO	10	0·720	10	n
1355−41	1·20	−28	77	1	0·89	0·08	1·4×0·4, p.a. 133	15	III				n
1414+11	0·93	−3	37	1	0·48		2·5, 1·5, sep. 2·1 (90)	17	12·2 E4	25	0·0237	25	n
1416+06	(<0·44)				1·02	0·27	0·6*I* in <0·003	14	16·8 QSO	10	1·439	10	sc.
1420−27	1·35	−26	75	1−	1·13	−0·42	0·5 (90)	17	18 QSO				sc.
1420+19	1·00	−3	87	2*	0·83	0·10	0·5 (90)	17	18·8 E5	12			n
1424−41					0·78	−0·66	<0·3 (90)	17					sc.
1425−01	(<0·53)				1·01	−0·01	<0·3 (90)	17	16·9 N				sc.
1434+03	0·53	−25	10	2*	0·74	−0·02	<0·3 (90)	17	III				sc.
1437−62	0·61	+72	148	1 }					} S.N. rem.				
1441−62				}									
1451−36	0·94	−2	69	1	1·20	−0·10	<0·6, sep. 0·8 (90)	17	III				n
1453−10					0·78	0	<0·3 (90)	17	17·4 QSO	10	0·940	10	sc.
1459−41	0·48				1·17				S.N. rem.				n
1502+26	<0·15				1·02	0·43	2·0, sep. 2·1, (0)	20	14 db	8	0·0543	28	(n)
1504−167					0·37	−0·12			18·5 g	5			n
1508−05	0·97	−26	81	1	0·67	−0·19	<0·0008	23	III				n
1508+08	0·95	+11	7	1*	0·85	0·22	<1·0, sep. 1·9, p.a. 56	20	III				n
1510−08	0·63	−10	60	1	−0·07	0·33	<0·0008	23	16·5 QSO	10	0·361	10	sc.
1511+26	0·72	0	114	1	0·65	0·45	0·9 (90)	17	17·5 db	28	0·1086		(n)
1514+00	1·31	−12	163	1	0·38	0·23	0·7, 1·1, 0·7, max. sep. 3·0 (90)	17	19 QSO	10			
1514+07					1·15	0·32	0·05 (67)	2	16·0 E3	12	0·0351	28	n
1514−24	1·29	−20	50	1	0·17	−0·09	<0·3 (90)	17	16·2 E	3			
1518+047									18·2 g				
1524−13					0·74	−0·20			20·5 QSO?	5			
1526−42	0·83	−20	67	1−*			0·7 (90)	17					
1529+24	1·07	+12	174	1*			0·4 (90)	17	III				
1545+21	0·86	+20	125	1*			0·5 (90)	17	16 QSO	10	0·264	10	
1547+21							<0·3 (90)	17	III				(n)
1547−79	0·68	+41	118	1			<0·5	15					
1549−56									S.N. rem.				
1549−79	0·45						<0·4	15					
1550+20									18·5 g	8			
1553+20	0·30	+56	165	2*			<0·03, sep. 0·29 (64)	2	III				(n)
1559+02	0·92	+12	154	1	0·82	0·12	sep. 3·5, p.a. 90	20	17·0 D	12	0·1041	28	n
1602+01					0·88	0·22	0·07, sep. 0·13 (65)	2	III				
1602−63	0·15	−67	170	2	0·94		2·1, 1·2, sep. 7·0, p.a. 120	15	17·5 db	15			n
1602−09	0·97	−5	22	1	0·80	0·11	<0·4, 1·3, 1·7, max. sep. 3·6	17	III				n
1603+00	0·82	+19	80	1*			<0·3 (90)	17	18·0 QSO	10			
1607+26							<0·3 (90)	17	QSO?				(n)

* Only two frequencies were used for the Faraday rotation curve and the value of R_M given is the smallest possible one.
† For references see corresponding footnote at end of table.

TABLE 4 (*Continued*)

(1) PKS Source No.	(2) D	(3) R_M	(4) θ_0	(5) Class	(6) α(408, 1410)	(7) C	(8) Dimensions (′)	(9) Ref.† (Dim.)	(10) Ident.	(11) Ref.† (Ident.)	(12) z	(13) Ref.† (z)	(14) Scint.
1610−608	0·18	−72	41	2			6·0, 4·0×3·5, sep. 9·2, p.a. 76	15	12·8 E3	15			n
1610−605									III				n
1610−77	0·83	+103	80	1	0·21	0·08							
1614+21	1·31	+9	87	1*									
1618−49									HII				
1619−49									HII				
1621−11	(1·62)	+5	133	1*	0·82	−0·03	<0·3 (90)	17	III				sc.?
1622+23	0·49	+31	132	1*			0·03, sep. 0·30 (65)	2	17·5 QSO	10	0·927	10	(n)
1630−47									HII				
1636−46									HII				
1637−77	1·45	+50	123	1−*	0·71	−0·04	1·6×1·3, sep. 2·6, p.a .165	15	16 D3	15			
1641+17	0·27				0·74	0·13	<0·3 (90)	17	17·5 E3	12			sc.
1644−10	0·75	−47	9	1*	0·92	−0·31	<0·3 (90)	17	III				n
1648+05	0·19	+11	25	1	0·93	0·21	0·8, sep. 2·0, p.a. 101	20	19·0 D	12	0·157	21	n
1717−00	0·44	+36	88	1	0·74	0	1·0, 1·0, 1·0, max. sep. 3·7 (90)	17	16·8 D	5	0·0307	28	n
1722−02	0·59	−37	148	1*	0·45	0·40							n
1727−21							2·7 (90)	17	Kepler's N.				n
1730−13	0·82	−50	60	1	0·16	0·14	<0·3 (90)	17	III				sc.
1732−09	1·42	+58	167	1	0·70	−0·06			III				sc.
1733−56	3·4				0·84	−0·02	<0·5, 1·0, sep. 4·5, p.a. 37	15	III				n
1737−30							5 (90); 3 (0)	18	galactic?				
1737−60	1·05	−6	75	1	0·80	−0·22	0·7×0·4, sep. 1·3, p.a. 153	15					n
1754−59	1·73	+3	62	1−*	1·20	0·28			III				
1814−51					1·10	0·15	<0·5	15	III				
1814−24									S.N. rem.				
1814−63	>(2·6)				0·80	0·03	<0·4	15					sc.
1817−16							5·5 (90)	17	HII				
1817−64	0·58	+74	148	1									
1819−67	0·91	+5	46	1	0·60	−0·35							n
1821−12													
1827−36	(3·0)				1·00	0·50	<0·3	15, 17	IV				sc.
1830−21	(2·0)												
1836+17	2·8	+69	64	1	0·66	0·17	1·4 (90)	17	16 D	12	0·0033	21	n
1839−48					0·95	0·02	0·7 (90)	17					n
1840−40	0·21	−19	79	2*	0·76	0·34	0·7 (90)	17					sc.?
1846−00							2·5 (90)	17	IV				n
1850+01									galactic				
1859−23					0·97	0·08			IV				sc.
1901+05	0·44	−16	33	2*			4·0 (90)	17					
1905+07							3·0, 4·0, sep. 6·5 (90)	17	galactic				

1922−62	0·98	+41	136	1	0·94	−0·22	1·6×0·7, p.a. 70	15	III				n
1932−46	0·55	+35	165	1−	0·92	0·13	0·7× <0·3, p.a. 110	15					n
1933−58					0·54	0·61							sc.
1934−63					−0·33	0·89	<0·3	15	18·4 g	15			
1938−15	0·66	−75	49	1	0·69	0·20	sep. 0·04 (90)	23	III				sc.
1949+02	0·69	−39	43	1	0·72	0·08	0·6, sep. 1·3 (90)	17	16·5 SO	12			n
1953−42	(>2·6)				0·90	−0·08	<0·3 (90)	17	III				sc.
1954−55	0·13	−17	146	2	0·65	0·12	1·1×0·5, p.a. 60	15	16·5 E	15			n
1955−35	0·97	+19	169	1*	0·79	0	<0·5	15	III				sc.
2012+23					1·00	−0·05	<0·3 (90)	17	III				(n)
2019+09	0·58	−115	170	1	0·77	0·10	0·3 (90)	17					n
2020−57	0·32	+17	134	1	0·78	0·28							n
2030−23	0·99	−29	161	1	0·96	−0·15	0·8 (90)	17	20 D				n
2032−35	1·13	+5	86	1	0·69	0·12	0·4 (171); 0·3 (86)	15	III				sc.
2040−26	0·81	−21	166	1	0·76	0·15	2·0×0·9, sep. 3·0, p.a. 157	15	15·4 E				n
2041−60					1·05	0·58	<0·6	15	III				sc.
2044−02	(1·75)	−28	172	2*	0·79	−0·10	<0·3	17	III				sc.
2045+06	1·30	−64	90	1	0·89	0·09	0·08	2	18·4 E	12			
2052−47	1·22	+37	175	1	0·13	−0·13	<0·3 (90)	17					
2053−20	1·30	−5	130	2*	0·75	0·03	<0·5 (173), 0·7 (79)	15	17·8 E	3			sc.?
2058−28	(1·0)				0·78	0·16	1·5×1·3, sep. 2·8, p.a. 155	15	16·6 E	3			n
2104−25	0·70	−11	32	1	0·84		1·1×1·8, 6·0×1·9, sep. 3·3, p.a. 16	15	16·8 E	3			n
2111−25	2·21	+33	60	1−*	0·48	0·29	<0·3 (90)	17	19 QSO				
2113−21	0·82	−23	80	1	0·85	0·20	<0·3 (90)	17	III				n
2115−30	0·85	+28	86	1	0·67	0·24	<0·3 (90)	17	16·5 QSO	10			sc.
2121+24	0·87	−76	166	1	0·77	0·11	<0·03, sep. 0·22 (67)	2	17 D	8	0·1025	28	n
2126+07					0·79	0·71	0·6 (90)	17	19·5 QSO	10			n
2127+04					−0·35	1·01	<0·0008	23	III				(sc.)
2128−12					−0·14	0·05			16·0 QSO	10			
2135−14	1·15	+19	6	1	0·82	0·03	0·7, sep. 1·7 (90)	17	15·5 QSO	10	0·200	10	n
2140−43	0·80	+3	91	1	0·92	0·08	<0·3 (90)	17	III				n
2141−81	0·85	+113	5	1	1·00	−0·15							
2144+15	1·94	−18	60	1	0·86	0·08	0·05	2	III				n
2145+06					−0·11	0·01	<0·0008	23	17·5 QSO	10			sc.
2147+14	0·23						<0·4 (90)	17	III				
2148+14	1·80	−17	134	1*			<0·4 (90)	17	III				
2149−28	0·80	−40	132	1	0·50	0·03	<0·3 (90)	17	III				n
2150−52					0·85	−0·03							n
2152−69	0·58	+34	30	1	0·79	0·03	2·0×0·5, <1·0, sep. 3·8, p.a. 96	15	13·8 D	15	0·0266		
2154−18	1·15	+15	58	1−	0·72		sep. 1·0, p.a. 100	32	16·5 QSO?	10			n
2203−18					0·14	0·24	<0·0008	23	19·0 QSO	10			sc.
2204−54					0·10	0·04	<0·5	15	17 SO	33			
2209+08	0·88	−28	114	1	0·48	−0·12	<0·3 (90)	17	18·5 QSO?	12			
2210+01					0·24	0·60	<0·3 (90)	17	III				

* Only two frequencies were used for the Faraday rotation curve and the value of R_M given is the smallest possible one.
† For references see corresponding footnote at end of table.

TABLE 4 (*Continued*)

(1) PKS Source No.	(2) D	(3) R_M	(4) θ_0	(5) Class	(6) α(408, 1410)	(7) C	(8) Dimensions (′)	(9) Ref.† (Dim.)	(10) Ident.	(11) Ref.† (Ident.)	(12) z	(13) Ref.† (z)	(14) Scint.
2211−17	1·18	−3	4	1−*	1·00	0	sep. 1·2, p.a. 165	31	19 D	5			n
2212+13	0·74	−38	162	1	0·98		6, p.a. 50	18	14·3 db	12	0·02618		n
2216−28					0·91	0·44	<0·5	15	18 E	3			sc.
2221−02	0·69	+5	115	1	0·98		1·5, sep. 3·8, p.a. 0	18, 20	15·8 N	26	0·0568	28	n
2223−05	0·78	−21	0	1	0·41	0·04	<0·0008	23	18·4 QSO	10	1·403	10	sc.
2223−52	0·50	+40	71	2*	0·93	0·11							n
2226−41	0·61				0·85	0·01	<0·3 (90)	17	III				n
2230+11	0·98	−47	48	1	−0·10	0·49	<0·0002	9	17·3 QSO	10	1·037	10	sc.
2247+11	0·73	−19	48	1	0·83	0·03	4·3, 1·0, sep. 2·3 (90)	17	14·4 E	12			n
2247+14	2·45				0·46	0·22	<0·3 (90)	17	III				n
2249+18	0·32	−87	107	1	0·52	0·44	<0·003	14	18·4 QSO	10	1·757	10	sc.
2250−41	0·39	+16	62	1	0·82	0·11	<0·6	15	III				n
2251+15	1·26	−52	18	1	0·13	0·16	<0·0004	23	16·1 QSO	10	0·859	10	sc.
2252+12	0·53	+13	133	2	0·88	0·12	0·3*I* in <0·002	14	14·0 E4	27	0·0334	27	sc.
2252−53	0·30	−8	56	1−	0·63	0·28							n
2253−52	0·21				0·92	0·12							n
2259−37					0·75	0·18	<0·3 (90)	17	III				n
2309+09	0·76	+3	24	1−*	0·95	0·09	0·3*I* in <0·003	14	19·5 E	4	0·2337	28	sc.
2310+05	0·64	0	37	1−	0·86	0·19	0·5, 0·5, 0·5, max. sep. 2·6 (90)	17	g				n
2313+03	0·72	+7	159	1	0·93	−0·12	0·3*I* in <0·003	14	17·6 N	26	0·2205	28	sc.
2317−27	1·08	+8	94	1	0·90	−0·08	1·5×0·7, sep. 2·9, p.a. 175	15	18 N	12			n
2323−40	0·19	+22	150	1	0·69	0·32	<0·3 (90)	17	III				n
2324−02	1·37	−13	2	1−*	0·89	−0·22			18·3 E	5			n
2331−41	0·54				0·85	0·02	<0·4 (174); 0·5 (90)	15	III				n
2335+26	<0·08				0·86		5·0, p.a. 140	18, 20	15 g	28	0·0301	28	
2338−58	0·71	+2	86	1−	0·78	0·09							n
2338−16	(1·37)				0·87	0·02	0·7, 1·6, sep. 2·5 (90)	17	III				n
2354−11	(0·75)				0·22	0·09			19 QSO	5			
2356−61	1·08	+23	7	1	0·91		0·8, sep. 4·0, 8·1, p.a. 132	15	16 D	15			n

* Only two frequencies were used for the Faraday rotation curve and the value of R_M given is the smallest possible one.

† References are: 1, Anderson *et al.* (1965); 2, Bash (1968); 3, Bolton, Clarke, and Ekers (1965); 4, 5, 6, Bolton and Ekers (1966*a*, 1966*b*, 1966*c*); 7, Bolton and Kinman (1966); 8, Bolton, Shimmins, and Merkelijn (1968); 9, Broten *et al.* (1967); 10, 11, Burbidge (1967*a*, 1967*b*); 12, Clarke, Bolton, and Shimmins (1966); 13, Cohen and Gundermann (1967); 14, Cohen, Gundermann, and Harris (1967); 15, Ekers (1967); 16, Evans (1967); 17, Fomalont (1967); 18, Gardner and Davies (unpublished data); 19, Macdonald and Kenderdine (1967); 20, Maltby and Moffett (1962); 21, Matthews, Morgan, and Schmidt (1964); 22, Miley, Rickett, and Gent (1967); 23, Palmer *et al.* (1967); 24, Ryle, Elsemore, and Neville (1965); 25, Sandage (1966); 26, 27, Sandage (1967*a*, 1967*b*); 28, Schmidt (1965); 29, Shimmins, Clarke, and Ekers (1966); 30, Shobbrook (1966); 31, Taylor (1966); 32, Taylor and de Jong (1968); 33, Westerlund and Smith (1966).

Source identifications and associated reference numbers are given in columns 10 and 11. Data without references were kindly provided in advance of publication by J. G. Bolton. Objects considered as galactic are shown as "galactic", "HII", "S.N. rem.", or merely by name. The significance of the roman numerals is explained in Bolton, Gardner, and Mackey (1964). Apart from double galaxies (db), Seyfert galaxies (Sey), and galaxies of unknown type (g), the symbols are self-explanatory.

Redshift data and corresponding reference numbers are shown in columns 12 and 13 respectively. Redshifts without references are from unpublished data supplied by J. G. Bolton.

The division of sources into scintillators (sc) or non-scintillators (n) is shown in the last column. The results in parentheses refer to sources observed only by Cohen, Gundermann, and Harris (1967). The remainder were derived by observations at Parkes (Whiteoak, unpublished data); for sources also observed by Cohen, agreement is excellent. Low frequency studies of interplanetary scintillation for sources within about 50° of the Sun are most useful for a coarse discrimination of angular size (Hewish, Scott, and Wills 1964). The Parkes observations, available for about 40% of the sources in the table, were obtained mostly at 154 MHz. On several occasions additional observations at frequencies ranging from 408 to 2650 MHz were recorded. The higher frequencies provided scintillation data for flat-spectrum sources too faint at 154 MHz for observation. For a source shown as a scintillator, it generally holds that at least 30% of its total intensity at 154 MHz emanates from a region of angular size less than $0''\cdot3$. Although the selection of sources for scintillation study was based mainly on flux densities at 408 MHz, it is believed that most sources listed as non-scintillators are sufficiently intense at 154 MHz for the lack of detected scintillations to be physically significant.

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