

INFRA-RED OBSERVATIONS OF NGC 7552 AND NGC 7582 AND THEIR IDENTIFICATION WITH PKS RADIO SOURCES

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SUMMARY

*JHK*L fluxes are given for NGC 7552 and 7582 and upper limits on the *JHK* fluxes are obtained for NGC 7590. The identification of the first two of these with PKS 2313-428 and PKS 2315-426 is suggested.

During an infra-red survey of some bright Southern galaxies (Glass, in preparation) measurements of the quartet in Grus (Sersic 1968) were attempted. Infra-red radiation was detected from NGC 7552 and NGC 7582 but not from NGC 7590. The other member, NGC 7599 was too faint to set on. Details of the observations are given in Table I. All measurements were made with a *JHK*L photometer (Glass 1972) attached to the 74-inch Radcliffe reflector and standardized using stars selected from Johnson *et al.* (1966).

The infra-red colour indices of the two measurable galaxies are given in Table II. The colour corrections for galactic absorption have not been included since the high galactic latitude ($b^{\text{II}} \sim -65^\circ$) makes them small. The (*K*-*L*) colours are far in excess of the averages found for normal galaxies by Johnson (1966), and are comparable to some of those for Seyfert and other peculiar cases found by Rieke & Low (1972).

The Parkes 2700 MHz survey (Shimmins 1971) was examined for positional coincidences and it was found that the sources PKS 2315-426 and PKS 2313-428 correspond fairly closely to the positions given by de Vaucouleurs & de Vaucouleurs (1964) for NGC 7552 and 7582 respectively. Palomar chart overlays were prepared for the radio locations which were found to fall within the optical images of the galaxies. The precise positions of the nuclei of the two identified galaxies were obtained from a Cape Astrographic Zone (CAZ) plate of epoch 1905.8. The coordinates are given in Table III. The only significant deviation is in the RA of NGC 7582, where the difference is about four times the estimated rms error in the radio positions for sources of this intensity.

The radio fluxes are 0.19 fu and 0.16 fu for NGC 7552 and 7582 respectively. The radial velocities (Shobbrook 1966a) are 1644 and 1427 km s⁻¹. The emitted power is readily seen to be of the same order of magnitude as that for most Seyfert and ordinary galaxies.

Photoelectric observations of these galaxies have been made by Andrews (1973, private communication) using an aperture of the same size as the infra-red one. His *V* magnitudes, (*B*-*V*) and (*U*-*B*) colours have been included in Tables I and II. Shobbrook (1966b) shows a photograph of NGC 7582, 7590 and 7599 which form a trio within the quartet. A composite print which emphasizes colour

TABLE I
Observations of galaxies in *Grus* quartet

NGC No.	Date	<i>J</i>	<i>H</i>	<i>K</i>	<i>L</i>	<i>V</i>
7552	8/9/72	10.12 ± 0.20	9.30 ± 0.10	8.95 ± 0.07	7.63 ± 0.10	12.56
7590	8/9/72	> 11.94	> 11.29	> 11.27	—	13.70
7582	8/9/72	10.45 ± 0.11	9.65 ± 0.11	8.92 ± 0.08	8.19 ± 0.32	13.6
—	3/7/72	—	9.55 ± 0.08	8.90 ± 0.08	7.85 ± 0.16	—

Note: Aperture diameter 12 seconds of arc.

TABLE II
Infra-red colours of NGC 7552 and NGC 7582

NGC No.	<i>J-H</i>	<i>H-K</i>	<i>K-L</i>	<i>B-V</i> *	<i>U-B</i> *
7552	0.82 ± 0.22	0.35 ± 0.12	1.32 ± 0.12	0.58	-0.07
7582	0.87 ± 0.13	0.67 ± 0.08	0.99 ± 0.15	0.96	0.17
7590	—	—	—	0.96	0.42

* From Andrews (1973, private communication).

TABLE III
Positions of galaxies identified with PKS sources for 1950.0

NGC No.	7552	7582
RA (CAZ Plate)	$23^h 13^m 24^s.9$	$23^h 15^m 38^s.3$
Dec. (CAZ Plate)	$-42^\circ 51' 27''$	$-42^\circ 38' 39''$
RA (PKS)	$23^h 13^m 25^s.7$	$23^h 15^m 31^s.6$
Dec. (PKS)	$-42^\circ 52' 9''$	$-42^\circ 38' 25''$

Notes: The CAZ determination has an accuracy of within 1" arc. The PKS survey has an rms error of 18" arc for sources of these intensities.

shows that NGC 7599 lacks a nucleus as pronounced as those of the other two. The redder colours of the nucleus of NGC 7582 in *U-B* to *H-K* inclusive may be due, in part, to absorption by the spiral arms caused by its high inclination.

NGC 7552 and 7582 are both classified as R'SB(s)ab. Martin (1972) sees [S II], [N II], H_α , H_β and [O II] in emission and NaD, G band, H_δ , Ca II, H_ϵ and H_8 to H_{12} in absorption in NGC 7552. This galaxy is included in Sersic & Pastoriza's (1965) list of galaxies with peculiar nuclei, classified as being of amorphous type. In NGC 7582 Martin sees [S II], [N II], H_α , [O III], H_β , He II, [Ne III] and [O II] in emission and NaD, G band, Ca II and H_8 to H_{10} in absorption. Shobbrook (1966a) has also examined this galaxy, remarking that its nucleus is different in type from either NGC 7552 or 1566, a weakly Seyfert case.

It is believed that this is the first example of two closely-spaced galaxies showing strong infra-red excesses.

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