

THREE NEW PULSARS NEAR SUPERNOVA REMNANTS

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A search for pulsars in the directions of twenty Galactic supernova remnants (SNRs) was carried out at 327 MHz with the Ooty Radio Telescope (ORT). We have measured the P for one of the pulsars which is just outside the shell of SNR W44 and discuss here the possibility of its association with the HI shell around W44. The parameters of the remaining two pulsars have not yet been determined with sufficient accuracy to suggest association with the respective SNRs.

An area of $20 \times 20^\circ$ in the direction of each of the SNR was observed for 50 minutes with the ORT. A multi-channel receiver system (channel width 300 kHz) with an overall bandwidth of 4 MHz was used with each of the 12 beams of the ORT (covering $36'$ in declination) and the receiver outputs were sampled at 16 msec. Data were de-dispersed and folded using a Fast Folding Algorithm for periods between 0.056 s and 1.58 s. Sensitivities in the range of 4-15 mJy was obtained in various directions. Preliminary results are summarized in Table 1.

The parameters of the pulsars in W28 and G7.7-3.7 have large errors. Since we are still in the process of improving

TABLE 1

NAME	RA(1950)		DEC(1950)		PERIOD sec	DM cm^{-3}pc	FLUX mJy	FIELD
	h	m	o	'				
1853+00	18	53.5 \pm .3	+00	55 \pm 0.5	0.3569290	90 \pm 10	8	W44
1757-23	17	57 \pm 4	-23	43 \pm 1.5	1.03082 \pm 2	280 \pm 40	6	W28
1814-23	18	14 \pm 4	-23	13 \pm 1.5	0.62547 \pm 2	240 \pm 40	6	G7.7-3.7

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these parameters, in the subsequent discussions we will confine ourselves to the pulsar near W44.

Barycentric arrival time of the pulses from W44 was computed using ephemeris supplied by L.I. Shapiro of MIT. The P was estimated to be $0.3 + 0.15 \times 10^{-15} \text{ss}^{-1}$. The pulsar is located about 5' south of the shell of W44. This pulsar is also inside an expanding HI shell detected by Knapp and Kerr (1974). The parameters of the pulsar, SNR and HI shell are summarized in Table 2.

TABLE 2

	PULSAR	SNR	HI SHELL
Distance (kpc)	3	3.1	3.1
Diameter (pc)	-	26	80
Distance from pulsar (pc)	-	17	20
Age (yrs)	2×10^7	4000	7×10^6

Considering the ages of the three objects listed above, the pulsar is more likely to be associated with the HI shell rather than the SNR W44. The true age of the pulsar, which is about 1/4th of its characteristic age (Manchester and Taylor 1977) agrees with that of the HI shell. The estimated energy in the shell indicate that the shell was perhaps formed by a SN II event which is supposed to yield neutron star. The evidence suggests a scenario where, the supernova that yielded the pulsar was also responsible for the expanding HI shell. It is possible that the SNR W44 is the remnant of a second generation star. Stacy and Jackson (1982) have also proposed the association of an expanding HI shell with PSR 0740-28. It is of interest to measure the proper motion of these pulsars.

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