A SEARCH FOR HI IN NINE SOUTHERN GALACTIC CLUSTERS

C.A. Olano, W.G.L. Pöppel, M.D. Vota*
Instituto Argentino de Radioastronomía
Casilla de Correo 5
1894 Villa Elisa, B.A.
Argentina

The results of a search for HI features in nine galactic clusters are reported. The clusters were selected from the catalog of Alter *et al*. (1970) with galactic latitudes $|b| \gtrsim 8^{O}$ in order to reduce the galactic background radiation. The clusters are listed together with some of their newer optical data in Table 1. Column 1 gives the cluster's designation; 2 and 3 their galactic coordinates; and 4 and 5 their distances and mean angular diameters. Only two of the clusters have a measured radial velocity.

TABLE 1

Cluster	l (deg.)	b (deg.)	r (pc)	D (')
Cr 394	14.8	-9.6	860	23
Ru 3	238.8	-14.8		3
Ru 106	300.9	+11.7		3
NGC 5460	315.8	+12.7	780	64
Cr 121	235.4	-10.4	760	60
Cr 132a	243.8	- 9.2	560	85
Cr 132b			330	
Cr 140	245.0	- 8.0	365	92
Cr 135	248.8	-11.2	325	45

All the observations were carried out with the 30-m radiotelescope at Villa Elisa. This telescope has a HPBW of 30 arcmin in the 21-cm line and filter passbands of 10 kHz, equivalent to 2 km s^{-1}.

In order to detect hydrogen structures, if any, centered at the clusters, a set of points was defined on the sky for each one of them. These points were distributed along two equal arms, one of constant l, and the other of constant b, forming a cross centered on the cluster. The sets included 17 points spaced $0^{O}.5$ for each of the three clusters with a diameter less than the antenna's HPBW, and 21 points for each of the other clusters. In the latter case, the five inner points were more closely spaced. At every point, at least three six minute profiles were obtained on different dates. These profiles were averaged together and the resulting profiles had a mean noise of 0.4^{O}K plus 3% of the brightness temperatures, T_b, due to gain uncertainties.

* Lic. M.D. Vota only participated in the observations and study of the clusters Cr 394, Ru 106, and NGC 5460.

In order to test the possibility of "HI-features" being present in the direction of the clusters we looked for maxima or minima of T_b.

In the analysis twelve HI-features (nine maxima and three minima) were detected, of which seven were disregarded as not being related to any cluster. As a conclusion, it appears that no neutral hydrogen is related to the clusters Cr 121, Cr 140, Cr 132 a, b, Ru 3, and Ru 106. From these, only the first four clusters have the earliest spectral type determined, namely BO IV, $\sim$ B3, $\sim$ B3, and B9, respectively. For the remaining clusters (NGC 5460, Cr 135, and Cr 394) the evidence was inconclusive.

Therefore, our results are in general agreement with the qualitative conclusion that interstellar HI should be expected only in relatively young clusters, although not necessarily found there (see, for example, Tovmassian *et al*. (1973)]. Referring now to future observations and in order to derive more quantitative conclusions, it appears that more optical work is necessary. Especially, the determination of the earliest spectral type present and the radial velocity of the clusters located above $|b|=8^{o}$ would be very useful. It would also be very valuable to analyze an statistically complete and homogeneous set of clusters.

A full account of this investigation will be published in *Astrophysics and Space Science*.

REFERENCES

Alter, G., Ruprecht, J. and Vanysek, V.: 1970, *Catalog of Star Clusters and Associations*, 2nd ed., Akadémiai Kiado, Budapest.
Tovmassian, H.M., Shabazian, E.T., and Nersessian, S.E.: 1973, *Australian J. Phys*. *26*, 829.