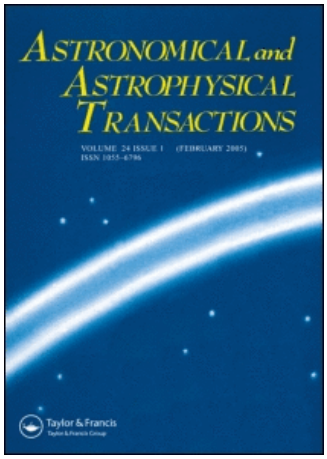

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THE HIGH VELOCITY CLOUD CONNECTED WITH THE KAPTEYN GROUP

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Many fragments of a nearby high velocity cloud are found. Gas clouds can be a significant factor for the stabilization of very old stellar groups.

KEY WORDS High velocity clouds (HVC), the Kapteyn stellar group.

A new survey of high velocity HI clouds (HVC) (Bajaja *et al.*, 1985; Hulsbosch & Wakker, 1988) allow to continue the examination of our hypothesis about the gas cloud connected with the Eggen stellar group (Shatsova, 1983; 1984).

The Kapteyn group includes about fifty stars scattered all over the sky. The mean motion of the group is $v = 289$ km/s in the direction $l = 270°$, $b = 0°$, the dispersion is $\sigma = 50$ km/s (Eggen & Iben, 1989). One of the criteria of belonging to the group is based on the following quantity:

$$\Delta = |v_r + 289 \sin l \cos b| / \sigma < 1 \quad \text{or} \quad 2.$$

Here v_r is the observed radial velocity (LSR). For more than 46 stars, it has been found that $\Delta < 1$ in 65% of cases and in 88%, $\Delta < 2$. It shows us the reliability of the selection of the group members.

The HVC motions at many hundreds of sky points, combined into large and small arrays, enter the network ($\bar{v}_r$, σ) basing on the criterion $\Delta < 1$ with the same as for stars parameters. Apparently, they are fragments of a big, inhomogeneous cloud of the Kapteyn group. Some stars of this group are inside the fragments. The others are near to or on the border, and the third are far from them (Figure 1).

U. A. Haud (private communication) picked out the HVC which are the closest to the above 46 stars. It is necessary to exclude those 12 stars which have $|v_r| < 80$ km/s, the limiting value in the HVC catalogues. The statistics of Δ for the 34 HVC: $\Delta < 1$ in 69% and $\Delta < 2$ in 91% of cases. Among the 34 pairs (star-cloud), 14 has the separation $0 \div 3°$. The difference in their (large) v_r is less than σ and can be often attributed to observational errors.

A considerable number of close pairs became the basis for a search for unknown members of the Kapteyn group in the places of HVC concentration. So, using the Norris catalogue (1986), not claiming for completeness, the stars were

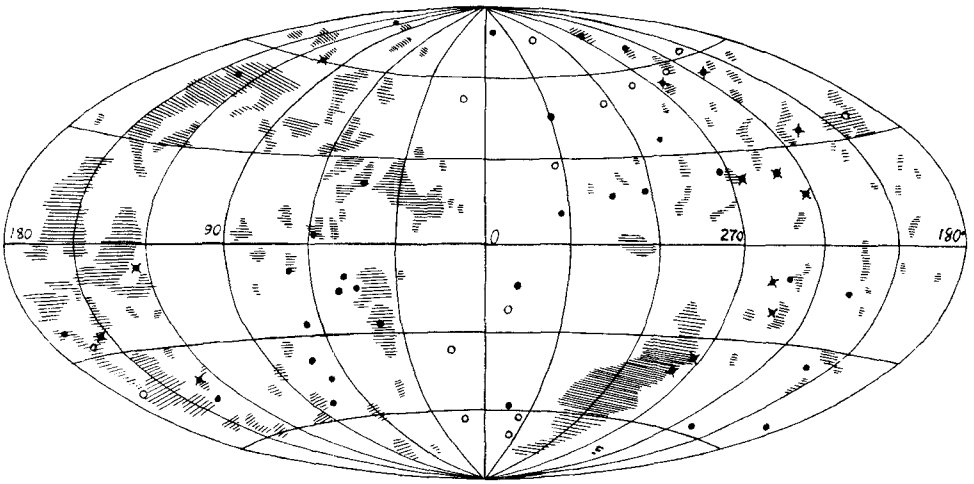

Figure 1 The distribution of HVC and the Kapteyn group stars in the galactic coordinates. Members of the group: (○)—$|v_r| \leq 80$ km/s (LSR), (●)—$|v_r| > 80$ km/s; possible members: (×).

found that are suitable with respect to both the radial and spatial velocities: G36-50, 44-30, 46-31, C-45°3283, HD6833, 302/99, 34048, 47147, 74000, 82590, WY Ant, SS Leo, RU Psc, SX UMa. 10 stars among them are related to particular nearby HVCs, which increases the total number of coincidences to 24, or 50%.

For each pair, the three coordinates coincide, (l, b, v_r); meanwhile, for the totality of the pairs, scattered all over the sky, already five coordinates (l, b, v_x, v_y, v_z) coincide. This implies a large probability of the coincidence for the sixth one, the distance, if not for each pair then for the stellar group and the whole cloud. They extend to $R \lesssim 1$ kpc. It is clear that the gas cloud can be a significant factor for the stabilization of the group of very old stars ($\approx 10^{10}$ years).

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