MOVING CLUSTERS AMONG GALACTIC HALO STARS

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ABSTRACT. It has been suggested that most of the primeval galactic globular clusters have been dissociated by encounters with molecular clouds, and by tidal effects in the vicinity of the galactic center; their stellar remnants would move preserving some memory of their original kinematical parameters and might resemble the well-known population I moving clusters. However it has been shown, by direct numerical integration, that a significant fraction of the halo stars have chaotic orbits and many others reach high z-values; hence the usual criterium of identifying group members by the similarity of their V-velocities breaks down. Instead, we use the constancy of the integrals of motion, i.e. the total energy and the z- component of the angular momentum, as well as the metallicity [Fc/H], as the identifying parameters for group membership of a given star. From the analysis of the metallicities and the integrals of motion of 206 halo stars, we have been able to identify several halo moving groups.

CONCLUSIONS

a) Because of the high incidence of chaotic orbits among halo stars, the similarity of the velocities, in particular the V-component, by itself does not seem to be a very good criterium to identifiy group members, b) The integrals of motion in an axis symmetric potential, the energy E and the z-component of the angular momentum h, as well as the iron abundance [Fe/H] are three independent parameters appropriate to identify moving groups in the halo population, c) We have identified 5 new possible moving groups among the sample of 206 halo stars, d) Halo moving groups must have originated in very rich and sparse parent clusters in the halo that have dissociated by tidal encounters with the galactic center. These clusters may be identified with globular clusters or dwarf satellite galaxies.

REFERENCES

Eggen, O.J., 1965, in: Galactic Structure, eds. A. Blaauw and Marten Schmidt. University of Chicago Press, p. 111.
Eggen, O.J., 1987, in: The Galaxy, eds. G. Gillmore and B. Carswell, Reidel Dordrecht, p. 211.
Schuster, W.J., Nissen, P.E. 1988, A&AS 73, 225.
Schuster, W.J., Nissen, P.E. 1989a, A&A 221, 65.
Schuster, W.J., Nissen, P.E. 1989b, A&A 222, 69.

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