THE SIMILARITY OF THE HALO FIELD K GIANT POPULATION WITH THE GLOBULAR CLUSTER SYSTEM OF OUR GALAXY

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Line-of-sight velocities and improved metal abundance estimates are available for a representative sample of 58 giants located by an objective prism survey (Ratnatunga and Freeman 1985), in a 20 square degree field near SA 127 (l = 272, b = +39). These in-situ K-giants of the outer regions of our galactic halo give a direct comparison of the field population with the globular cluster system. Fig. 1 illustrates the distribution of line-of-sight velocity with abundance for the sample of giant stars in SA 127. The mean and dispersion of the sample appears to be discontinuous at [FeH] ~ -0.8. Fig. 2 shows the distribution of [Fe/H] with distance from the Sun for the same stars. The metal stronger giants (filled symbols) represent a population of stars up to 6 kpc above the plane of the disk and have a velocity dispersion of about 50 km/s. In contrast, the metal weaker giants have a typical halo dispersion of about 120 km/s.

The field halo population appears to separate into two components with clearly different chemical and kinematical properties. (1) A metal-weak spheroidal halo component which is at most slowly rotating. (2) A metal-stronger thick disk-like component which is rotating with the disk and has a velocity dispersion of 50 km/s. Statistics for the spheroidal (SP) and thick-disk (TD) subsamples are given in Table I. The difference in both kinematic and chemical properties seems to be sufficient justification to separate the halo into two density components. This appears to be positive kinematic support for the presence of an intermediate scale height population, the existence of which cannot be convincingly proved by star counts alone (Bahcall et al. 1985). This result is very similar to the disk and halo sub-systems for the galactic globular clusters as shown by Zinn (1985). The change in kinematics is seen at about the same abundance.

REFERENCES

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TABLE I

MEAN KINEMATICS in SA127 (272.0 +38.6)

Sub sample	giants	<d> kpc	<z> kpc	<R> kpc	<Mv> mag.	<[Fe/H]> dex	<Vlos> km/s		σlos km/s	
SP	44	13.1	8.1	15.5	-0.5	-1.3	153	19	122	13
TD	14	4.9	3.1	9.3	1.2	-0.4	36	14	51	10

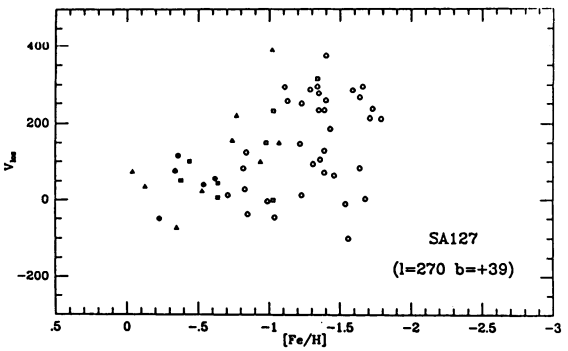

Fig. 1. Line of sight velocity of field halo K giants as a function of metal abundance for SA 127. Note the much smaller mean velocity and velocity dispersion of the metal stronger giants (filled symbols) in SA 127. I use circles, triangles and squares to identify observations made with the AAT:IPCS, MSO:B2PCA and MSO:R2PCA respectively.

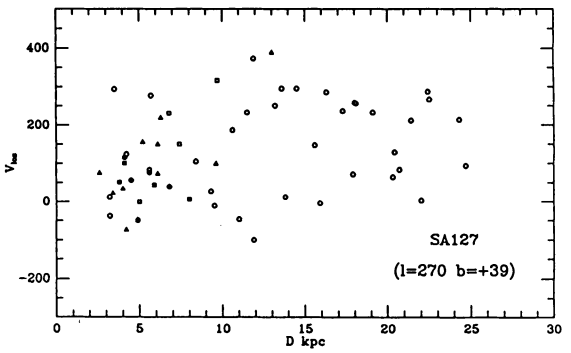

Fig. 2. Kinematics with distance from Sun of field halo K giants in SA 127 with same symbols as in Fig. 1.