KINEMATICS OF RR LYRAES IN THE INNER (OLD?) HALO

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Zinn & Lee (1994, in prep.) have shown that the halo globular clusters with $R_{gc} < 6$ kpc are dominated by clusters with relatively blue horizontal branches for their metal abundance, which they interpret as a sign of their old relative ages. Of these "Old Halo" clusters having $-1.7 <$ [Fe/H] < -0.8 dex, they find a net rotation about the galactic center of $V_{rot} = 59 \pm 22$ km s^{-1}, and a line-of-sight velocity dispersion of $\sigma_{los} = 62 \pm 10$ km s^{-1}.

Does the "Old/Young Halo" dichotomy extend to the field stars? To answer this question, we have obtained V-band photometry and 2 Å spectra for 78 halo RR Lyrae stars which have $3 < R_{gc} < 6$ kpc, $|Z| > 1.5$ kpc and which are situated so that their radial velocities primarily measure their rotation about the galactic center. Radial velocities accurate to 15 km s^{-1} and abundances accurate to 0.2 dex were obtained from the spectra.

The kinematics of the RR Lyraes are $V_{rot} = 24 \pm 19$ km s^{-1} and $\sigma_{los} = 146 \pm 12$ km s^{-1}. This slow rotation and large velocity dispersion contrast sharply with the kinematic properties of the globulars mentioned above, and are much closer to the properties of the RR Lyrae stars in the solar neighborhood (Layden 1993, Ph.D. thesis, Yale Univ.) and of the "Young Halo" globulars. Attempts to find a RR Lyrae subsample with "Old Halo" kinematics proved unsuccessful. We suspect that the inner halo field stars include both Old and Young Halo populations, and that either (1) the inner Young Halo globulars were destroyed by tidal interactions with the bulge (the outer Young Halo clusters have rather eccentric orbits), or (2) the inner Old Halo is inefficient at producing RR Lyraes, relative to the inner Young Halo. More work is required to clarify this, however.