A NEW PROGRAM TO DETERMINE K(z) FROM MAIN SEQUENCE STARS

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Recently Dessureau and Upgren (1975) redetermined the velocity distribution of giant stars in the north galactic pole direction using Upgren's (1962) catalogue and Oort's (1960) determination of K(z). The velocities were assumed to be represented by n Gaussian distributions with no further constraints imposed. The velocities are well represented by three such distributions whose properties disagree with those found by Oort. A larger number did not improve the stability of the solution. Without radial velocities, however, they could not redetermine the K(z) force itself.

Solutions for K(z) have usually had to be based on the giants, although the main-sequence A-stars have also been used (Perry 1969). Both groups are luminous, reasonably abundant at high latitudes and easily identified by their spectra, even in low-dispersion surveys. But the A-stars may not be numerous enough at large z-distances and the absolute magnitudes of giants appear to vary with z in a way which is difficult to measure with certainty. If the limiting magnitudes of recent objective-prism surveys could be extended by a few magnitudes, the main-sequence F-stars would be more suitable than either the A-stars or giants, since they then would also be identifiable at large distances from the plane. The new 1.0-1.5 meter Schmidt telescope of CIDA, the Venezuelan observatory, with its objective prisms reaches a limiting magnitude of about 15. As Stock, Osborn and Upgren (1976) show, spectral classes, radial velocities and proper motions could be determined for the F-stars to distances beyond one kpc (since their absolute magnitudes vary from +3 for F0V stars to +5 for G0V stars) with photographic plates taken with a conventional objective prism.

The abundance of these stars has been found by Bok and Basinski (1964); they obtained V magnitude of stars in a south polar region. Their group defined by $0.30 < B - V < 0.60$ closely corresponds to F0-G0 on the main sequence and they find about 19 stars within this interval per square degree. In a modest polar region of 100 square degrees, perhaps as many as 2000 such objects may be discovered.

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The F-stars possess the further advantage over the giants of having absolute magnitudes whose variation with z is well known, providing only that the sequence for subluminous stars is well determined. For this purpose, the Van Vleck Observatory is measuring parallaxes for many dwarfs and subdwarfs in the F0-G0 range. The absolute magnitudes of these stars must be known with precision and at present, those of the high-ultraviolet excess stars (which become relatively abundant at large z) are not well known (Sandage 1970). Also, since the new parallaxes are of higher precision than existing ones, the volume correction (Lutz and Kelker 1973) can be successfully applied to provide more definitive main and subluminous sequences from which to calibrate absolute magnitudes.

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