THE METALLICITY DISTRIBUTION OF LATE TYPE DWARFS

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The Hipparcos catalogue provides an accurate and extensive sampling of the solar neighbourhood HR diagram. The morphology of this diagram depends on selection criteria of the catalogue such as the limiting magnitude, angular separation and on the characteristics of the stellar populations near the sun (space density, metallicity, star formation rate, etc). Since the Hipparcos data are so accurate, one needs to model precisely the different selection bias and, at the same time, parametrize models of the galactic stellar populations with sufficient flexibility that as much information as possible can be grasped from the catalogue.

Comparisons between our model and the Hipparcos catalogue will be presented elsewhere. Since the quantity of information contained in the Hipparcos catalogue is so important, models ought to be complex, and external contraints, obtained prior to any general comparison with the model, are welcome.

A major factor that influences the distribution of the stars in the HR diagram is the metallicity. For the late type stars, the metallicity distribution can be best studied by re-analysing a volume-limited sample of stars from the catalogue.

Completness tests show that within a 25 pc sphere, the Hipparcos catalogue is approximately complete to M_v=8. However, available photometric metallicity indicator are calibrated down to early K type dwarfs only. Stars have been selected bluer than the limit B-V=1.05, and metallicities were calculated using the Geneva, after rejection of suspected binaries. Long lived stars were found by comparisons with adequate isochrones, and we endded with a sample containing 243 stars. The metallicity distribution of these stars shows two main differences with previous determinations. The first one is the relatively low amount of metal deficient stars, with only 6.5% of the sample having [Fe/H]<-0.5. This is compatible with the amount of thick disc found in deeper surveys of the Galaxy, but is to be compared with the 20 percents found in former studies of the G-dwarf problem. The second difference concerns the metal-rich end of the distribution. There are 14 stars with [Fe/H]>0.2 (none in Wyse & Gilmore (1995)), for instance).

Around solar metallicity (-0.15,+0.15 dex), stars have a rather cold kinematic behavior, with vertical velocity dispersion around 13-15 km.s^{-1}. Outside this metallicity interval, the dispersion is rising to values of the order of 25-30 km.s^{-1}.

More details about this study are published in the proceedings of the symposium held in Venice, may 1997, and in a paper in preparation.

References

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