stars. Luyten has continued this survey for proper motions of faint stars on Schmidt plates and finds evidence that the frequency of such proper motions decreases with galactic latitude and this appears to become more prominent for fainter stars. This may mean that eventually we may have to use different luminosity functions for different galactic latitudes.

From the luminosity function of main-sequence nearby stars, D'Antona and Mazzitelli have derived the Initial Mass Function between 0.1 and 1 $M_\odot$ (42.155.001). The local mass density of halo stars has been discussed by Lee (41.155.110) and Dawson (41.155.092/.106). The initial mass function for massive stars in the Galaxy and the Magellanic Clouds has been determined by Humphreys and McElroy. The authors find no observational evidence that the slope of the massive IMF differs from the normal IMF for the solar neighbourhood or that it varies with galactocentric distance. Observational constraints on the form of the high-mass stellar IMF have been reviewed by Scalo (41.155.121). There is no convincing evidence for any systematic variations of the shape of the high-mass IMF.

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3. Stellar Studies of Local Galactic Structure

This subsection reports results on the existence and nature of the possible unseen matter near the Sun, the local density of disc and halo stars, the respective luminosity functions and the local distributions of some special type objects. It summarizes work relating to the space density of stars of different types in the plane of the Galaxy and dealing with photometric stellar studies in the Milky Way fields of strong interstellar extinction. It also reviews galactic models relevant to the local structure.

3.1 The Volume Closest to the Sun

The existence and nature of unseen matter in the solar neighbourhood received much attention in the past triennium; the subject remains controversial.

Bahcall (38.155.084) determined the total amount of matter in the vicinity of the Sun by comparing the observed distributions of K giants with the predictions of detailed Galaxy models. Hartwick *et al.* (38.114.121) studied a sample of 65 faint cool stars from the LHS catalog. Strömgren (39.155.020) discussed the determination of the galactic force K_z and the local mass density. Boeshaar and Tyson (39.155.096) searched for faint red stars out to 40–100 pc from the Sun. A survey of low luminosity M-dwarfs from deep UK Schmidt plates has been described by Hawkins (42.155.081).

The local density of disc and halo stars, and the respective luminosity functions were investigated on different kinematically selected new samples. Eggen (42.113.032) discussed the distributions of abundances and space motions based on four-colour, H_β, and (R, I) photometry for some 5000 stars in four kinematically unbiased samples. He computed (1987) the luminosity and abundance distributions based on a catalog of *VRI* photometry of stars with $V > 15.1$ and annual proper motion $> 0.5''$. Sandage and Kowal (41.113.053) gave *UBV* photometry for 1690 high-proper-motion stars, providing a finding list for potential high-velocity stars of various metallicities. Sandage (1987) determined the disk and halo densities at the galactic plane from star counts at the galactic poles. From a kinematically unbiased sample of halo stars, S.G. Lee (41.155.165) estimated the local mass density of halo dwarfs. The luminosity function of the main-sequence galactic halo population was derived from the LHS catalog by Dawson (42.155.106).

Westin (38.155.063) studied the distribution of early type stars and the orientation and extent of the Gould's Belt. A population of super-metal-rich stars was searched by Grenon (39.155.165). He estimated the age and space density of the SMR subpopulation.

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3.2 Objects at Low Galactic Latitudes

Efforts to determine the space density of stars of different types in the plane of the Galaxy continue. Results of a spectrophotometric study of 277 OB stars in a region around P Cyg was published by Garibdzhanyan *et al.* (38.155.026). Reed and FitzGerald (38.155.034) presented spectroscopic and photometric parallaxes for 108 OB stars in Puppis. These authors (38.155.035) also classified 3339 B5–M5 stars in this field. Vega *et al.* (42.155.-016) studied the spiral structure in the Vela. Spectral classification of carbon stars with the Kiso Schmidt telescope was carried out by Maehara (40.114.053) in the Cassiopea region. The distribution of late-type giant stars in the galactic plane were studied by Melik-Alaverdyan and Tovmassyan (42.155.011) based on the "SAO and Atrophysical Data" catalog. Downes (42.126.007) determined the space densities of white dwarfs, subdwarfs, and cataclysmic variables based on UV excess objects with $B > 15.3$ mag. and $b < 11°$. Winkler *et al.* (38.155.060) published a complete isophote map of the Galaxy in the ultraviolet spectral region ($\lambda = 356$ nm).

RGU photometry was extensively applied to study the interstellar reddening and space density in Milky Way fields of strong interstellar extinction. Fenkart and Karaali (38.113.005) measured colours for 1700 stars down to $G = 18$ mag. in the anticentre direction in order to determine the reddening, density and luminosity function. Alfaro and Garcia-Pelayo (38.113.019) studied the reddening and space density of 2099 stars in the Carina region. Karaali *et al.* (39.155.073) completed *RGU* photometry of 2647 stars in a field of Scutum. Becker and Steppe (39.155.075) reported application of the method of 3-colour photometry on Milky Way fields with strong interstellar extinction. Fenkart *et al.* (39.113.004) gave *RGU* colours for 1362 stars down to $G = 18$ in the anticentre direction (A6). *RGU* photometry in a complexly reddened Milky Way field in the direction to SA 193 was given by Fenkart and Topaktas (1987).

3.3 Objects at Intermediate and High Galactic Latitudes

Experimental testing of current galactic models has motivated a number of attempts to prove, or exclude, the existence of a "thick disc" component. Gilmore *et al.* (39.155.062) determined V and $B-V$ for 10,000 stars in 11.5 sq. deg. towards $(l, b) = (0°, -90°)$ and for 28,000 stars in 17 sq.deg. towards $(l, b) = (37°, -51°)$. They derived the parameters of the galactic spheroid, and the form of the stellar luminosity function. Stobie *et al.* (41.155.017) obtained *UBV* colours of stars in the $12 < V < 18$ range covering 24 sq.deg. in the NGP region. Yoshii *et al.* (1987) obtained *UBV* data of 18,303 stars of $V > 19$ mag. over 21.46 sq.deg. towards the NGP. Del Rio and Fenkart (1987) have attempted to compare observed density gradients in a field near the galactic centre using the models of Bahcall and Soneira and of Gilmore and Wyse. Fenkart and Karaali (1987) measured 1806 stars down to $G = 19.5$, and made comparisons with current galactic models. A study was performed on 993 stars of $V < 12.5$ in a 19 sq.deg. field centered on NGC 7686 by Balazs *et al.* (41.155.095). The best fit to the space densities was obtained by an isothermal model.

The Basel group has continued study of star fields at different galactic latitudes in order to get more detailed distribution of stars in the galactic disc and halo. Fenkart and Esin-Yilmaz (38.155.058) applied the Basel Halo Program methods (BHP) in *UBV* to SA 82, already treated in *RGU*. Photometry in the RGU system was carried out by Karaali (38.133.004) in a field of 3.56 sq.deg. containing a large fraction of the Praesepe cluster with 1500 stars down to $G = 16.2$ mag. Fenkart and Karaali (38.113.012) derived space density functions of 759 stars in a 1.70 sq.deg. starfield near M67, based on *RGU* photometry.

McNeil (42.155.036) investigated the distribution of G5–M stars in a south galactic pole region, studying the density distribution as a function of distance from the galactic plane. Opal and Weller (38.155.025) scanned two-thirds of the celestial sphere in the 911–1050 Å band. The correlation between the stars and the continuous 240 MHz radiation in the Loop I main ridge region were calculated by Anisimova (38.155.073). Tritton and Morton (38.155.008) identified and classified all objects with $B < 20.0$ in a 0.31 sq.deg. region centered on $l = 36°.5, b = -51°.1$. They determined the B and V magnitudes of 601 normal stars and 2 white dwarfs to this magnitude limit. An objective prism survey was completed by Stephenson (41.155.040) of 583 late-type stars more then 10° from the galactic plane and north of -25° declination.

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