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New nearby stars among bright APM high proper motion stars

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ABSTRACT

As part of a new southern sky survey for faint high proper motion stars based on Automatic Plate Measuring (APM) measurements of UK Schmidt Telescope plates, we have found a large number of previously unknown brighter objects. Spectroscopic follow-up observations with the European Southern Observatory New Technology Telescope of 15 of these new, relatively bright ($12 < \mathrm{R} < 15$) high proper motion stars ($\mu > 0.45\,\mathrm{arcsec\,yr^{-1}}$) show one-third of them to be nearby ($\mathrm{d} < 25\,\mathrm{pc}$). Among the nearby stars is an M6 dwarf with strong emission lines at a spectroscopic distance of about 11 pc and an M4 dwarf at about 13 pc. Coupled with earlier South African Astronomical Observatory spectroscopic observations of three similar bright high proper motion stars, the success rate of finding nearby stars ($\mathrm{d} < 25\,\mathrm{pc}$) is about 45 per cent. All newly discovered nearby stars have disc kinematics confirmed by radial velocity measurements from our spectra. In addition there are several high-velocity stars with halo kinematics in the sample, mainly subdwarfs, at about 60 to 110 pc distance. These high-velocity stars are interesting targets for further study of the Galactic escape velocity. One of the detected nearby high proper motion stars was formerly thought to be an M giant in the Small Magellanic Cloud. The spectrum of one M3 star shows a strong blue continuum, which is likely to signify the presence of a hot companion. Spectroscopic follow-up observations of high proper motion stars are shown to be an effective tool in the search for the missing stars in the Solar neighbourhood. Candidates for more extensive trigonometric parallax determination can be selected on the basis of the spectroscopic distance estimates.

Key words: surveys – stars: activity – stars: distances – stars: kinematics – stars: late-type.

1 INTRODUCTION

Our knowledge of stars in the Solar neighbourhood is one of the main starting points for investigations of the stellar luminosity function, the initial mass function and other properties of stars in general, as well as for the search for planetary systems. New large telescopes not only allow us to discover the most distant galaxies and to see the early Universe, but they also allow a much more detailed view of the Solar neighbourhood. In their search for planets around other stars, the Space Interferometry Mission (SIM) of NASA, as well as other planned missions like the Terrestrial Planet Finder (TPF) of NASA or the Infra-Red Space Interferometer DARWIN (IRSI or DARWIN) of the European Space Agency (ESA), will (have to) concentrate on very nearby stars ($\mathrm{d} < 10\,\mathrm{pc}$) in order to be able to detect not only Jupiter-class but also Earth-like planets.

The sample of known stars within 10 pc includes 315 stars in 227 systems as of 2000 January 1. The census includes 163 single stars, 46 doubles, 13 triples, four quadruples and one quintuple. These numbers are taken from the home page of the Research Consortium on Nearby Stars (RECONS).[1] Henry et al. (1997) estimated the number of missing systems within 10 pc as 130 systems, assuming the density of stars within 5 pc carries to 10 pc. The total number of stars within 25 pc (again scaled from the better-known sample within 5 pc) is expected to be at least 7500, but only ~2600 objects are presently known to that distance. Thus the catalogue is now only about 30 per cent complete (see NASA NStars research project home page).[2] In addition, the space density of substellar objects may be comparable to that of stars (Reid et al. 2000).

Recent discoveries of very nearby stars with spectroscopic distances from the Sun of only 4 pc (Delfosse et al. 2001) and 6 pc (Scholz, Meusinger & Jahreiß 2001) give us a hint that even the 5 pc sample is still not complete.

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[1] http://www.chara.gsu.edu/RECONS/TOP100.htm
[2] http://nstars.arc.nasa.gov/

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The majority of the nearby stars were discovered on the basis of their proper motion. A lot of effort is being made to detect nearby stars neglecting the proper motion information by looking at extremely red faint objects, i.e. very late-type M dwarfs and the new class of L dwarfs obtained in the Two Micron All Sky Survey (2MASS) (Reid et al. 2000; Gizis et al. 2000) and in the DEep Near-Infrared Survey (DENIS) (Delfosse et al. 2001) or at young stars with X-ray activity (Fleming 1998). However, all newly discovered nearby stars also turned out to be high proper motion stars, at least in those cases when distances of less than about 15 pc were measured. Kelu 1, a free-floating brown dwarf in the Solar neighbourhood, was detected by Ruiz, Leggett & Allard (1997) as a proper motion object.

The high proper motion catalogues of Luyten [i.e. the LHS catalogue (Luyten 1979) with about 3600 stars with proper motions exceeding 0.5 arcsec yr^{-1}, and the NLTT catalogue (Luyten 1979–80; Luyten & Hughes 1980) with about 59 000 stars with proper motions larger than 0.18 arcsec yr^{-1}] represent the results of a huge effort over more than three decades. North of $\delta = -33°$, these catalogues are mainly based on observations with the Palomar Schmidt Telescope. In the southern sky with $\delta < -33°$, the main source for Luyten's catalogues is the Bruce Proper Motion Survey, most of whose plates reach only to about $\mathrm{m_{pg}} = 15.5$.

Fig. 1 shows the deficiency of faint stars from the catalogue of nearby stars (Gliese & Jahreiß 1991) in the southern sky. The lack of nearby low-luminosity stars in this sky region is due to the incompleteness at faint magnitudes of the high proper motion catalogues in comparison to the northern sky. Another well-known problematic sky region in the NLTT catalogue (not shown here) is the Galactic plane, where the detection of proper motion stars was very difficult as a result of the large numbers of objects in the deep photographic observations, leading to strong image crowding.

In our search for missing nearby stars we use several possibilities. First we preselect candidates from the large number of known high proper motion stars, e.g. from the NLTT catalogue, on the basis of their red optical colour and obtain rough distance estimates from spectroscopic follow-up observations (Jahreiß et al. 2001). These provisional distance estimates can be obtained from low-resolution and 'bad weather' spectra. Owing to the colour selection, this kind of search aims at nearby red dwarfs and subdwarfs. A success rate of about 50 per cent was achieved if we consider all stars with spectroscopic distances less than 25 pc as nearby (Jahreiß et al. 2001).

A second selection of candidate nearby stars among the high proper motion stars is based on optical-to-infrared colours. This kind of cross-correlation using the NLTT catalogue in combination with 2MASS data is very promising, as first results, i.e. the finding of a previously unknown star at 6 pc spectroscopic distance from the Sun, have shown (Scholz et al. 2001).

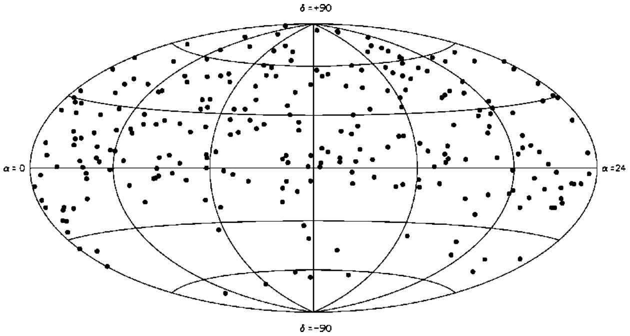

Figure 1. Distribution in equatorial coordinates of all stars from the catalogue of nearby stars with magnitudes $\mathrm{V} > 13$ and distances $\mathrm{d} < 25$ pc. The lack of nearby stars in the southern sky ($\delta < -30°$) is clearly visible.

Our third main search strategy consists in finding formerly unknown high proper motion stars with apparent magnitudes fainter than $\mathrm{R} = 10$ in the southern sky, where the proper motion catalogues are known to be incomplete. This new survey (Scholz et al. 2000) has already led to the discovery of a new nearby (spectroscopic distance $\mathrm{d} = 12$ pc) active M5 dwarf (Scholz et al. 1999), which was identified with a bright X-ray source. Among the faintest newly detected high proper motion stars we expect to find nearby late-type M dwarfs and brown dwarfs. Preliminary spectroscopic distance estimates of these high proper motion stars have also demonstrated a high success rate for finding nearby stars (Schweitzer et al. 2001). Since the proper motion survey is not primarily restricted by colour selection, we also find normal white dwarfs and cool white dwarfs (Scholz et al. 2000).

All three strategies require trigonometric parallaxes to give unbiased and more accurate distance estimates. However, by using all the photometric, spectroscopic and proper motion information, it is possible to optimize the selection of objects put forward for the time-consuming parallax work.

In this paper we report on the discovery of 18 previously unknown bright high proper motion stars and use spectroscopic follow-up observations to determine provisional distances.

2 DETECTION AND SELECTION OF NEW HIGH PROPER MOTION STARS

The new proper motion survey in the southern hemisphere is based on Automatic Plate Measuring (APM) measurements of sky survey plates taken with the UK Schmidt Telescope (UKST). For a pilot study (Scholz et al. 2000) 40 UKST survey fields covering mainly the region between 0^{h} and 7^{h} in right ascension and $-63°$ and $-32°$ in declination (about 1000 deg^2) were selected. The intention of the survey is to complete the existing high proper motion catalogues at fainter magnitudes. However, even in the magnitude range $10 < \mathrm{R} < 15$, where the existing proper motion catalogues were expected to be complete, new discoveries were made.

Among those bright stars, APMPM J0237−5928 was investigated first in more detail since it has the largest proper motion (Scholz et al. 1999). For an extended candidate list for the nearby star search we used as a first step all newly detected proper motion stars with magnitudes $10 < \mathrm{R} < 15$ and a proper motion limit of $\mu > 0.45$ arcsec yr^{-1}, i.e. similar criterion to that of the LHS catalogue. The whole sample includes 18 stars. For three stars listed in the lower parts of Tables 1 and 2, a preliminary spectral classification as 'M star' was already given in the catalogue of Scholz et al. (2000). APMPM J0237−5928 was already the subject of an earlier paper (Scholz et al. 1999).

Table 1 lists for all the newly discovered stars with $\mu > 0.45$ arcsec yr^{-1} and $10 < \mathrm{R} < 15$: the APMPM names, J2000 coordinates, UKST field numbers, epochs of the positions (red plate), proper motions as obtained from one pair of plates, R magnitudes and $\mathrm{B_J} - \mathrm{R}$ colours as well as some notes on individual stars. The upper part of Table 1 contains the data for the 15 stars for which NTT spectra were obtained. In the lower part, three stars are added for which SAAO spectroscopy was carried out earlier (Scholz et al. 2000). The photographic R magnitudes given in Table 1 usually agree within a few tenths of a magnitude of the charge-coupled device (CCD) estimates in Table 2. As already shown in table 2 of Scholz et al. (2000), the APM measured

Table 1. APM astrometry and photometry of new bright high proper motion stars.

Name	α, δ (2000)		Field	Epoch	μ_x[a] (arcsec yr^{-1})	μ_y[a]	R[b]	$B_J - R$[b]	Notes[c]
APMPM J0020−6751	0 19 43.32	−67 51 0.9	50	1987.73	+0.34	−0.49	14.70	+1.88	
APMPM J0053−8200	0 52 52.75	−82 0 17.3	13	1991.63	−0.16	−0.56	14.13	+1.76	
APMPM J0216−5233	2 15 49.75	−52 32 58.0	153	1990.93	+0.43	+0.14	12.70	+2.20	1
APMPM J0220−6519	2 19 55.74	−65 18 44.8	81	1989.73	+0.51	+0.11	14.93	+2.02	
APMPM J0220−4558	2 20 22.66	−45 57 43.0	246	1990.73	+0.47	+0.14	14.60	+1.96	1
APMPM J0302−6952	3 2 29.98	−69 51 58.4	53	1987.72	+0.42	−0.35	11.94	+2.03	
APMPM J0548−4233	5 48 3.90	−42 33 7.6	306	1992.02	+0.32	+0.37	13.17	+1.55	1
APMPM J0654−6441	6 54 27.22	−64 40 38.5	88	1992.00	−0.07	+0.48	14.78	+1.70	
APMPM J0710−5704	7 9 37.29	−57 3 45.4	162	1992.17	+0.33	+0.31	11.93	+2.11	1
APMPM J2025−3344	20 25 21.68	−33 43 46.7	400	1989.72	−0.29	−0.39	14.68	+1.87	
APMPM J2102−4246	21 1 30.61	−42 45 46.7	341	1991.68	+0.06	−0.58	12.86	+1.76	4
APMPM J2104−3828	21 3 30.50	−38 27 47.2	342	1991.76	−0.39	−0.43	14.49	+1.74	3
APMPM J2109−4004	21 8 30.86	−40 3 45.8	342	1991.76	+0.44	−0.39	13.21	+1.78	
APMPM J2126−4454	21 26 23.90	−44 53 30.4	287	1993.61	−0.19	−0.56	14.28	+2.02	
APMPM J2359−6246	23 58 42.29	−62 45 43.6	78	1993.64	+0.60	+0.13	14.91	+2.48	
APMPM J0237−5928	2 36 31.84	−59 28 9.6	115	1991.78	+0.57	+0.51	13.43	+1.86	1, 2
APMPM J0332−5629	3 31 49.72	−56 28 59.7	156	1993.96	+0.21	+0.52	12.58	+2.42	1
APMPM J0544−4108	5 43 46.37	−41 8 4.7	306	1992.02	+0.18	−0.59	12.68	+1.76	1

[a] The average proper motion errors are about ± 0.025 arcsec yr^{-1}.
[b] Photographic magnitudes and colours are accurate within ± 0.2 mag.
[c] Notes: 1, already published in Scholz et al. (2000); 2, already discussed in more detail in Scholz et al. (1999); 3, high proper motion also detected in overlapping UKST field 341; 4, high proper motion also detected in overlapping UKST fields 286 and 342.

Table 2. CCD magnitudes, spectral types, distances, tangential velocities, heliocentric radial velocities and heliocentric space velocities of APM high proper motion stars[a].

Name	R_{CCD} (± 0.1)	Spec. type[b]	Dist. [c] (pc)	v_t (km s^{-1})	v_r[d]	U (km s^{-1})	V (km s^{-1})	W (km s^{-1})
APMPM J0020−6751	14.5	M2	112	317	+81	−42 ± 22	−313 ± 57	+86 ± 36
APMPM J0053−8200	13.9	M3	41	113	−4	+60 ± 17	−32 ± 19	+91 ± 23
APMPM J0216−5233	12.7	M3	24	51	−9	−46 ± 10	−18 ± 13	+18 ± 22
APMPM J0220−6519	14.4	M4	37	92	−6	−75 ± 16	−46 ± 19	+25 ± 20
APMPM J0220−4558	14.0	M3	43	100	−20	−85 ± 18	−36 ± 15	+43 ± 23
APMPM J0302−6952	12.3	M3	20	52	+74	+21 ± 06	−87 ± 19	−14 ± 19
APMPM J0548−4233	13.2	M0	106	246	+43	−187 ± 38	−69 ± 23	+151 ± 38
APMPM J0654−6441	14.9	sdK7	63	145	+253	−128 ± 30	−222 ± 22	−139 ± 14
APMPM J0710−5704	12.1	M4	13	28	−12	−11 ± 03	+3 ± 24	+28 ± 10
APMPM J2025−3344	14.1	M3.5	38	88	−24	+13 ± 22	−79 ± 16	+43 ± 16
APMPM J2102−4246	12.8	sdK5	58	160	−224	−182 ± 19	−155 ± 33	+136 ± 18
APMPM J2104−3828	14.1	sdK5	105	289	+288	+350 ± 34	−200 ± 45	−62 ± 33
APMPM J2109−4004	12.7	M3.5	20	56	+17	−16 ± 19	−36 ± 08	−43 ± 18
APMPM J2126−4454	14.3	sdM0	44	123	+46	+60 ± 19	−117 ± 24	+2 ± 20
APMPM J2359−6246	15.1	M6e	11	32	−7	−32 ± 12	−6 ± 11	−4 ± 20
APMPM J0237−5928[e]	13.4[f]	M5e	12	44				
APMPM J0332−5629	12.6[f]	M3	23	61				
APMPM J0544−4108	12.7[f]	M3.5	20	58				

[a] Spectral types of the 15 stars in upper part of the table were obtained from NTT spectra. For the three stars in the lower part the spectral types were obtained from SAAO spectra (Scholz et al. 2000).
[b] Spectral type determined using the spectral features described in Kirkpatrick et al. (1991). The subdwarf classification was made in the system of Gizis (1997).
[c] Distance estimate using the absolute magnitudes for K and M dwarfs given in Bessell (1995). For the subdwarfs we used mean absolute magnitudes of corresponding sdK and sdM stars obtained from Gizis (1997). An uncertainty of 20 per cent in the distance estimates has been assumed in the determination of space velocities U, V, W.
[d] Radial velocity errors of ± 25 km s^{-1} have been assumed in the determination of space velocities U, V, W.
[e] Nearby active M5 dwarf already discussed in detail in Scholz et al. (1999).
[f] No CCD but photographic magnitudes.

photographic colours $B_J - R$ of the high proper motion stars are correlated with the spectral types (cf. Tables 1 and 2).

3 NTT PHOTOMETRY AND SPECTROSCOPY

Spectroscopic observations, even with low resolution and varying sky conditions, provide a fast method to give first estimates on the distances of late-type dwarfs (see e.g. Henry, Kirkpatrick & Simons 1994) before a more extensive trigonometric parallax determination is undertaken.

Follow-up observations of 15 high proper motion stars were carried out with the 3.5-m New Technology Telescope (NTT) at the

European Southern Observatory (ESO) La Silla on 1999 September 16 using the EMMI multimode instrument equipped with the TEK 2048 × 2048 CCD ESO #36. The observations were performed as a back-up programme of the original programme (ESO No. 63.O–0595) because of technical problems that did not allow observation with multi-slit masks during this night.

The photometry for the 15 stars was done using the R-band images for acquiring the field before performing spectroscopy. The pixel size of the images was 0.27 arcsec. During the night the seeing was around 0.8 arcsec. The exposure time for each image was 10 s. The data reduction (bias subtraction, flat-field correction, cosmic ray removal) and the instrumental magnitude calculation were performed applying standard MIDAS procedures. The magnitudes were calibrated using a Landolt (1992) photometric standard field, observed during the same night.

Optical spectra of 15 high proper motion stars were obtained using a 300 line mm^{-1} grism in the RILD mode of EMMI. The grism has an efficiency of 78 per cent at the blaze wavelength of 4900 Å. This configuration yields a spectral resolution of 2.8 Å pixel^{-1} and a resolution of ~6 Å. The spectra were taken

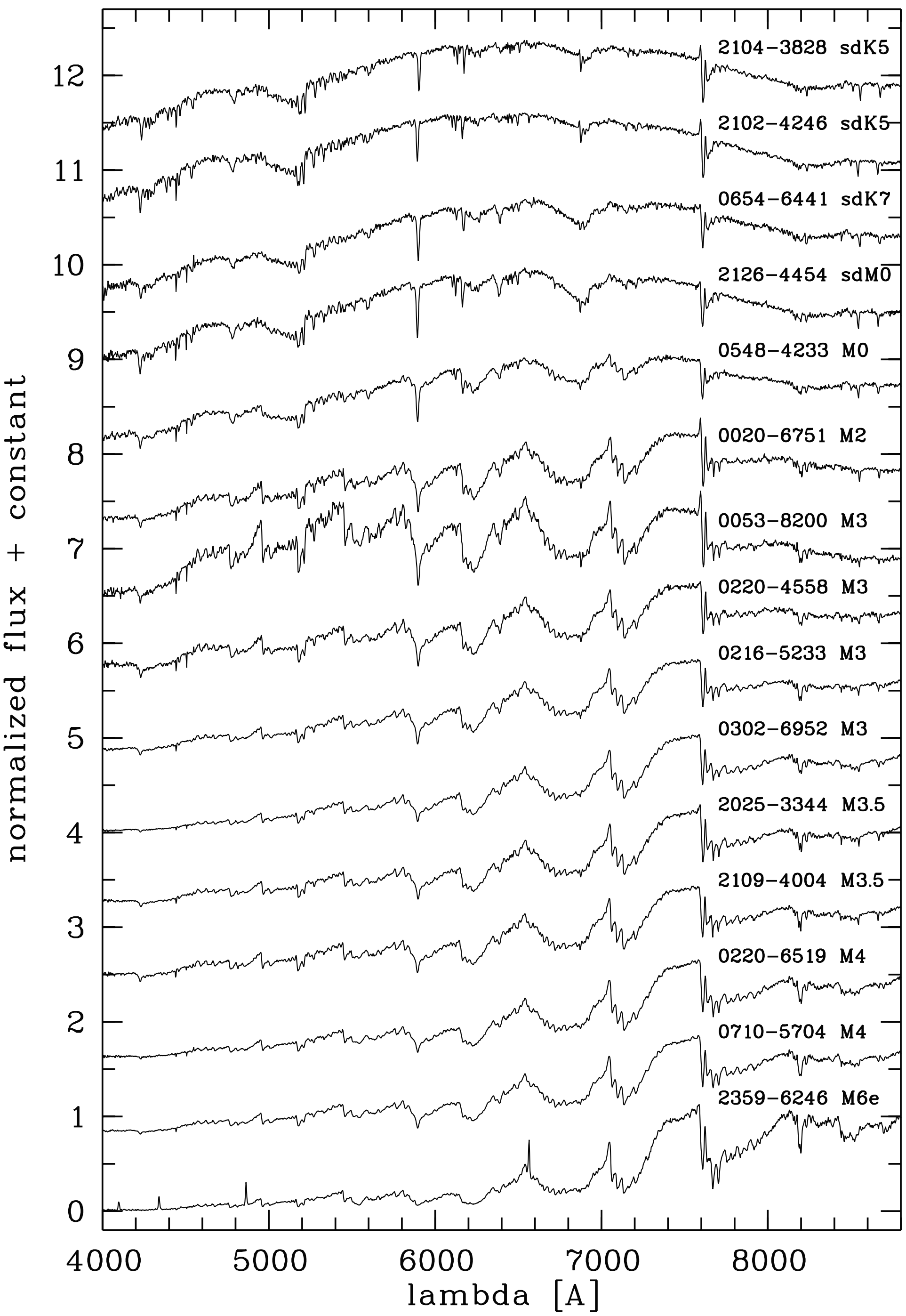

Figure 2. Spectra of high proper motion stars observed with the NTT. The spectra (F_λ) were normalized at 7500 Å and shifted by a constant. The rather blue continuum of APMPM J0053−8200 is probably due to a blue companion.

with a 1.0 arcsec wide slit in the normal-speed CCD read-out mode. Without using an order-blocking filter the final wavelength coverage is about 3850–8000 Å.

The exposure times of the relatively bright stars range from 60 to 180 s. The spectra were processed with the software package MIDAS involving standard reduction techniques (e.g. bias subtraction, flat-field correction). The extraction of the one-dimensional spectra was performed using an optimal extraction algorithm described by Horne (1986). He–Ar calibration spectra taken at the end of the night were used to determine the wavelength scale. The spectrophotometric standard star Feige 110 (Oke 1990) was observed to calibrate the relative flux of the spectra. The spectra were corrected for atmospheric molecular absorption bands using a correction function derived from the standard star spectrum.

Fig. 2 shows all spectra observed with the NTT sorted by the spectral types adopted, i.e. from sdK5 at top to M6 at bottom. The blue continuum of APMPM J0053−8200 (classified as M3) can be explained as the signature of a blue companion.

4 SPECTROSCOPIC DISTANCES

Spectral types have been determined using the spectral features described in Kirkpatrick, Henry & McCarthy (1991), Reid, Hawley & Gizis (1995) and (for the subdwarfs) of Gizis (1997). Since the radial velocities we determined (see following section) were not very accurate, we preferred to use the Kirkpatrick et al. (1991) spectral types, which are not as sensitive to shifts due to radial velocity (errors) as the Reid et al. (1995) spectral types. The spectral types of the K and M dwarfs obtained using the Reid et al. (1995) features were nevertheless in good agreement with those listed in Table 2 (maximum deviation was one spectral class).

The distances and the tangential velocities given in Table 2 were derived for these high proper motion stars without extinction and using the absolute magnitudes for K and M dwarfs given in Bessell (1995). For the subdwarfs, mean absolute magnitudes, respectively, of sdK5, sdK7 and sdM0 as obtained from Gizis (1997) were used.

5 RADIAL VELOCITIES AND SPACE VELOCITIES

For the determination of radial velocities, the spectra were extracted in the usual way within IRAF using optimal profile fitting and sky estimation symmetrically placed either side of the object spectrum. Sky lines on one of the target frames were used to define the basic wavelength calibration, which was then applied to all other target spectra. The resulting wavelength calibration was then refined by comparing the cross-correlation of the extracted sky spectra for each object with the cross-correlation of object spectra and template. For deriving velocities on an internal system one of the target spectra of mid-spectral type (K/M) and good signal-to-noise ratio was used as a reference and all other spectra placed on the same system after correcting to a heliocentric system.

A radial velocity standard observed as part of another VLT + FORS programme (HD 107328) was used to place the entire internally derived velocity system on a conventional scale. Systematics due the position of the objects in the slit were monitored and corrected by using the position of the main absorption feature in the atmospheric A band, which was readily visible in all target spectra. Most of the weight in the solution was given to the region containing the Ca II infrared triplet lines when these lines were clearly visible. In one object of late spectral type where Ca II lines were not visible, TiO and VO lines were used instead.

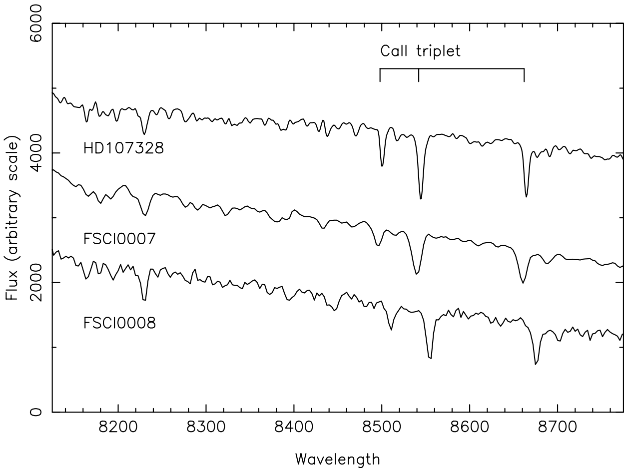

Figure 3. Example spectra of two high-velocity K subdwarfs (FSCI 0007=APMPM J2102−4246, FSCI 0008=APMPM J2104−3828) plus radial velocity template (HD 107328) around the Ca II triplet region. The absorption feature near 8230 Å is a sky absorption line.

All of the spectra have good signal-to-noise ratio and the final velocity errors are dominated by systematic errors in the wavelength solution/velocity zero-point calibration and typically lie between 20 and 30 km s^{-1}. The quality of the spectra and two of the high-velocity K subdwarfs are shown in Fig. 3 together with the spectrum of the radial velocity standard HD 107328.

Table 2 lists the results of the radial velocity determination together with estimates of the heliocentric space motion (Johnson & Soderblom 1987) based on the proper motions (Table 1), the spectroscopic distance estimates (assuming 20 per cent errors) and the heliocentric radial velocities (assuming 25 km s^{-1} errors for all stars). The velocity components U, V and W are positive in the directions of the Galactic Centre, Galactic rotation and the North Galactic Pole, respectively.

6 DISCUSSION

The three objects with the largest radial velocities were classified as K subdwarfs. They do also have very high space velocities typical of the halo/spheroid component of the Galaxy. The distinction between dwarfs and subdwarfs was not quite clear for the two K5 stars. However, if these two stars were classified as normal dwarfs, their distances would be much larger as well as their tangential velocities. In the case of APMPM J2104−3828 the resulting (Galactocentric) total space velocity would exceed the Galactic escape speed, which was estimated to be between 450 and 650 km s^{-1} (Leonard & Tremaine 1990; Meillon et al. 1997). With the classification of sdK5, APMPM J2104−3828 has still a very large space velocity. Clearly, the high-velocity subdwarfs (or dwarfs) discovered among the new high proper motion stars deserve more attention in future investigations.

Most of the other objects show disc kinematics. There are one more subdwarf (sdM0) and two M dwarfs (M0 and M2) with large space velocities. From their spectra the two M dwarfs are both clearly close to solar abundance, and hence they may very well be thick disc stars.

For three objects we found JHK$_s$ magnitudes in the 2MASS data base (second incremental release public data base): APMPM J0020–6751 ($J = 12.18$, $H = 11.61$, $K_s = 11.39$), APMPM J0302–6952 ($J = 9.67$, $H = 9.16$, $K_s = 8.90$) and APMPM J0654–6441 ($J = 13.26$, $H = 12.66$, $K_s = 12.54$). Comparing these apparent magnitudes with absolute magnitudes of corresponding M dwarfs (Kirkpatrick & McCarthy 1994) and subdwarfs (Leggett 1992), we got distance estimates of 120 pc, 33 pc and 157 pc, respectively, for the three objects (with negligible variation between the results obtained from J, H and K data). Whereas these values, based on the relation spectral type/M_J (or M_H or M_K), in the case of the M dwarfs APMPM J0020−6751 (M2) and APMPM J0302 − 6952 (M3) are more or less in good agreement with those based on the relation spectral type/M_R (see Table 2), there is a large difference between the distance estimates for APMPM J0654−6441 (sdK7). Again we mention a rather large uncertainty in the tangential velocity, although the classification of APMPM J0654−6441 as a high-velocity halo object is still valid.

Five out of 15 stars with new NTT follow-up spectroscopy and all three stars with SAAO spectroscopy turned out to have distance estimates such that they should be included in the catalogue of nearby stars ($d < 25$ pc) according to their spectroscopic distances. The success rate is therefore about 45 per cent for the discovered bright high proper motion stars with $10 < R < 15$ and $\mu > 0.45$ arcsec yr^{-1}.

This success rate is comparable with that achieved for samples of known (but forgotten) proper motion stars from the NLTT catalogue preselected on the basis of their red colour (Jahreiß et al. 2001) and of the late-type dwarfs discovered in the APM high proper motion survey (Schweitzer et al. 2001), where about 50 per cent of the stars turned out to be within 25 pc according to their spectroscopic distances. The selection criteria of the NLTT stars investigated in Jahreiß et al. (2001) were $10 < R < 17$ and $\mu > 0.35$ arcsec yr^{-1}, where only a small sky region was included. The colour criterion ($B_J - R > 1.9$) was applied in addition, and only those stars were investigated that were lacking spectral types.

The closest ($d = 11$ pc) and latest-type star (spectral type M6) discovered among the new bright high proper motion stars (APMPM J2359−6246) shows strong emission lines. However, in distinction to the similar active M5 dwarf (APMPM J0237−5928) discovered earlier (Scholz et al. 1999), it could not be identified with an X-ray source.

One of the other nearby stars (APMPM J0302−6952) found in the NTT spectroscopic follow-up observations was formerly reported to be a late-type supergiant in the Small Magellanic Cloud (Prevot et al. 1983). The high proper motion ($\mu = 0.55$ arcsec yr^{-1}) and the spectrum clearly rule out this possibility.

A more accurate distance determination for the new bright high proper motion stars presented in this paper will require trigonometric parallax measurements and/or accurate photometry and a better photometric parallax estimate. The spectroscopic distance estimates provide the most interesting candidates for that task. A dedicated programme of spectroscopic follow-up observations of large numbers of high proper motion stars that have not yet been investigated would be an effective tool for completing our knowledge on the stars in the immediate Solar neighbourhood.

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