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THE SOLAR NEIGHBORHOOD. XXV. DISCOVERY OF NEW PROPER MOTION STARS WITH 0″.40 yr^{-1} > $\mu \geqslant$ 0″.18 yr^{-1} BETWEEN DECLINATIONS −47° AND 00°

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ABSTRACT

We present 2817 new southern proper motion systems with 0″.40 yr^{-1} > $\mu \geqslant$ 0″.18 yr^{-1} and declination between −47° and 00°. This is a continuation of the SuperCOSMOS-RECONS (SCR) proper motion searches of the southern sky. We use the same photometric relations as previous searches to provide distance estimates based on the assumption that the objects are single main-sequence stars. We find 79 new red dwarf systems predicted to be within 25 pc, including a few new components of previously known systems. Two systems—SCR 1731-2452 at 9.5 pc and SCR 1746-3214 at 9.9 pc—are anticipated to be within 10 pc. We also find 23 new white dwarf (WD) candidates with distance estimates of 15–66 pc, as well as 360 new red subdwarf candidates. With this search, we complete the SCR sweep of the southern sky for stars with $\mu \geqslant$ 0″.18 yr^{-1} and $R_{59F} \leqslant 16.5$, resulting in a total of 5042 objects in 4724 previously unreported proper motion systems. Here we provide selected comprehensive lists from our SCR proper motion search to date, including 152 red dwarf systems estimated to be within 25 pc (9 within 10 pc), 46 WDs (10 within 25 pc), and 598 subdwarf candidates. The results of this search suggest that there are more nearby systems to be found at fainter magnitudes and lower proper motion limits than those probed so far.

Key words: astrometry – solar neighborhood – stars: distances – stars: low-mass – stars: statistics – surveys

Online-only material: machine-readable and VO tables

1. INTRODUCTION

The Research Consortium On Nearby Stars (RECONS)[6] has been surveying the southern sky for proper motion objects using the database of the SuperCOSMOS Sky Survey, with new discoveries dubbed SuperCOSMOS-RECONS (SCR). This sixth SCR survey paper is the second for objects with 0″.40 yr^{-1} > $\mu \geqslant$ 0″.18 yr^{-1} and $R_{59F} \leqslant 16.5$, and completes our sweep of the southern sky for objects meeting these criteria. Results of previous efforts have been reported in Hambly et al. (2004), Henry et al. (2004), Subasavage et al. (2005a, 2005b), and Finch et al. (2007). These are papers VIII, X, XII, XV, and XVIII in the *The Solar Neighborhood* (TSN) series, respectively (hereafter TSN VIII, TSN X, etc.). This paper specifically complements TSN XVIII, which presented results from our search from declinations −90° to −47° for objects with proper motions, μ, between 0″.40 yr^{-1} and 0″.18 yr^{-1}. Here we report results for objects with the same proper motions, but for declinations −47° to 00°. We have reported a total of 1971 objects in 1907 SCR proper motion systems in previous papers in this series, where a system is defined to be one or more objects that appear to be gravitationally bound, as evidenced during these searches by being near to one another on the sky and having similar proper motions. Here, we report an additional 3073 objects in 2817 systems, which more than doubles the total SCR count, and brings the total to 5042 objects in 4724 SCR systems.[7]

One of the primary goals of this work is to add to the census of stellar systems known within 25 pc, in an effort to develop the most accurate measurements of the stellar luminosity and mass functions, and to provide a fundamental sample of nearby stellar systems for studies of multiplicity, activity, ages, and exoplanet searches. To date, our searches have focused on the southern sky, which historically has not been searched as methodically as the northern sky. Our SCR efforts are, of course, the latest in a long line of proper motion surveys for nearby stars. Early searches include the classics by Giclas et al. (1971, 1978) and Luyten (1979, 1980b). Many more have since been conducted utilizing modern technology but fundamentally similar techniques, including the searches of Wroblewski & Torres (1994), Wroblewski & Costa (1999), Scholz et al. (2000, 2002), Oppenheimer et al. (2001), Pokorny et al. (2003, 2004), Lépine (2005, 2008), Deacon et al. (2005, 2009), and Deacon & Hambly (2007). Each of these searches has yielded new proper motion objects, including candidates close to the Sun. The significance of these searches individually is discussed in detail in previous papers in this series, so will not be addressed here.

[6] http://www.recons.org/

[7] New proper motion systems reported in Winters et al. (2011) were found via customized searches different than our typical search methodology used for this and the other five SCR proper motion papers. Thus, for the statistics quoted in this paper, we only include new systems reported in Winters et al. (2011) if they were also (re)found via the search methodology outlined here.

In this paper, we present photometric distance estimates for the red dwarf, cool subdwarf, and white dwarf (WD) systems revealed during the search. We anticipate that 79 red dwarf systems from the present search are within 25 pc, including two estimated to be closer than 10 pc. While most of the systems reported here are made up of red dwarfs, we also report 23 WD candidates and 360 red subdwarf candidates selected via reduced proper motion (RPM) diagrams. These three types of intrinsically faint objects are typically underrepresented in Galactic models. Thus, it is important to reveal these systems if we are to develop accurate pictures of Galactic structure and populations.

2. SEARCH CRITERIA AND METHODOLOGY

The searches use data from SuperCOSMOS scans of four Schmidt survey photographic plates taken of each field. The photographic plates scanned into the SuperCOSMOS database are $6^\circ \times 6^\circ$ with a $0\overset{\circ}{.}5$ overlap on each side, giving $\sim$25 deg^2 of unique sky coverage per field (in order to streamline computations of astrometric and photometric data, the overlap regions were not used). Six hundred fifty-four fields have been included in the current search, giving a total of $\sim$16,350 deg^2 covered, or about 40% of the entire sky. In total, 16,748 candidate objects were detected, which is more than twice as many as the 7410 in TSN XVIII. TSN XV searched the same area of the sky as in this paper, albeit for objects with $\mu \geqslant 0\overset{''}{.}40$ yr^{-1}, and found 3879 candidate objects. The ratio of candidates from TSN XV to this paper (0.23) is similar to that of TSN XII to TSN XVIII (0.19), which both searched the sky from -47° to the southern celestial pole with proper motions that match TSN XV and this paper, respectively.

The current search uses techniques for object detection and extraction of astrometric and photometric data similar to those of previous SCR searches, which are given in detail in previous papers (see TSN XVIII in particular). Briefly, we utilize astrometric position and proper motion information and photometric magnitudes in the B_J, ESO $- R$, R_{59F}, and $I_{\rm IVN}$ passbands. We generally require that sources be detected on all four plates, and that they have $R_{59F} \leqslant 16.5$ mag. As in previous searches, an ellipticity quality flag was checked for each of the four plates, and any object with two or more ellipticities greater than 0.35 was excluded. For the present search, we added an additional check: if the mean of the three best (i.e., lowest) ellipticities for an object was greater than 0.25, it was thrown out. This cutoff was chosen because in trial samples it removed a substantial number of false objects, but no real proper motion objects. Thus, it simply lowered the number of false detections in the sample that had to be investigated. Such "garbage" may result from blended images, plate defects, and objects near bright star halos, many of which can be eliminated by these ellipticity constraints. Undoubtedly, a small number of true proper motion systems were excluded using this criterion, e.g., binary systems that were elongated, that could be picked up in future searches with relaxed criteria. In addition to the ellipticity constraints, the further sifting process discussed in TSN XII and applied to subsequent searches was also used here—if the two R magnitudes differed by more than 1.0 mag the object was considered to be a mismatch or a variable giant with an erroneous proper motion, and was discarded from further consideration.

Once a list of reliable candidates was extracted, the objects were then checked using SIMBAD and other proper motion surveys (e.g., NLTT—Luyten 1980a; LEHPM—Pokorny et al. 2003; SIPS—Deacon et al. 2005) in VizieR to identify previously known objects. In both SIMBAD and VizieR, a 90$''$ radius was used to match objects in accordance with the findings of Bakos et al. (2002), who found that coordinates of stars in the Luyten half-second (LHS) catalog were usually accurate to within $\sim$90$''$ (see their Figure 2). All new and known candidate proper motion objects were inspected using Aladin by blinking the B_J, R_{59F}, and $I_{\rm IVN}$ SuperCOSMOS plate images to confirm that the object was indeed a proper motion object. For real objects, Two Micron All Sky Survey (2MASS) positions, epochs, and JHK_s photometry were extracted. The blinking was done using a 5$'$ radius field and SIMBAD and VizieR overlays to ensure new discoveries were not incorrectly labeled as known and vice versa, and to ensure the correct 2MASS data were collected. The blinking process led to the discovery of many common proper motion (CPM) systems, discussed in Section 5.6.

Table 1
Discovery Statistics for the Entire SCR Sample to Date[a]

Category	MOTION[b]	SLOWMO[c]	MINIMO[d]	Total
New discoveries	9	141	4574	4724
Known	171	1159	17244	18574
Duplicates	15	91	1640	1746
Garbage	1989	344	5335	7668
Total hits	2184	1735	28793	32712

Notes.
[a] A few objects were also reported in searches done concurrently by Deacon et al. (2005), Deacon & Hambly (2007), and Lépine (2005, 2008).
[b] MOTION sample includes $\mu \geqslant 1\overset{''}{.}00$ yr^{-1}.
[c] SLOWMO sample includes $1\overset{''}{.}00$ yr$^{-1} > \mu \geqslant 0\overset{''}{.}50$ yr^{-1}.
[d] MINIMO sample includes $0\overset{''}{.}50$ yr$^{-1} > \mu \geqslant 0\overset{''}{.}18$ yr^{-1}.

3. COMPARISON TO PREVIOUS SEARCHES

As in previous papers, we examine the discovery statistics of our SCR search, which have been updated to include systems from this paper. Results are summarized in Table 1. In order to be consistent with TSN XVIII, we reintroduce the terminology used there to describe the various samples. We divide the systems into three categories: MOTION, SLOWMO, and MINIMO, which contain systems with $\mu \geqslant 1\overset{''}{.}00$ yr^{-1}, $1\overset{''}{.}00$ yr$^{-1} > \mu \geqslant 0\overset{''}{.}50$ yr^{-1}, and $0\overset{''}{.}50$ yr$^{-1} > \mu \geqslant 0\overset{''}{.}18$ yr^{-1}, respectively, with the two lower cutoffs chosen to match those of the LHS and Luyten Two Tenths (LTT) efforts. Here, we update the hit rates—defined as the number of real objects, including new objects, known objects, and duplicates of new and known objects, divided by the total starting sample size including all candidate objects—for the MOTION, SLOWMO, and MINIMO samples from those given in TSN XVIII, which included SCR searchs only between -90° and -47°. For the entire southern sky SCR search, we find hit rates of 8.9% and 80.2% for the MOTION and SLOWMO samples, respectively. The previous hit rate for MINIMO systems, the focus of this paper, between -90° and -47° was 78.1%. In this paper, our hit rate is 81.4%, which is slightly higher because of the additional ellipticity constraint that eliminated $\sim$500 garbage entries.[8] Table 1 lists

[8] The hit rate for all MINIMO objects listed in Table 1 is 81.5%, which is slightly higher than either of the rates given for the searches in TSN XVIII and those reported here, which include objects with $0\overset{''}{.}40$ yr$^{-1} > \mu \geqslant 0\overset{''}{.}18$ yr^{-1}. Objects with proper motions of $0\overset{''}{.}50$ yr$^{-1} > \mu \geqslant 0\overset{''}{.}40$ yr^{-1} have very high, i.e., reliable, hit rates, thereby increasing the overall hit rate for MINIMO systems.

Table 2
New SCR Objects with 0″.40 yr^{-1} > $\mu \geqslant$ 0″.18 yr^{-1} between Declinations −47° and 00°

Name	R.A. (J2000)	Decl. (J2000)	μ (″ yr^{-1})	θ (°)	B_J	R_{59F}	$I_{\rm IVN}$	J	H	K_s	$R_{59F} - J$	Est Dist (pc)	Notes
SCR 0000-4117B	00 00 19.18	−41 17 46.2	0.245	124.1	...	20.26	17.45	15.00	14.47	14.48	5.26	114.9	a
SCR 0001-2641	00 01 37.84	−26 41 51.8	0.184	142.1	14.44	13.39	12.95	12.53	12.12	12.00	0.86	[147.5]	b
SCR 0002-0622	00 02 31.46	−06 22 49.5	0.187	117.4	12.03	11.10	10.40	10.16	9.66	9.57	0.94	[55.1]	b
SCR 0002-4644A	00 02 35.66	−46 44 51.9	0.197	122.5	17.20	15.39	14.70	14.23	13.60	13.45	1.16	[328.3]	a,c
SCR 0002-4644B	00 02 36.20	−46 44 57.8	0.240	112.3	21.82	19.48	18.33	16.95	16.17	15.92	2.53	[625.3]	a,c

Notes.
[a] Common proper motion system, see Table 6.
[b] Fewer than six relations for distance estimate, therefore unreliable (in brackets).
[c] Subdwarf candidate, see Table 4; unreliable distance estimate (in brackets).
[d] White dwarf candidate, see Table 5; unreliable distance estimate (in brackets).
[e] Proper motion or position angle suspect.
[f] No 2MASS data available, so no distance estimate.
[g] Coordinates not J2000.0 due to lack of proper motion or 2MASS data. SuperCOSMOS coordinates used instead.
[h] Red dwarf candidate within 25 pc, see Table 3.

(This table is available in its entirety in machine-readable and Virtual Observatory (VO) forms in the online journal. A portion is shown here for guidance regarding its form and content.)

the distribution of real and garbage objects divided into their appropriate proper motion bins.

There are 13,363 objects in the NLTT catalog that meet the sky location, magnitude, and proper motion parameters of the search reported here. Of these, 9474 were recovered, corresponding to a 71% recovery rate. The 29% not recovered can be attributed primarily to the factors mentioned in TSN XVIII—differences in proper motion and magnitude measurements can lead to dropping objects that were kept in the NLTT, i.e., the SCR measurements are different enough to push objects beyond the designated search limits. In addition, our search has trouble picking up bright sources. The brightest NLTT object recovered has $R_{59F} \sim 5$, while the brightest NLTT object in this part of the sky has Luyten's $r \sim 2$.

4. DATA

In Table 2, we list the 2817 systems discovered during the present search. The table of discoveries is presented in full in the electronic version of the Journal. For this total, we only count systems comprised entirely of new discoveries, i.e., an SCR companion to a known object is *not* included in this number. There are 3073 total SCR objects from the present search, which exceeds the number of systems because (1) some systems have more than one SCR object and (2) systems including both a known and an SCR object are not included in the number of systems. We provide SCR names, coordinates, relative proper motions and position angles of the proper motions, plate magnitudes from SuperCOSMOS, photometry from 2MASS, the $R_{59F} - J$ color, a distance estimate, and notes, as we have for systems found in previous SCR searches. The proper motions and position angles have errors of ∼0″.010 yr^{-1} and ∼2°.7, respectively. All coordinates have been computed for epoch J2000.0 using the 2MASS coordinates and the SuperCOSMOS proper motions and position angles. Tables 3–5 provide summary lists of our discoveries of red dwarfs within 25 pc, cool subdwarfs, and WDs, respectively, from the searches to date using the methodology outlined in the six SCR proper motion papers.

In TSN XVIII, the proper motion and position angle data from the SCR searches were shown to be consistent with those of *Hipparcos* and NLTT. *Hipparcos* observed stars brighter than $V \sim 12$, which tend to have the poorest proper motions in the SCR survey because of image saturation on the photographic plates. Even so, the proper motions and position angles had average deviations of 0″.020 yr^{-1} and 3°.9, respectively. The agreement between SCR and NLTT values is rather worse, at 0″.025 yr^{-1} and 6°.8. Finch et al. (2010) compared UCAC3 (Zacharias et al. 2010) and SuperCOSMOS proper motion data for 137 objects in both catalogs. The average differences found were less than 0″.020 yr^{-1}. We also compare the SCR sample to the PPMX (Röser et al. 2008) and PPMXL (Röser et al. 2010) catalogs. We have searched a single hour of R.A. between R.A. = 12 and 13 to derive representative samples for comparison, with the search radii for object matching set at 30 arcsec. In the PPMX catalog, we recovered 52 of 158 SCR objects, or 33%, with the proper motions differing by an average of 0″.021 yr^{-1} and 0″.027 yr^{-1} for R.A. and decl., respectively. In the PPMXL catalog, we recovered 115 of 158 SCR objects, or 73%, with the proper motions differing by an average of 0″.024 yr^{-1} and 0″.027 yr^{-1} for R.A. and decl., respectively. These values are the mean differences between proper motions values in R.A. and decl. for the catalogs. Systematic offsets between the SCR and PPMX results in R.A. and decl. are −0″.022 yr^{-1} and 0″.013 yr^{-1}, whereas offsets between SCR and PPMXL results are −0″.026 yr^{-1} and 0″.011 yr^{-1}. These indicate a small systematic shift between the catalogs.

Hambly et al. (2004) describe the 11 relations generated from the six photometry values, $B_J R_{59F} I_{\rm IVN} JHK_s$ (hereafter *BRIJHK*), associated with each object that can be used to estimate distances photometrically. The relations were generated using stars with accurate (errors less than 10 mas) trigonometric parallaxes, and the estimates assume that each object is a single main-sequence star with colors corresponding to a K or M dwarf. Stars for which fewer than six relations produced distance estimates are noted with distances in brackets; these objects typically have colors too blue for the relations. For the stars with accurate trigonometric distances used to generate the relations, the mean of the absolute differences between their true distances and their estimated photometric distances is 26%. Thus, errors on the distance estimates listed for red stars are a minimum of 26%. An additional error for an object's distance arises from the standard deviation of results from the (up to) 11 different distances from the relations. Away from the Galactic

Table 3
SCR Red Dwarf Candidates Estimated to be within 25 pc

Name	R.A. (J2000)	Decl. (J2000)	μ ($''$ yr^{-1})	θ (°)	B_J	R_{59F}	I_{IVN}	J	H	K_s	Est Dist (pc)	TSN	Notes
SCR 0017-3219	00 17 15.73	−32 19 54.0	0.210	094.3	16.81	14.69	12.48	10.64	10.08	9.73	20.6	XXV	21.3 pc[a]
SCR 0027-0806	00 27 45.36	−08 06 04.7	0.184	122.3	18.65	16.26	13.49	11.57	10.97	10.61	22.9	XXV	18.6 pc[a]
SCR 0111-4908	01 11 47.51	−49 08 09.0	0.542	213.1	18.93	16.50	13.01	11.54	11.00	10.61	23.6	XII	17.6 pc[a]
SCR 0135-6127	01 35 53.66	−61 27 11.1	0.255	256.8	15.62	13.67	11.81	10.06	9.53	9.24	20.8	XVIII	24.8 pc[a]
SCR 0137-4148	01 37 23.49	−41 48 56.2	0.238	054.3	16.91	14.54	12.24	10.68	10.07	9.78	21.8	XXV	24.1 pc[a]
SCR 0138-5353	01 38 20.51	−53 53 26.1	0.297	071.0	15.70	13.70	11.74	10.28	9.69	9.42	24.2	XVIII	39.7 pc[a]
SCR 0143-3840	01 43 03.26	−38 40 07.5	0.188	101.2	12.71	10.51	9.22	8.52	7.85	7.68	19.3	XXV	
SCR 0211-0354	02 11 51.67	−03 54 02.5	0.185	178.9	16.77	14.53	11.90	10.68	10.07	9.73	22.9	XXV	
SCR 0232-8458	02 32 50.12	−84 58 09.5	0.220	141.9	12.31	10.17	9.88	9.00	8.34	8.18	24.9	XVIII	43.3 pc[a]
SCR 0238-1420	02 38 07.50	−14 20 11.3	0.221	158.0	12.99	11.41	9.75	9.05	8.39	8.16	23.3	XXV	
SCR 0246-7024	02 46 02.25	−70 24 06.3	0.259	113.2	15.71	13.33	10.71	9.84	9.33	9.02	20.0	XVIII	14.2 pc[a]
SCR 0325-0308	03 25 03.09	−03 08 20.4	0.197	082.7	15.22	13.17	11.39	10.06	9.45	9.20	24.8	XXV	31.5 pc[a]
SCR 0327-3634	03 27 46.79	−36 34 40.4	0.184	244.5	13.40	11.29	9.27	8.92	8.26	8.04	20.2	XXV	
SCR 0337-1056	03 37 38.22	−10 56 54.8	0.181	091.7	11.81	9.68	8.44	8.41	7.80	7.59	21.3	XXV	
SCR 0420-7005	04 20 12.54	−70 05 58.8	0.670	021.2	18.18	15.68	12.58	11.19	10.59	10.25	22.5	X	16.3 pc[a]
SCR 0509-4325	05 09 43.85	−43 25 17.4	0.225	324.9	15.12	13.00	10.71	9.61	9.00	8.73	18.0	XXV	16.5 pc[a]
SCR 0517-4252	05 17 21.43	−42 52 47.3	0.187	012.8	12.79	10.29	9.25	8.34	7.73	7.45	16.6	XXV	
SCR 0527-7231	05 27 06.99	−72 31 20.0	0.368	018.3	16.01	13.97	11.77	10.34	9.76	9.47	22.6	XVIII	25.1 pc[a]
SCR 0630-7643AB	06 30 46.63	−76 43 09.2	0.483	356.8	15.78	13.56	10.74	8.89	8.27	7.92	6.9	X	8.75 pc[b]
SCR 0631-8811	06 31 31.28	−88 11 36.8	0.516	349.9	16.96	14.67	11.46	10.04	9.46	9.07	12.8	XII	10.4 pc[a]
SCR 0635-6722	06 35 48.81	−67 22 58.5	0.383	340.0	12.21	9.84	8.67	8.54	7.96	7.69	22.7	XVIII	26.1 pc[a]
SCR 0640-0552	06 40 13.97	−05 52 23.5	0.592	170.5	11.23	8.79	7.59	6.84	6.21	5.96	8.5	XV	9.3 pc[a]
SCR 0642-6707	06 42 27.15	−67 07 19.9	0.811	120.4	17.00	14.69	11.60	10.61	10.15	9.81	24.1	XII	17.6 pc[a]
SCR 0644-4223AB	06 44 32.09	−42 23 45.2	0.184	159.7	15.34	13.08	10.32	9.93	9.27	8.98	22.9	XXV	17.5 pc[a]
SCR 0702-6102	07 02 50.33	−61 02 47.6	0.786	041.4	17.50	15.10	11.73	10.36	9.85	9.52	15.9	X	10.8 pc[a]
SCR 0713-0511	07 13 11.23	−05 11 48.6	0.304	183.6	11.76	9.31	8.84	7.65	7.08	6.82	13.1	XXV	13.5 pc[a]
SCR 0717-0501	07 17 17.10	−05 01 04.0	0.580	133.6	13.86	11.34	8.83	8.87	8.35	8.05	15.9	XV	13.2 pc[a]
SCR 0723-8015	07 23 59.65	−80 15 17.8	0.828	330.4	18.68	16.44	13.27	11.30	10.82	10.44	19.3	X	17.1 pc[a]
SCR 0724-3125	07 24 21.23	−31 25 57.7	0.209	282.6	15.25	12.35	10.25	9.79	9.22	8.89	24.5	XXV	
SCR 0733-4406	07 33 42.67	−44 06 12.5	0.298	161.5	16.19	13.89	11.53	10.32	9.73	9.44	22.3	XXV	
SCR 0736-3024	07 36 56.69	−30 24 16.3	0.424	145.7	14.76	12.06	9.46	9.36	8.79	8.49	20.2	XV	17.3 pc[a]
SCR 0740-4257	07 40 11.80	−42 57 40.1	0.714	318.1	14.52	12.37	9.99	8.68	8.09	7.77	10.0	XV	7.2 pc[a]
SCR 0754-3809	07 54 54.86	−38 09 37.4	0.401	351.4	16.90	14.68	11.75	10.01	9.42	9.08	12.0	XV	11.3 pc[a]
SCR 0803-1939	08 03 26.89	−19 39 28.2	0.292	149.5	15.19	12.66	10.02	10.02	9.45	9.15	23.8	XXV	
SCR 0805-5912	08 05 46.18	−59 12 50.6	0.637	155.0	15.76	13.76	11.33	10.07	9.52	9.22	20.4	XII	19.4 pc[a]
SCR 0827-2526	08 27 06.99	−25 26 54.2	0.216	167.9	14.91	12.29	10.12	9.65	9.09	8.78	23.8	XXV	
SCR 0837-2819	08 37 20.42	−28 19 57.5	0.256	140.7	17.05	14.60	11.95	10.73	10.19	9.89	24.4	XXV	
SCR 0838-5855	08 38 02.24	−58 55 58.7	0.320	188.9	18.44	16.11	12.44	10.31	9.71	9.27	8.4	XVIII	8.0 pc[a]
SCR 0840-3113	08 40 56.62	−31 13 32.6	0.226	160.0	15.57	13.32	11.35	10.06	9.54	9.27	23.8	XXV	
SCR 0850-0318	08 50 08.60	−03 18 26.3	0.223	260.3	12.49	10.43	9.77	8.63	8.02	7.82	21.2	XXV	
SCR 0852-3507	08 52 54.12	−35 07 32.7	0.346	272.3	14.89	12.79	10.17	9.77	9.19	8.94	24.7	XXV	
SCR 0853-3924	08 53 28.65	−39 24 41.0	0.356	262.3	13.21	10.86	8.34	8.51	7.94	7.72	15.1	XXV	
SCR 0853-4137	08 53 55.16	−41 37 35.7	0.194	316.7	15.65	13.36	11.13	9.94	9.37	9.10	20.4	XXV	
SCR 0914-4134	09 14 17.43	−41 34 38.9	0.749	312.5	16.33	13.69	10.98	9.98	9.42	9.12	18.2	XV	14.6 pc[a]
SCR 0939-4300	09 39 44.66	−43 00 27.3	0.394	209.4	14.05	12.14	10.30	9.50	8.87	8.64	24.8	XXV	
SCR 1107-3420B	11 07 50.25	−34 21 00.6	0.287	167.0	16.34	14.14	11.81	10.26	9.70	9.41	19.2	XXV	19.1 pc[a,c]
SCR 1110-3608	11 10 29.03	−36 08 24.7	0.527	268.5	17.20	15.07	12.72	10.93	10.34	10.00	22.3	XV	23.8 pc[a]
SCR 1124-3900	11 24 23.24	−39 00 43.1	0.186	168.3	15.67	13.65	11.37	10.00	9.45	9.10	19.1	XXV	
SCR 1125-3834	11 25 37.28	−38 34 43.2	0.586	252.1	16.04	13.80	11.66	10.09	9.51	9.19	18.1	XV	20.5 pc[a]
SCR 1138-7721	11 38 16.82	−77 21 48.0	2.141	286.7	16.45	14.12	11.45	9.40	8.89	8.52	8.8	VIII	8.18 pc[b]
SCR 1147-5504	11 47 52.49	−55 04 11.9	0.192	011.3	14.96	12.23	10.25	9.67	9.08	8.81	24.1	XVIII	23.1 pc[a]
SCR 1157-0149	11 57 45.56	−01 49 02.4	0.451	116.4	17.29	15.13	12.62	10.90	10.35	10.02	22.2	XV	21.3pc[a]
SCR 1204-4037	12 04 15.54	−40 37 52.6	0.695	150.0	14.70	12.61	10.72	9.57	9.02	8.75	21.2	XV	25.2 pc[a]
SCR 1206-3500	12 06 58.52	−35 00 52.2	0.422	229.3	15.55	13.46	11.19	10.01	9.40	9.13	21.0	XV	17.7 pc[a]
SCR 1209-3815	12 09 23.61	−38 15 42.6	0.254	207.9	16.38	14.15	11.82	10.33	9.75	9.45	20.0	XXV	
SCR 1210-2213AB	12 10 42.18	−22 13 09.0	0.286	038.2	13.56	11.41	9.92	9.03	8.66	8.37	24.5	XXV	[c]
SCR 1214-4603	12 14 40.01	−46 03 14.4	0.750	250.8	16.80	14.53	11.60	10.32	9.75	9.44	18.0	XV	14.2 pc[a]
SCR 1217-7810	12 17 26.93	−78 10 45.9	0.212	056.6	17.55	15.69	13.15	11.20	10.64	10.36	24.5	XVIII	23.3 pc[a]
SCR 1217-3557	12 17 55.84	−35 57 14.6	0.208	274.4	15.05	13.06	11.02	9.94	9.33	9.09	24.4	XXV	
SCR 1220-8302	12 20 03.71	−83 02 29.2	0.243	244.2	17.03	14.94	12.80	10.97	10.39	10.07	25.0	XVIII	26.3 pc[a]
SCR 1224-5339	12 24 24.44	−53 39 08.8	0.189	251.9	16.93	14.78	12.30	10.51	9.93	9.65	18.1	XVIII	26.3 pc[a]
SCR 1227-4039	12 27 03.90	−40 39 39.6	0.201	233.7	12.90	10.82	9.40	8.93	8.27	8.08	24.4	XXV	
SCR 1230-3411	12 30 01.76	−34 11 24.2	0.527	234.9	15.29	13.18	10.92	9.34	8.77	8.44	12.6	XV	11.7 pc[a]
SCR 1240-8116	12 40 56.05	−81 16 31.1	0.492	279.8	15.15	13.12	11.25	9.73	9.16	8.89	19.2	XII	19.2 pc[a]

Table 3
(Continued)

Name	R.A. (J2000)	Decl. (J2000)	μ ($''$ yr^{-1})	θ ($^\circ$)	B_J	R_{59F}	$I_{\rm IVN}$	J	H	K_s	Est Dist (pc)	TSN	Notes
SCR 1241-4655	12 41 03.26	−46 55 23.4	0.260	259.3	12.84	10.44	9.07	8.68	8.09	7.81	21.5	XXV	
SCR 1245-5506	12 45 52.60	−55 06 49.9	0.412	107.0	14.84	12.82	10.34	8.99	8.43	8.12	11.5	XII	11.3 pc[a]
SCR 1247-0525	12 47 14.74	−05 25 13.5	0.722	319.8	15.90	13.38	10.92	10.13	9.62	9.29	24.2	XV	20.3 pc[a]
SCR 1254-3811B	12 54 35.41	−38 11 11.5	0.161	121.1	12.00	11.15	10.21	9.06	8.45	8.23	22.0	XXV	[c]
SCR 1343-4002	13 43 41.48	−40 02 29.3	0.243	117.8	16.44	14.05	11.37	10.14	9.61	9.25	18.0	XXV	
SCR 1347-7610	13 47 56.80	−76 10 20.0	0.194	089.7	12.40	10.27	8.88	8.62	8.01	7.77	22.5	XVIII	29.2 pc[a]
SCR 1410-2750	14 10 22.57	−27 50 59.2	0.186	241.6	17.04	14.83	12.63	10.89	10.31	10.05	24.8	XXV	
SCR 1420-7516	14 20 36.84	−75 16 05.9	0.195	243.7	14.23	12.68	10.45	9.44	8.91	8.63	21.3	XVIII	17.9 pc[a]
SCR 1437-2613	14 37 51.41	−26 13 27.7	0.190	231.5	12.98	10.24	9.57	8.95	8.17	7.97	23.6	XXV	
SCR 1441-7338	14 41 14.42	−73 38 41.4	0.207	029.0	18.28	16.15	13.05	11.20	10.61	10.27	19.0	XVIII	17.2 pc[a]
SCR 1444-3426	14 44 06.58	−34 26 47.3	0.451	187.7	15.01	12.49	10.47	9.74	9.18	8.88	24.0	XV	17.7 pc[a]
SCR 1448-5735	14 48 39.82	−57 35 17.7	0.202	188.8	12.47	10.60	12.46	9.15	8.56	8.43	18.2	XVIII	62.4 pc[a]
SCR 1450-3742	14 50 02.86	−37 42 10.1	0.449	212.2	15.41	13.23	11.30	9.95	9.37	9.07	21.2	XV	25.9 pc[a]
SCR 1456-7239	14 56 02.29	−72 39 41.4	0.207	225.0	16.50	14.22	11.99	10.62	10.06	9.74	24.9	XVIII	22.8 pc[a]
SCR 1511-3403	15 11 38.62	−34 03 16.6	0.561	202.9	16.04	14.05	12.09	10.05	9.42	9.13	16.1	XV	20.5 pc[a]
SCR 1528-3807	15 28 50.57	−38 07 41.0	0.376	232.5	13.74	11.96	10.63	9.25	8.59	8.38	21.1	XXV	
SCR 1532-3622	15 32 13.90	−36 22 31.0	0.438	235.4	15.48	13.50	11.96	10.10	9.54	9.28	23.0	XV	31.5 pc[a]
SCR 1551-3554	15 51 12.15	−35 54 48.4	0.193	205.1	15.94	14.26	12.39	10.12	9.49	9.19	16.9	XXV	
SCR 1601-3421	16 01 55.72	−34 21 57.0	0.683	118.2	17.05	15.75	13.27	10.96	10.33	9.98	20.2	XV	18.7 pc[a]
SCR 1604-3303B	16 04 18.97	−33 03 10.6	0.322	249.0	19.52	17.48	14.34	11.96	11.34	10.95	20.5	XXV	[c,d,e]
SCR 1626-3812	16 26 51.69	−38 12 32.6	0.397	229.7	17.46	15.82	13.15	10.37	9.80	9.44	11.7	XXV	
SCR 1630-3633AB	16 30 27.29	−36 33 56.0	0.413	249.2	15.94	14.39	11.88	10.04	9.50	9.03	14.8	XV	15.4 pc[a]
SCR 1636-4041	16 36 57.58	−40 41 08.8	0.284	192.6	14.69	12.88	10.93	9.20	8.57	8.31	13.3	XXV	
SCR 1637-4703	16 37 56.52	−47 03 45.5	0.503	215.4	16.17	13.49	14.16	10.60	10.04	9.70	20.8	XV	32.0 pc[a]
SCR 1639-4652	16 39 25.81	−46 53 00.4	0.301	195.5	14.46	12.44	10.46	9.30	8.69	8.43	17.6	XXV	
SCR 1656-2046	16 56 33.61	−20 46 37.4	0.275	224.0	18.65	16.39	13.66	11.30	10.71	10.37	17.8	XXV	
SCR 1656-4238	16 56 49.84	−42 38 48.1	0.220	191.9	14.42	11.96	10.32	9.52	8.86	8.61	23.4	XXV	
SCR 1712-1907	17 12 26.05	−19 07 04.1	0.231	117.6	17.03	15.40	14.10	10.72	10.16	9.89	22.1	XXV	
SCR 1716-2239	17 16 35.68	−22 39 49.2	0.294	184.4	17.33	15.94	14.82	10.69	10.07	9.84	24.5	XXV	
SCR 1721-3129	17 21 36.75	−31 29 54.0	0.184	180.0	12.21	10.42	9.99	8.51	7.95	7.82	19.8	XXV	
SCR 1724-3727	17 24 06.97	−37 27 52.7	0.241	203.9	16.53	14.58	12.64	10.69	10.12	9.79	23.4	XXV	
SCR 1726-8433	17 26 23.04	−84 33 08.4	0.518	134.8	15.42	13.31	11.16	9.87	9.33	9.02	20.1	XII	20.6 pc[a]
SCR 1728-0143	17 28 11.06	−01 43 57.0	0.184	145.0	15.61	13.93	11.98	9.89	9.32	9.01	16.4	XXV	
SCR 1731-2452	17 31 03.84	−24 52 43.6	0.199	217.6	14.76	13.39	13.00	9.27	8.61	8.38	9.5	XXV	
SCR 1733-2452	17 33 04.62	−24 52 57.1	0.251	181.9	15.64	14.40	14.36	10.63	9.97	9.77	22.6	XXV	
SCR 1738-5942	17 38 41.02	−59 42 24.4	0.280	148.2	16.57	14.21	11.93	10.38	9.83	9.58	20.8	XVIII	24.0 pc[a]
SCR 1745-2020	17 45 17.51	−20 20 46.0	0.192	207.3	13.32	11.51	11.16	9.14	8.52	8.39	20.4	XXV	
SCR 1746-8211	17 46 21.54	−82 11 56.6	0.228	184.9	13.42	11.36	9.65	8.55	7.99	7.71	14.6	XVIII	15.5 pc[a]
SCR 1746-3214	17 46 40.66	−32 14 04.4	0.240	062.2	17.94	15.89	12.71	10.33	9.74	9.39	9.9	XXV	
SCR 1750-2530	17 50 07.56	−25 30 21.0	0.271	226.7	16.75	14.89	12.48	10.65	9.95	9.68	19.1	XXV	
SCR 1755-0455	17 55 30.65	−04 55 42.4	0.195	073.0	16.63	15.34	13.76	10.70	10.08	9.78	21.5	XXV	
SCR 1800-0755	18 00 33.93	−07 55 02.8	0.204	219.3	14.71	13.56	12.08	9.86	9.26	8.98	21.1	XXV	
SCR 1802-1919	18 02 28.73	−19 19 18.7	0.189	156.8	16.14	14.51	13.76	10.64	9.97	9.77	23.1	XXV	
SCR 1805-2042	18 05 15.13	−20 42 28.0	0.272	232.3	16.84	15.08	12.96	10.58	9.95	9.62	17.4	XXV	
SCR 1809-0755A	18 09 36.84	−07 55 26.5	0.193	193.0	14.61	13.48	12.59	9.88	9.22	9.01	19.9	XXV	[c]
SCR 1820-6225	18 20 49.35	−62 25 52.7	0.190	164.8	13.35	11.18	8.44	9.14	8.49	8.30	22.4	XVIII	36.6 pc[a]
SCR 1821-0700	18 21 54.16	−07 00 18.0	0.206	216.3	13.93	12.57	12.34	9.63	8.91	8.73	18.5	XXV	
SCR 1826-6542	18 26 46.83	−65 42 39.9	0.311	178.9	18.68	16.44	12.91	10.57	9.96	9.55	9.2	XVIII	9.3 pc[a]
SCR 1841-4347	18 41 09.79	−43 47 32.6	0.790	264.2	17.65	15.19	12.32	10.48	9.94	9.60	14.6	XV	11.9 pc[a]
SCR 1842-2736	18 42 56.66	−27 36 32.8	0.243	156.9	14.94	13.68	13.00	10.02	9.37	9.18	21.0	XXV	
SCR 1844-1310	18 44 59.57	−13 10 24.0	0.195	214.4	16.12	14.84	13.75	10.69	10.12	9.89	23.2	XXV	
SCR 1845-6357AB	18 45 05.09	−63 57 47.7	2.558	074.8	...	16.33	12.53	9.54	8.97	8.51	3.5	VIII	3.85 pc[b]
SCR 1847-1922	18 47 16.69	−19 22 20.8	0.626	230.7	15.36	13.08	10.94	9.91	9.38	9.09	23.0	XV	20.6 pc[a]
SCR 1853-7537	18 53 26.61	−75 37 39.8	0.304	168.7	12.20	9.85	9.09	8.34	7.73	7.50	20.0	XVIII	25.9 pc[a]
SCR 1854-2859	18 54 20.76	−28 59 53.1	0.183	178.3	15.30	13.86	13.03	10.01	9.42	9.20	18.8	XXV	
SCR 1855-6914	18 55 47.87	−69 14 14.8	0.832	145.3	18.01	15.63	12.20	10.47	9.88	9.51	12.5	XII	10.7 pc[a]
SCR 1856-4704AB	18 56 38.40	−47 04 58.3	0.252	131.3	16.29	13.93	11.65	10.29	9.75	9.45	21.4	XVIII	22.6 pc[a]
SCR 1856-4011BC	18 56 59.22	−40 11 41.6	0.219	171.0	16.80	14.72	11.99	10.61	10.00	9.73	21.2	XXV	[c,e]
SCR 1901-0737	19 01 32.37	−07 37 24.3	0.190	227.1	16.53	14.44	12.12	10.57	10.00	9.70	22.4	XXV	
SCR 1901-3106	19 01 59.16	−31 06 45.0	0.214	120.2	15.14	13.87	12.91	9.61	9.01	8.77	13.5	XXV	
SCR 1904-2406	19 04 21.84	−24 06 15.7	0.213	289.9	15.63	13.53	11.59	10.12	9.55	9.27	22.3	XXV	
SCR 1924-0931	19 24 10.95	−09 31 34.1	0.234	165.6	14.76	12.71	10.81	9.83	9.20	8.93	24.5	XXV	
SCR 1927-0409	19 27 13.01	−04 09 49.0	0.264	166.5	16.47	14.77	12.47	10.56	9.94	9.68	20.5	XXV	
SCR 1931-0306	19 31 04.70	−03 06 18.6	0.578	031.0	17.87	16.06	...	11.15	10.56	10.23	18.0	XV	18.0 pc[a]

Table 3
(Continued)

Name	R.A. (J2000)	Decl. (J2000)	μ ($''$ yr^{-1})	θ ($^\circ$)	B_J	R_{59F}	$I_{\rm IVN}$	J	H	K_s	Est Dist (pc)	TSN	Notes
SCR 1932-1119	19 32 08.11	−11 19 57.3	0.244	085.3	15.03	13.09	10.82	9.60	8.98	8.71	17.4	XXV	
SCR 1932-0652	19 32 46.33	−06 52 18.1	0.318	193.3	14.91	13.27	11.50	9.94	9.36	9.10	23.7	XXV	26.7 pc[a, c]
SCR 1932-5005	19 32 48.64	−50 05 38.9	0.257	157.5	16.87	14.51	11.99	10.75	10.11	9.85	24.4	XVIII	23.5 pc[a]
SCR 1959-3631	19 59 21.03	−36 31 03.9	0.436	158.1	11.58	9.44	8.40	8.24	7.62	7.41	19.8	XV	25.0 pc[a]
SCR 1959-6236	19 59 33.55	−62 36 13.4	0.189	288.7	17.48	15.36	12.68	11.07	10.49	10.23	24.3	XVIII	21.9 pc[a]
SCR 1959-5549	19 59 58.76	−55 49 29.6	0.413	169.9	16.19	13.95	11.82	10.47	9.88	9.63	25.0	XII	
SCR 2016-7531	20 16 11.25	−75 31 04.5	0.253	081.3	17.07	14.75	12.25	10.47	9.86	9.51	16.2	XVIII	14.3 pc[a]
SCR 2018-3635	20 18 06.52	−36 35 27.7	0.237	125.0	16.31	14.07	11.46	10.21	9.66	9.44	20.7	XXV	24.9 pc[a]
SCR 2025-1534	20 25 08.55	−15 34 16.1	0.190	179.3	13.33	11.23	9.29	8.91	8.30	8.05	20.9	XXV	
SCR 2025-2259	20 25 18.93	−22 59 06.0	0.191	219.5	15.26	13.26	11.40	10.00	9.48	9.16	23.5	XXV	24.6 pc[a]
SCR 2025-3545	20 25 29.98	−35 45 46.1	0.242	268.7	15.93	13.55	11.31	9.98	9.39	9.04	17.8	XXV	
SCR 2040-5501	20 40 12.40	−55 01 25.7	0.514	125.4	16.56	14.26	12.16	10.56	10.02	9.69	22.9	XII	23.3 pc[a]
SCR 2042-5737AB	20 42 46.44	−57 37 15.3	0.264	142.6	15.07	13.22	11.56	9.97	9.53	9.03	22.7	XVIII	25.3 pc[a]
SCR 2112-5428B	21 12 56.65	−54 28 06.8	0.152	117.0	17.08	15.27	13.49	10.15	9.54	9.32	13.5	XVIII	
SCR 2122-4314	21 22 16.92	−43 14 05.0	0.262	184.7	14.26	12.06	10.01	9.13	8.53	8.21	17.0	XXV	14.9 pc[a]
SCR 2130-7710	21 30 07.07	−77 10 37.5	0.589	118.0	18.28	15.93	13.44	11.29	10.67	10.36	20.6	XII	18.4 pc[a]
SCR 2230-5244	22 30 27.95	−52 44 29.1	0.369	125.7	19.02	16.34	...	11.85	11.24	10.91	24.6	XVIII	24.8 pc[a]
SCR 2241-6119A	22 41 44.36	−61 19 31.2	0.184	124.0	15.64	13.65	11.70	10.21	9.61	9.35	23.2	XVIII	26.6 pc[a]
SCR 2252-2220	22 52 25.82	−22 20 06.8	0.299	187.6	14.95	12.82	10.85	9.70	9.11	8.86	21.3	XXV	24.1 pc[a]
SCR 2253-1238	22 53 42.76	−12 38 43.3	0.191	104.4	13.49	10.90	9.78	9.02	8.40	8.16	23.4	XXV	
SCR 2307-8452	23 07 19.88	−84 52 03.8	0.613	097.2	16.33	14.16	11.83	10.36	9.81	9.47	20.6	XII	19.9 pc[a]
SCR 2330-0838A	23 30 16.88	−08 38 37.4	0.190	090.8	15.47	13.57	11.58	9.97	9.36	9.12	19.9	XXV	[c]
SCR 2335-6433A	23 35 18.43	−64 33 42.4	0.196	103.1	11.80	9.97	9.02	8.64	8.02	7.86	24.5	XVIII	35.9 pc[a]
SCR 2356-0429	23 56 20.41	−04 29 31.6	0.204	095.2	14.74	12.75	10.54	9.64	9.04	8.78	21.6	XXV	

Notes.
[a] Winters et al. (2011).
[b] Henry et al. (2006).
[c] Common proper motion, see Table 6.
[d] μ and/or position angle suspect.
[e] Not detected during automated search but noticed by eye during blinking process.

plane, this standard deviation error is typically 15%, which results in total errors for the distances of ∼30%. Near the Galactic plane, where crowding is an issue and one or more images on the plates may be corrupted by background sources, the photometry is less accurate and consistent between the *BRI* plate magnitudes, so errors may climb to 50% or more in extreme cases.

Distance estimates will be erroneous for certain classes of stars, notably WDs and subdwarfs, both of which are underluminous compared to main-sequence stars of the same color. Thus, the overestimated distances for these candidates are listed in brackets in Table 2. Where possible, WD candidates have more accurate distances listed in the notes of Table 5. SuperCOSMOS data were gathered manually for companions noticed by eye during the blinking process that appeared to have CPM with a target being checked. These objects were typically not picked up during the initial search because they are fainter than the $R = 16.5$ cutoff. Some lack SuperCOSMOS data, and therefore distance estimates, because they are blended on the plates or are too faint for reliable SuperCOSMOS magnitudes.

We anticipate a roughly 1% contamination rate of false positive proper motion objects in the sample of 2817 systems. Some false positives are particularly bright stars on the *B* or *I* plates where the blinker must use diffraction spikes to judge the location of the image center because the image itself is large and/or asymmetric. In these cases, we erred on the side of inclusion, so the list likely contains a few bright objects that do not really exhibit proper motion. Objects near plate edges are a second type of false positive. Plate edges are effectively "cut" at designated locations to provide full sky coverage. In some cases, individual star images are split between, for example, a *B* plate and an *R* plate, and those images are offset, thereby causing a false proper motion. These detections were kept as candidates because they meet the SCR search criteria, but may not be proper motion objects.

5. ANALYSIS

5.1. Color–Magnitude Diagram

Figures 1 and 2 show color–magnitude diagrams for SCR objects and previously known systems recovered during the present search. As in previous SCR efforts, the systems discovered here are generally fainter and redder than previously known systems, with a concentration of points around $R \sim 15$ and $(R - J) \sim 3$, representing red dwarfs of spectral types ∼M2.0V. The 21 SCR objects with $(R - J) \geqslant 4.5$ are estimated to have spectral types of M5.0V to M8.0V. As in TSN XVIII, many of the systems discovered are brighter and bluer than in earlier SCR search papers. There are 55 objects with *R* brighter than 10, with SCR 1843-0146 at $R = 8.54$ mag being the brightest. TSN XVIII reported only nine objects brighter than $R = 10$. In addition to sample size, the difference in detection rates may be due to the omission during the TSN XVIII search of several plates near the Galactic plane, where blue proper motion objects may be found superimposed on the swath of background stars and dust of the plane. Because of their blue colors, none of these objects have re-

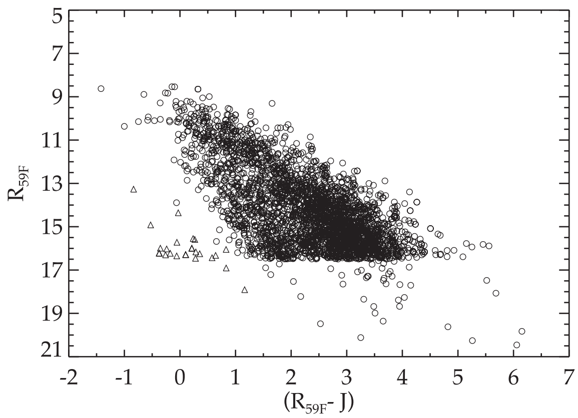

Figure 1. Color–apparent magnitude diagram for new SCR objects with $0\farcs40$ yr^{-1} > $\mu \geqslant 0\farcs18$ yr^{-1} found during the search described in this paper. Data points below $R_{59F} = 16.5$ are common proper motion companions found during the blinking process. Triangles represent white dwarf candidate objects from the RPM diagram.

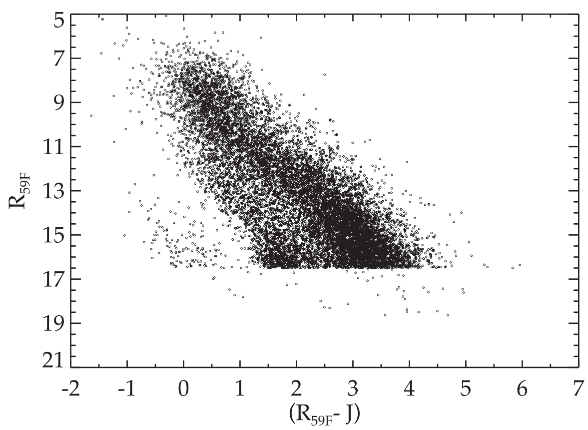

Figure 2. Color–apparent magnitude diagram for known objects with $0\farcs40$ yr^{-1} > $\mu \geqslant 0\farcs18$ yr^{-1} found during the search described in this paper. Data points below $R_{59F} = 16.5$ are common proper motion companions found during the blinking process.

liable distance estimates presented here, as the suite of distance estimate equations is only applicable to red stars. Nonetheless, the stars are bright and have confirmed proper motions so are certainly worthy of follow-up work. Points below the search cutoff of $R = 16.5$ represent CPM companions noticed by eye during the blinking process. In addition, WD candidates represented by triangles are immediately visible, clustered around $R \sim 16$ and $(R - J) \sim 0$. The subdwarf population, while less well defined, is also noticeable as a group of points stretching from $R \sim 12$ and $(R - J) \sim 0$ to $R \sim 16$ and $(R - J) \sim 2$. Further assessment of WD and cool subdwarf candidates can be accomplished using an RPM diagram.

5.2. Reduced Proper Motion Diagram

Figure 3 shows the RPM diagram for SCR objects found during the present survey. The RPM diagram is a powerful tool for estimating the luminosity class of a star. It is similar in nature to the H-R diagram except that the proper motion is used instead of a distance, relying on the inverse statistical relationship between proper motion, μ, and distance. While obviously not foolproof—for example, subdwarfs may masquerade as main-sequence stars, and vice versa—the diagram allows for the rough classification of systems. The equation used here to determine the pseudo-absolute magnitude $H_{R_{59F}}$ plotted on the vertical axis

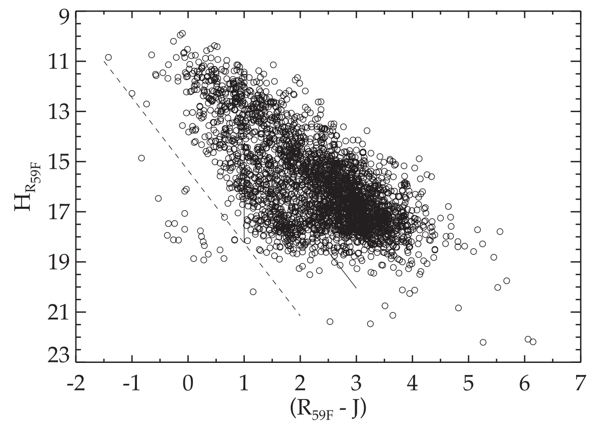

Figure 3. Reduced proper motion diagram for new SCR systems with $0\farcs40$ yr^{-1} > $\mu \geqslant 0\farcs18$ yr^{-1} found during the search described in this paper. The dashed line separates candidate white dwarfs and subdwarfs and matches that in other TSN papers. The solid lines denote the upper and bluest boundaries of the cool subdwarf candidate section.

of Figure 3 is

$$H_{R_{59F}} = R_{59F} + 5 + 5 \log \mu.$$

The dashed line in Figure 3 is the same as for similar RPM plots in TSN XII, XV, and XVIII, and is used to separate WDs from subdwarfs. The solid lines, while not plotted in previous papers, are used to denote the cool subdwarf area on the plot. We find 23 new WD candidates from this effort. As in previous searches, we also use the RPM diagram to identify cool subdwarf candidates. From this search, there are 360 subdwarf candidates defined as having $R - J > 1.0$ and $H_{R_{59F}}$ up to 4.0 mag brighter than the WD–subdwarf line. Although this is a somewhat arbitrary definition, it has proven reliable for delineating subdwarfs from both main-sequence stars and WDs. Samples selected from the red dwarf, cool subdwarf, and WD regions of the RPM diagram are discussed in the next three sections.

5.3. SCR Red Dwarfs within 25 pc

Table 3 lists the 152 red dwarf systems estimated to be within 25 pc found during the SCR proper motion surveys. We provide coordinates, proper motions, plate and 2MASS magnitudes, a photometric distance estimate using the suite of relations presented in TSN VIII, the paper in which the object was first published, and notes. Nine of the systems are estimated to be in the RECONS 10 pc sample. We reported trigonometric parallaxes for three of the systems in Henry et al. (2006), including SCR 0630-7643AB at 8.76 pc, SCR 1138-7721 at 8.18 pc, and SCR 1845-6357AB at 3.85 pc. As of 2011 January 1, the latter system ranked as the 23rd nearest system to the Sun.[9]

The current search adds 79 systems to the 25 pc sample, more than doubling the number of systems within this volume from previous SCR search efforts, including two systems likely to be within 10 pc—SCR 1731-2452 at 9.5 pc and SCR 1746-3214 at 9.9 pc. Four of the nine objects estimated to be within 10 pc have proper motions greater than $0\farcs50$ yr^{-1}, the cutoff of the LHS catalog, while the other five are moving more slowly. For objects between 10 and 25 pc, 118 of 143 have proper motions less than $0\farcs50$ yr^{-1}. The fact that so many nearby objects have

[9] http://www.recons.org/TOP100.posted.htm

Table 4
SCR Cool Subdwarf Candidates

Name	R.A. (J2000)	Decl. (J2000)	μ ($''$ yr^{-1})	θ (°)	B_J	R_{59F}	$I_{\rm IVN}$	J	H	K_s	Est Dist (pc)	TSN	Notes
SCR 0002-4644A	00 02 35.66	−46 44 51.9	0.197	122.5	17.20	15.39	14.70	14.23	13.60	13.45	[328.3]	XXV	a
SCR 0002-4644B	00 02 36.20	−46 44 57.8	0.240	112.3	21.82	19.48	18.33	16.95	16.17	15.92	[625.3]	XXV	a
SCR 0005-6152	00 05 31.98	−61 52 48.7	0.283	161.1	18.40	16.25	15.16	14.36	13.70	13.69	[324.9]	XVIII	
SCR 0008-5843	00 08 15.37	−58 43 31.7	0.224	123.7	16.40	14.54	13.45	12.91	12.33	12.15	[167.0]	XVIII	
SCR 0009-7305	00 09 48.15	−73 05 37.5	0.276	117.6	18.10	16.04	15.31	14.58	14.04	13.87	[380.3]	XVIII	

Notes.
[a] Common proper motion system, see Table 6.
[b] Fewer than six relations for distance estimate, therefore unreliable (in brackets).
[c] Coordinates not J2000.0 due to lack of proper motion or 2MASS data. SuperCOSMOS coordinates used instead.
[d] Proper motion or position angle suspect.

(This table is available in its entirety in machine-readable and Virtual Observatory (VO) forms in the online journal. A portion is shown here for guidance regarding its form and content.)

relatively low proper motions suggests that there may yet be more nearby systems at even lower proper motions.

5.4. SCR Cool Subdwarfs

During the SCR surveys, we have also identified potential cool subdwarfs, including 598 total candidates, of which 360 are from this paper. We provide data similar to that given for the SCR red dwarfs in Table 4; the complete list is available in the online version of the Journal.

Subdwarfs are less luminous than their main-sequence counterparts and so have distance estimates that are larger than their true distances. For this reason, their distances have been listed in brackets in Tables 2 and 4. The methodology used to identify the subdwarfs, detailed in Section 5.2, leads to some contamination of the sample by WDs and main-sequence objects, so spectroscopic confirmation is desired. We have continuing programs to spectroscopically confirm cool subdwarfs (Jao et al. 2008) and to measure their distances via trigonometric parallax, as described in Jao et al. (2005) and Jao et al. (2011), the latter reporting the first two SCR subdwarf parallaxes, for SCR 1107-4135 (67.61 pc) and SCR 1916-3638 (67.66 pc).

5.5. SCR White Dwarfs

During the SCR surveys, we found 46 WD candidates, which are listed in Table 5. All of the WD candidates were selected based on the criteria described in Section 5.2. The current search has provided 23 WD candidates, matching the total of our previous SCR searches. In Table 5, we provide the same data as for the 25 pc red dwarf and subdwarf tables, except the listed distance estimates are from the single-color linear relation of Oppenheimer et al. (2001). Ten WD candidates are estimated to be within 25 pc using this relation, although none have been added to the 10 pc sample.[10]

Fifteen of the 46 candidates discovered have been spectroscopically confirmed to be WDs by Subasavage et al. (2007, 2008), and similar spectroscopic confirmation is underway for the rest of the SCR WD sample. Of particular interest are three relatively hot WDs ($T_{\rm eff}$ > 10,000 K) estimated to be within 25 pc—SCR 1920-3611 at 14.7 pc, SCR 1107-3420A at 16.0 pc, and SCR 0711-2518 at 20.3 pc (see Section 5.8). The distance relation of Oppenheimer et al. (2001) becomes unreliable at hotter effective temperatures, in effect, because hot WDs are underrepresented in the local neighborhood sample of WDs that was used to generate the relation. Thus, we adopt the distance estimates determined by Subasavage et al. (2007, 2008) using $VRIJHK_s$ and fits to atmospheric models. These distance estimates, as well as those for all of the spectroscopic confirmations, are listed in the notes of Table 5.

In Subasavage et al. (2009), we reported trigonometric parallaxes for four of these WDs, SCR 0753-2524 (17.69 pc), SCR 0821-6703 (10.65 pc), SCR 2012-5956 (16.55 pc), and SCR 2016-7945 (24.96 pc). Using the best distance estimates available, we find seven WDs predicted to be within 25 pc, Of these, three have proper motions less than 0$''$.50 yr^{-1}, while the 39 beyond 25 pc all have proper motions less than 0$''$.50 yr^{-1}.

5.6. Common Proper Motion Systems

This search yielded 250 potential CPM systems, listed in Table 6. These systems were found in two ways. First, if two sources appeared to be CPM in blinking frames, they were noted for further investigation. Second, we used search criteria that linked pairs of objects with separations $\leqslant$1200$''$, $\Delta\mu \leqslant$ 0$''$.025 yr^{-1}, and $\Delta\theta \leqslant 15°$. In total, 121 systems have all components as new discoveries, and an additional 129 systems have at least one new SCR component. The list includes 239 doubles, 10 triples, and one possible quintuple system. Table 6 lists identifiers for system members, the proper motions and position angles for each component, separations and position angles between the components, distance estimates from the *BRIJHK* photometry where available, and notes. The separations and position angles were determined using 2MASS positions and spherical trigonometric relations. As in TSN XVIII, because of errors in the plate relations, distance estimates that agree to within a factor of two are considered to indicate a candidate system. Table 6 is broken into two classes of CPM candidate systems depending on the reliability of the physical association. Those at the top we consider probable because all components of the systems have complete sets of μ and θ values that match within 0$''$.025 yr^{-1}, and 15°. The second class of systems have either (1) mismatched μ and θ values extracted from SuperCOSMOS, or (2) no available values. In the former case, the pairs often appeared to be better matched when blinking the plate images, and the available data are suspected to be erroneous. Companions that were not retrieved during the initial search tended to be either fainter than the $R_{59F} = 16.5$ cutoff or moving slightly beyond the limits of the proper motion range searched.

[10] We note that the potentially nearest WD candidate, SCR 1800-5112B at 10.2 pc from TSN XVIII, has colors that are inconsistent with it actually being a WD. Nonetheless, we include this object in Table 5 because it falls below the WD cutoff line drawn in the RPM diagram.

Table 5
SCR White Dwarf Candidates

Name	R.A. (J2000)	Decl. (J2000)	μ ($'' \mathrm{yr}^{-1}$)	θ (°)	B_J	R_{59F}	I_{IVN}	J	H	K_s	Est. Dist.[a] (pc)	TSN	Notes
SCR 0004-6120B	00 04 45.41	−61 23 40.0	0.171	127.6	16.86	16.76	16.53	16.43	15.93	16.47	59.3	XVIII	
SCR 0018-6851	00 18 08.56	−68 51 19.4	0.220	091.6	16.55	16.46	16.48	16.62	16.13	17.18	52.2	XVIII	
SCR 0104-5742B	01 04 12.14	−57 42 48.6	0.239	091.1	16.19	15.89	15.78	15.67	15.56	15.75	34.5	XVIII	DA6.5[c], 44.4 pc[c]
SCR 0125-4545	01 25 18.04	−45 45 31.2	0.759	137.8	17.04	16.13	15.80	15.11	14.84	14.91	24.7	XV	DA8.5[c], 24.9 pc[c]
SCR 0150-7207	01 50 38.49	−72 07 16.8	0.334	223.9	16.18	15.71	15.24	15.65	15.64	15.42	28.0	XVIII	DC[c], 36.2 pc[c]
SCR 0245-6038	02 45 27.77	−60 38 58.2	0.196	049.6	17.15	16.36	16.07	15.83	15.47	15.66	29.9	XVIII	
SCR 0252-7522	02 52 45.57	−75 22 44.5	0.496	063.5	17.10	16.32	16.17	15.77	15.76	15.34	29.6	XII	DC[b], 34.7 pc[b]
SCR 0311-6215	03 11 21.28	−62 15 15.9	0.416	083.3	15.68	16.05	16.13	16.13	16.31	16.50	60.4	XII	DA3.5[b]
SCR 0337-4609B	03 37 12.04	−46 09 59.6	0.286	141.9	19.61	17.91	17.55	16.75	16.23	16.09	31.2	XXV	
SCR 0355-5611	03 55 31.89	−56 11 28.2	0.279	029.1	17.36	16.46	16.11	16.05	15.53	15.44	28.9	XVIII	
SCR 0402-4037	04 02 41.53	−40 37 47.8	0.307	189.2	15.66	15.55	15.38	15.31	15.30	15.25	33.8	XXV	
SCR 0426-4153	04 26 43.97	−41 53 41.2	0.262	103.2	17.16	16.43	16.26	15.86	15.70	15.62	32.4	XXV	
SCR 0429-5423B	04 29 05.93	−54 23 03.6	0.170	039.7	17.91	17.08	16.97	...	...	...	40.5	XVIII	[d]
SCR 0454-3439	04 54 23.72	−34 39 48.3	0.231	126.1	15.97	16.30	16.34	16.56	17.41	15.96	65.8	XXV	
SCR 0605-3857	06 05 35.56	−38 57 13.2	0.186	000.3	16.49	16.35	16.30	16.41	17.12	16.34	47.8	XXV	
SCR 0710-4144	07 10 39.41	−41 44 24.8	0.225	123.9	16.18	16.00	15.78	15.78	15.77	15.12	39.4	XXV	
SCR 0711-2518	07 11 14.39	−25 18 15.1	0.223	334.4	14.42	14.36	13.97	14.39	14.39	14.49	20.3	XXV	DA4.5[c], 30.5 pc[c]
SCR 0711-0240	07 11 48.86	−02 40 30.2	0.198	188.9	16.12	15.99	16.09	16.34	15.76	17.09	40.8	XXV	
SCR 0715-3706	07 15 50.55	−37 06 42.2	0.311	303.6	16.87	16.46	16.21	16.18	15.99	16.34	41.4	XXV	
SCR 0728-1302	07 28 05.01	−13 02 56.4	0.204	188.9	14.71	14.92	14.95	15.45	15.58	15.55	31.9	XXV	
SCR 0753-2524	07 53 56.58	−25 24 01.4	0.426	300.2	16.18	15.25	15.67	14.75	14.47	14.30	16.2	XV	DC[c], 17.69 pc[e]
SCR 0818-3110	08 18 40.27	−31 10 20.4	0.842	162.6	15.74	14.80	14.52	14.92	14.73	14.83	13.1	XV	DZ[c], 23.8 pc[c]
SCR 0821-6703	08 21 26.67	−67 03 20.4	0.758	327.6	16.44	15.08	14.61	13.79	13.57	13.34	11.0	XII	DA10.0[b], 10.65 pc[e]
SCR 0840-7826	08 40 29.00	−78 26 46.0	0.399	010.3	16.06	15.82	15.77	15.62	15.57	15.47	34.8	XVIII	
SCR 0841-3407	08 41 59.80	−34 07 31.2	0.273	157.8	16.50	16.17	15.99	15.88	15.54	15.67	38.1	XXV	
SCR 0857-6032	08 57 08.21	−60 32 45.4	0.217	333.3	15.20	15.37	15.45	15.94	16.20	15.78	38.2	XVIII	
SCR 0859-3647	08 59 11.29	−36 47 30.8	0.332	267.0	15.59	15.59	15.67	15.32	15.35	15.02	37.2	XXV	
SCR 0909-0903	09 09 35.15	−09 03 20.2	0.240	222.3	16.18	16.23	16.22	16.40	16.25	16.60	51.9	XXV	
SCR 1046-4146	10 46 45.99	−41 46 38.9	0.261	122.6	16.52	16.05	15.59	15.22	15.08	14.96	32.8	XXV	
SCR 1107-3420A	11 07 47.89	−34 20 51.5	0.287	168.0	13.98	13.89	13.83	13.95	13.98	14.05	16.0	XXV	DA3.5[b], 28.2 pc[b]
SCR 1246-1236	12 46 00.70	−12 36 19.4	0.406	305.4	15.84	15.80	15.86	15.74	15.73	16.13	39.9	XV	DA4.0[b], 62.6 pc[b]
SCR 1402-0736	14 02 34.11	−07 36 50.0	0.328	257.3	16.69	16.29	16.21	16.19	15.92	15.68	38.5	XXV	
SCR 1412-1842B	14 12 20.37	−18 42 41.7	0.174	132.6	17.77	16.91	16.62	16.08	15.81	15.70	36.5	XXV	
SCR 1447-3931	14 47 33.10	−39 31 10.9	0.308	217.7	16.55	16.25	16.10	15.89	15.58	16.13	40.7	XXV	
SCR 1800-5112B	18 00 29.91	−51 12 12.7	0.317	220.3	14.23	13.67	11.46	13.42	12.90	12.69	10.2	XVIII	
SCR 1821-5951	18 21 59.54	−59 51 48.5	0.365	194.9	17.49	16.31	15.72	15.20	15.00	14.90	22.2	XVIII	DC[c], 20.9 pc[c]
SCR 1857-2650B	18 57 09.10	−26 50 59.3	0.323	112.9	16.86	16.32	16.29	15.68	15.51	15.54	35.5	XXV	
SCR 1920-3611	19 20 02.83	−36 11 02.7	0.208	132.0	13.08	13.27	13.38	14.10	14.22	14.21	14.7	XXV	DB[c], 41.7 pc[c]
SCR 1959-1543	19 59 34.01	−15 43 39.4	0.186	136.7	15.67	15.72	15.76	15.78	15.76	15.53	41.2	XXV	
SCR 2012-5956	20 12 31.79	−59 56 51.6	1.440	165.6	16.66	15.63	15.13	14.93	15.23	15.41	18.0	VII	DC[b], 16.55 pc[e]
SCR 2016-7945	20 16 49.73	−79 45 53.0	0.434	128.4	16.75	16.09	15.75	15.11	15.03	14.64	29.1	XII	DA8.5[b], 24.96 pc[e]
SCR 2020-7806	20 20 52.98	−78 06 18.7	0.276	209.2	16.03	16.09	16.11	15.92	15.59	15.68	49.1	XVIII	
SCR 2032-4948B	20 32 41.74	−49 48 57.2	0.270	182.4	17.15	16.77	16.73	16.62	15.87	15.88	48.7	XVIII	
SCR 2126-3541	21 26 48.10	−35 41 45.1	0.221	138.7	16.16	16.22	16.22	16.59	16.53	17.08	52.1	XXV	
SCR 2352-4611	23 52 48.01	−07 01 16.1	0.194	094.8	16.31	16.03	15.83	16.27	16.21	14.98	37.1	XXV	
SCR 2354-6023	23 54 50.63	−60 23 16.0	0.230	098.6	16.31	16.06	15.93	15.87	15.77	16.31	38.6	XVIII	

Notes.
[a] Estimate given using relation of Oppenheimer et al. (2001).
[b] Subasavage et al. (2007).
[c] Subasavage et al. (2008).
[d] No 2MASS data available.
[e] Subasavage et al. (2009).

Figures 4 and 5 compare the proper motion sizes and position angles for components of multiple systems, respectively. As is well known, the position angle of an object's proper motion is often better determined than the size of its proper motion, particularly for low proper motions. As such, the position angles are more reliable in helping determine whether or not two moving objects comprise a system. Systems for which at least one component had its proper motion and position angle data gathered manually from the SuperCOSMOS Sky Survey database are marked with open circles. These data were retrieved from the SuperCOSMOS Sky Survey Web site one by one and tend to be less reliable than those from the initial search because the initial search utilized a specialized high proper motion version of the SuperCOSMOS data. The SuperCOSMOS Sky Survey Web site from which some data were retrieved used nearest-neighbor pairing within a restricted radius, while the specialized database used all possible pairings regardless of spurious pairings (which were removed at a later

Table 6
Common Proper Motion Systems

Primary	μ ($'' yr^{-1}$)	θ (°)	Distance (pc)	Companion(s)	μ ($'' yr^{-1}$)	θ (°)	Distance (pc)	Separation ($''$)	Position Angle (°)	Notes
Probable common proper motion systems										
BD-05 6069	0.228	123.8	36.3	SCR 2352-0404B	0.213	128.5	237.0	531.0	1.1	[d]
CF 11339	0.255	276.5	17.8	SCR 1344-4535B	0.247	277.2	26.1	27.6	52.2	
G 077-057	0.241	173.3	91.4	SCR 0329-0502B	0.226	180.5	264.9	15.3	78.4	[b]
G 154-053	0.296	220.7	34.0	SCR 1816-1246B	0.307	232.1	46.0	15.5	45.2	[b]
HD 207554	0.189	100.8	24.0	SCR 2150-1812B	0.182	113.3	111.6	57.4	10.5	[b,d]
LEHPM 2-2835	0.187	129.6	[128.7]	SCR 2125-4408B	0.190	136.2	[384.6]	319.5	216.1	[h]
LEHPM 2-3181	0.188	155.3	85.4	SCR 1140-1749B	0.181	147.8	40.1	433.7	74.6	
LEHPM 2-5986	0.184	159.4	82.6	SCR 2336-3242B	0.180	160.9	91.3	49.0	242.5	
LP 786-023	0.211	156.9	50.7	SCR 0857-1917B	0.199	158.8	62.5	37.5	305.1	
LP 799-074	0.182	132.3	39.0	SCR 1412-1842B	0.174	132.6	[800.5]	51.3	298.8	WD candidate at 36.5 ± 7.3 pc[b,g]
LP 994-039	0.223	080.5	57.0	SCR 0303-3955B	0.227	081.9	80.9	14.2	36.4	
LTT 4092	0.220	261.4	...	SCR 1106-4609B	0.238	257.5	179.8	99.6	289.3	[a]
LTT 7379	0.215	225.3	28.2	SCR 1836-4414B	0.194	222.1	72.3	174.9	346.1	*Hipparcos* distance at 156.74 pc
NLTT 21700	0.257	153.1	15.7	SCR 0924-4005B	0.257	139.6	32.9	25.6	11.9	[b]
NLTT 22466	0.195	295.3	33.4	SCR 0943-4338B	0.207	298.8	129.0	99.7	63.4	[b]
NLTT 23274	0.350	203.8	46.1	SCR 1002-3823B	0.347	201.1	62.7	14.8	45.2	
NLTT 2520	0.203	102.9	69.2	SCR 0045-3509B	0.183	110.5	123.0	180.0	299.0	
				NLTT 2510	0.212	104.6	115.0	125.3	325.4	[b]
NLTT 25456	0.207	212.0	20.7	SCR 1049-1759B	0.188	212.9	38.6	66.1	222.4	[d]
NLTT 25650	0.199	177.2	59.4	SCR 1053-3922B	0.203	175.6	79.9	174.9	86.1	
NLTT 26561	0.364	261.6	26.7	SCR 1111-3533B	0.359	260.4	58.3	21.5	29.0	
NLTT 26563	0.353	202.3	[87.4]	SCR 1110-4416B	0.349	203.2	[187.8]	118.0	206.5	[h]
NLTT 28317	0.234	230.6	37.3	SCR 1142-3453B	0.231	231.3	68.6	33.0	296.0	
NLTT 30602	0.204	159.2	219.4	SCR 1223-1202B	0.205	159.6	283.7	25.7	273.0	[b,d]
NLTT 32779	0.214	221.6	52.5	SCR 1304-3616B	0.223	219.2	115.9	26.7	4.7	[b]
NLTT 36808	0.204	161.9	[116.3]	SCR 1416-0422B	0.212	170.9	[419.3]	8.1	87.0	[b,h]
NLTT 37696	0.237	212.3	43.5	SCR 1433-3912B	0.236	209.0	75.5	68.0	2.5	
NLTT 41537	0.192	210.4	51.5	SCR 1557-4228B	0.181	220.8	48.2	192.5	28.3	
NLTT 42067	0.252	192.4	90.3	SCR 1608-1941B	0.235	185.9	119.7	13.0	230.8	[b]
NLTT 42882	0.259	207.4	39.4	SCR 1629-3122B	0.234	206.6	44.2	221.5	63.9	[b]
NLTT 47206	0.324	110.8	28.6	SCR 1857-2650B	0.323	112.9	[720.5]	63.7	338.5	WD candidate at 35.6 ± 7.1 pc[g]
NLTT 47389	0.261	239.4	44.8	SCR 1906-2604B	0.257	244.1	144.7	19.2	319.5	
NLTT 48063	0.200	199.3	47.2	SCR 1940-4440B	0.216	195.8	85.7	15.9	29.1	[b]
NLTT 51683	0.210	158.0	90.3	SCR 2137-1223B	0.207	159.4	142.4	46.4	44.3	[b]
NLTT 7295	0.230	090.7	...	SCR 0211-4523B	0.226	083.3	89.6	96.1	190.4	[a]
SCR 0053-4656A	0.271	090.0	116.6	SCR 0053-4656B	0.270	092.5	114.1	8.5	14.2	[b]
SCR 0146-1736A	0.185	095.3	111.0	LEHPM 2-1847	0.190	103.8	78.3	17.2	354.5	[a]
SCR 0152-2212A	0.180	122.3	62.1	SCR 0152-2215B	0.196	126.1	58.2	193.8	33.2	[d]
SCR 0157-3625A	0.196	130.9	57.7	SCR 0157-3625B	0.187	140.6	61.0	38.3	203.7	[a,d]
SCR 0254-4529A	0.223	197.2	56.4	SCR 0254-4527B	0.225	198.0	69.4	108.6	46.3	
SCR 0507-1158A	0.180	105.4	147.7	SCR 0507-1158B	0.185	102.2	126.4	8.8	229.9	[b]
SCR 0533-0810A	0.250	118.5	34.4	SCR 0533-0810B	0.241	127.6	98.0	8.0	279.5	[b,c,d]
SCR 0542-2220A	0.289	109.5	[185.2]	SCR 0542-2220B	0.281	112.4	[495.0]	5.3	41.9	[b,h]
SCR 0558-2239A	0.186	150.3	86.0	SCR 0558-2239B	0.166	152.1	236.8	16.3	302.0	[b]
SCR 0609-1002A	0.191	169.1	55.1	SCR 0609-1001B	0.183	170.5	69.8	23.1	50.8	
SCR 0629-4648A	0.219	066.9	25.8	SCR 0629-4648B	0.244	078.9	31.0	12.2	23.8	[b]
SCR 0635-3324A	0.225	132.4	36.1	LEHPM 2-2260	0.213	134.3	42.7	44.2	296.5	
SCR 0654-2208A	0.196	193.9	59.0	SCR 0654-2209B	0.196	193.5	83.4	14.2	191.1	
SCR 0709-2535A	0.225	176.1	126.2	SCR 0709-2535B	0.225	179.3	263.1	20.3	79.7	[b,h]
SCR 0749-3128A	0.185	050.0	105.6	SCR 0749-3128B	0.185	048.0	151.3	79.6	228.5	[b]
SCR 0750-4305A	0.282	066.8	68.1	SCR 0750-4305B	0.272	060.9	59.3	8.0	195.5	
SCR 0751-0916A	0.319	167.4	71.3	SCR 0751-0917B	0.313	166.9	85.6	15.7	209.4	
SCR 1020-0633A	0.188	262.5	35.1	SCR 1020-0634B	0.182	263.5	37.5	86.8	22.8	[a]
SCR 1107-3420A	0.287	168.0	...	SCR 1107-3420B	0.287	167.0	19.2	30.2	72.8	WD candidate at 16.0 pc[g]
SCR 1125-1903A	0.206	143.4	74.8	NLTT 27345	0.227	138.7	22.8	254.0	70.1	
SCR 1151-4343A	0.223	268.3	55.4	SCR 1151-4344B	0.241	269.8	68.5	57.8	246.1	
SCR 1205-3237A	0.186	197.6	36.8	NLTT 29579	0.194	200.6	37.8	12.6	23.7	[b]
SCR 1213-1243A	0.246	174.6	76.2	SCR 1213-1243B	0.238	175.8	97.8	13.5	13.2	
SCR 1233-3426A	0.247	274.6	39.3	SCR 1233-3427B	0.245	273.9	59.6	23.2	37.8	
SCR 1244-0814A	0.229	236.1	[193.0]	SCR 1244-0814B	0.235	235.8	[510.6]	9.7	191.0	[b,h]
SCR 1252-0538A	0.185	213.4	[296.5]	LP 676-024	0.183	214.7	[298.2]	145.8	87.4	[h]
SCR 1424-1733A	0.212	231.0	171.3	SCR 1424-1733B	0.223	235.5	204.9	9.5	325.9	[b]
SCR 1443-3439A	0.201	172.2	[128.7]	SCR 1443-3438B	0.209	179.5	[169.2]	22.8	39.7	[h]

Table 6
(Continued)

Primary	μ ($'' \mathrm{yr}^{-1}$)	θ ($^\circ$)	Distance (pc)	Companion(s)	μ ($'' \mathrm{yr}^{-1}$)	θ ($^\circ$)	Distance (pc)	Separation ($''$)	Position Angle ($^\circ$)	Notes
SCR 1454-1715A	0.183	201.6	100.7	SCR 1454-1715B	0.178	202.9	148.2	13.1	46.3	[b]
SCR 1455-3742A	0.194	224.5	69.2	SCR 1455-3742B	0.187	224.2	116.4	37.8	64.4	[b]
SCR 1526-0251A	0.188	191.0	78.7	SCR 1526-0251B	0.188	192.1	81.3	21.3	222.6	
SCR 1526-0808A	0.195	217.2	57.9	SCR 1526-0809B	0.198	218.5	115.1	120.4	217.0	
SCR 1530-2509A	0.210	187.9	53.0	SCR 1530-2509B	0.218	191.6	37.4	10.3	198.7	[b]
SCR 1558-0913A	0.192	288.8	51.2	SCR 1558-0915B	0.191	286.4	65.4	132.6	11.8	
SCR 1730-3256A	0.192	184.5	71.6	SCR 1729-3257B	0.195	184.6	88.3	97.0	246.1	[b]
SCR 1825-4540A	0.183	180.4	[249.6]	SCR 1825-4540B	0.191	187.2	[334.3]	14.5	259.3	[b,d,h]
SCR 2008-3013A	0.283	141.4	[236.6]	SCR 2008-3012B	0.280	134.9	[168.4]	77.0	19.3	[b,h]
SCR 2102-3128A	0.184	192.6	26.2	SCR 2102-3129	0.196	191.0	22.7	50.6	0.8	
SCR 2111-4214A	0.245	130.8	123.6	SCR 2111-4215B	0.240	132.9	152.7	50.1	227.0	
SCR 2123-0800A	0.212	189.5	114.7	SCR 2124-0754B	0.209	179.8	148.5	577.4	51.9	[d]
SCR 2142-2725A	0.212	139.9	...	SCR 2141-2725B	0.214	135.7	111.7	656.2	274.7	
SCR 2148-3431A	0.182	128.6	98.2	SCR 2148-3431B	0.175	127.3	121.5	7.9	73.5	[b]
SCR 2308-0556A	0.223	122.0	53.5	SCR 2308-0603B	0.228	128.3	83.4	511.9	38.4	[d]
SCR 2354-0352A	0.213	115.1	60.6	SCR 2355-0354B	0.231	113.6	60.0	695.4	78.1	
SIPS 1343-3823A	0.264	244.1	33.7	SCR 1343-3815B	0.248	241.3	104.4	398.6	355.8	
Possible common proper motion systems										
BD-06 3279	0.187	205.3	62.1	SCR 1059-0729B	...	...	...	6.5	182.7	[b,d,e]
BD-07 3307	0.198	207.4	...	SCR 1152-0755B	...	...	...	10.0	17.7	[b,e]
BD-16 0647	0.207	176.6	28.9	SCR 0330-1532B	...	...	...	11.8	351.0	[b,d,e]
BD-16 1266	0.204	180.7	...	SCR 0550-1610B	...	...	...	9.9	9.7	[b,e]
BD-16 3858	0.189	228.6	...	SCR 1423-1646B	...	...	...	9.8	202.8	[b,c,e]
BD-21 0450	0.185	084.5	...	SCR 0231-2111B	...	...	...	6.5	355.9	[b,e]
BP 16547-0006	0.270	229.8	[169.3]	SCR 1512-0303B	0.181	265.1	[374.6]	8.1	77.5	[b,d,f,h]
CCDM 12328-4007A	0.287	294.5	...	CCDM 12328-4007B	...	...	...	2.8	7.4	[b,c,e]
				SCR 1232-4011C	0.312	296.2	60.0	202.4	4.3	
CD-25 2902	0.093	113.4	[38.6]	SCR 0604-2553B	0.191	147.5	[263.1]	58.1	13.8	[d,f,h]
G 022-025	0.321	191.7	44.3	SCR 1920-0157B	0.211	163.7	55.7	8.1	48.2	[b,f]
G 114-022	0.247	172.3	39.6	SCR 0856-0424B	...	...	...	5.8	352.8	[b,c,e]
G 155-020	0.254	003.3	19.4	SCR 1831-0958B	0.217	355.9	27.6	11.8	236.5	
G 159-055	0.294	096.0	...	SCR 0218-0636B	...	...	...	24.4	31.5	*Hipparcos* distance at 87.72 pc[b,e]
G 266-049	0.206	173.4	155.6	SCR 0007-2444B	...	...	...	92.4	231.9	[b,e]
G 266-124	0.287	211.2	...	SCR 0030-1911B	...	...	...	23.8	298.8	*Hipparcos* distance at 84.96 pc[b,e]
G 267-075	0.214	182.0	146.9	SCR 0020-2642B	0.186	181.6	504.8	27.7	13.9	[b,d]
G 270-114	0.204	105.1	44.8	SCR 0101-1153B	...	...	...	9.2	183.1	[b,d,e]
G 274-001	0.242	067.6	35.7	SCR 0118-3146B	0.284	064.3	89.4	58.0	45.4	[b,d]
GJ 604	...	...	...	SCR 1557-4237B	0.387	219.7	101.0	41.3	71.8	*Hipparcos* distance at 14.67 pc[a,e]
HD 196276	0.225	111.3	18.8	SCR 2037-3312B	0.198	124.6	[339.5]	11.8	45.0	[b,g]
HD 213261	0.227	121.5	35.3	SCR 2230-1756B	...	...	...	7.1	53.9	[d,b,e]
HD 213565	0.185	095.6	17.1	SCR 2232-2437B	0.139	...	128.7	44.4	64.4	[d,b]
HD 295038	0.217	163.2	...	SCR 0623-0456B	...	...	...	5.8	78.2	[b,e]
HIC 68166	0.273	232.0	24.7	SCR 1357-3832B	0.302	230.8	39.9	21.7	321.4	
HIP 000027	0.180	129.5	19.8	SCR 0000-4117B	0.245	124.1	114.9	16.8	290.1	[b,d]
HIP 085236	0.187	187.5	6.3	SCR 1725-0913B	0.132	180.0	44.0	57.6	194.1	*Hipparcos* distance at 74.35 pc[b,d]
L 304-035	0.389	073.5	42.0	SCR 0447-4631B	0.419	069.2	42.6	9.6	320.1	[b,d]
LEHPM 2-1156	0.184	146.9	58.9	SCR 0100-3040B	0.146	166.8	72.4	16.2	82.3	[b]
LEHPM 2-3039	0.212	162.8	81.0	SCR 0304-4425B	0.215	139.1	96.0	11.8	243.7	[b]
LEHPM 2-3482	0.212	042.0	30.5	SCR 0424-3918B	0.286	059.3	40.0	18.5	279.1	[b]
LEHPM 2-3487	0.189	073.5	38.4	SCR 0343-3735B	0.217	067.0	[541.3]	41.4	193.1	WD candidate at 47.2 $\pm$ 9.4 pc[b,d,g]
LEHPM 2-3560	0.190	296.1	50.3	SCR 0634-4007B	...	...	...	3.9	29.9	[b,c,e]
LEHPM 2-3658	0.196	160.6	25.2	SCR 1922-4318B	0.189	142.3	261.5	34.5	327.6	[b]
LEHPM 2-3992	0.189	181.2	58.2	SCR 0433-4018B	0.127	187.5	76.6	129.6	245.0	[b,d]
LEHPM 2-4820	0.184	267.0	107.4	SCR 2232-4032B	0.227	266.3	138.0	17.2	324.0	[b]
LP 734-014	0.239	191.6	18.6	SCR 1201-1213B	...	...	...	6.0	23.7	[b,c,e]
LP 895-011	0.249	163.8	60.7	SCR 0627-3157B	...	...	...	3.9	30.3	[b,e]
LP 917-019	0.256	261.3	10.9	SCR 1604-3303B	0.322	249.0	20.5	57.9	299.1	*Hipparcos* distance at 23.26 pc[b,f]
LTT 1644	0.240	052.1	20.9	SCR 0328-4101B	0.335	066.7	49.2	20.9	54.3	*Hipparcos* distance at 67.07 pc[b,d,f]
LTT 2416	0.239	032.5	29.6	SCR 0556-4511B	0.218	012.7	91.5	22.7	88.0	*Hipparcos* distance at 72.25 pc[b,d]
NLTT 11457	0.255	152.8	40.8	SCR 0337-4609B	0.286	141.9	[905.6]	13.0	290.9	WD candidate at 31.6 $\pm$ 6.3 pc[b,g]
NLTT 12773	0.198	056.5	35.4	SCR 0412-3605B	...	...	...	6.1	241.2	[b,c]
NLTT 14952	0.220	167.4	...	SCR 0521-1609B	...	...	...	8.4	48.2	*Hipparcos* distance at 107.30 pc[b,e]
NLTT 16432	0.187	359.7	40.9	SCR 0621-4302B	...	...	...	2.5	192.7	[b,c,d,e]
NLTT 21562	0.252	107.4	...	SCR 0921-3656B	...	...	...	7.6	183.7	[b,e]

Table 6
(Continued)

Primary	μ ($'' \mathrm{yr}^{-1}$)	θ (°)	Distance (pc)	Companion(s)	μ ($'' \mathrm{yr}^{-1}$)	θ (°)	Distance (pc)	Separation ($''$)	Position Angle (°)	Notes
NLTT 22497	0.212	255.7	128.3	SCR 0944-3023B	0.197	240.3	141.8	176.1	80.2	b,d
NLTT 24839	0.253	255.1	92.3	SCR 1036-1154B	0.127	294.8	233.7	9.8	50.8	b,d,f
NLTT 24930	0.250	174.3	...	SCR 1038-1345B	...	...	...	7.0	216.8	b,e
NLTT 26054	0.198	281.7	...	SCR 1101-2952B	0.092	279.2	35.7	37.2	53.2	b,f
NLTT 26348	0.196	310.9	...	SCR 1107-1521B	...	...	...	11.8	236.5	b,e
NLTT 30124	0.312	299.6	44.6	SCR 1215-3202B	0.273	296.5	99.4	140.7	344.4	
				SCR 1215-3202C	...	...	...	...	...	c,i
NLTT 30414	0.368	261.9	15.3	SCR 1220-1953B	...	...	...	6.6	292.0	*Hipparcos* distance at 29.73 pc[b,c,d,e]
NLTT 31162	0.285	257.4	41.6	SCR 1234-4428B	...	...	...	4.3	52.6	b,c,d,e
NLTT 31886	0.201	244.1	...	SCR 1247-4344B	0.168	247.1	100.1	36.4	11.2	*Hipparcos* distance at 103.20 pc[b]
NLTT 34018	0.220	222.8	39.2	NLTT 34014	0.227	224.3	50.3	34.8	230.4	
				SCR 1324-0153C	0.116	232.8	103.8	35.7	331.3	f
NLTT 34652	0.182	147.9	39.3	HD 118512B	0.164	143.6	...	85.6	74.9	b,c,d
				HD 118512C	...	...	...	81.3	73.7	b,c,e
				SCR 1337-1046D	0.146	134.1	...	150.6	45.3	b,c
				SCR 1337-1046E	...	...	...	148.3	46.8	b,c,e
NLTT 35361	0.338	250.1	41.0	SCR 1350-4210B	0.399	221.9	25.1	7.8	231.3	b,d,f
NLTT 35513	0.210	197.1	51.4	SCR 1352-4240B	...	...	...	3.5	68.5	b,c,e,j
NLTT 37615	0.244	257.8	...	SCR 1432-3152B	...	...	...	3.7	201.9	b,e
NLTT 40174	0.345	241.4	37.6	SCR 1526-4502B	...	...	...	3.4	310.7	b,c,d,e
NLTT 40546	0.205	207.9	30.5	SCR 1534-2744B	0.146	242.4	31.3	101.4	13.4	b
NLTT 41770	0.208	196.4	39.3	SCR 1602-3230B	0.127	220.9	47.2	10.6	5.1	b
NLTT 43214	0.186	195.5	23.1	SCR 1638-3541B	...	...	...	8.7	2.8	b,d,e
NLTT 45817	0.303	153.5	17.8	SCR 1803-4551B	...	...	...	16.3	87.7	*Hipparcos* distance at 73.86 pc[b,d,e]
NLTT 465	0.259	099.2	42.3	SCR 0010-4600B	...	...	...	6.4	285.4	b,e
NLTT 46764	...	...	...	SCR 1838-3045B	0.186	171.2	26.2	3.6	45.1	a,c,e
NLTT 47391	0.218	202.7	18.8	SCR 1906-1903B	0.086	192.9	41.6	55.1	318.4	b,d,f
NLTT 47412	0.182	169.7	36.7	SCR 1907-2808B	...	...	...	6.5	25.7	b,d,e
NLTT 47860	0.291	144.5	...	SCR 1929-3310B	0.248	115.6	65.3	298.0	229.6	
NLTT 48631	0.182	068.3	33.5	SCR 2004-3548B	...	...	...	5.9	258.2	b,c
NLTT 49772	0.309	183.4	...	SCR 2044-3000B	...	...	...	6.0	54.9	*Hipparcos* distance at 136.61 pc[b,e]
NLTT 50958	0.181	118.3	32.8	SCR 2118-1025B	...	...	...	3.0	43.2	b,d,e
NLTT 51069	0.284	207.8	32.7	SCR 2121-3212B	...	...	...	8.5	319.3	b,d,e
NLTT 51151	0.274	179.5	34.7	SCR 2123-2613B	0.296	155.6	70.4	6.9	272.5	b
NLTT 51937	0.190	129.8	27.9	SCR 2144-2753B	0.124	156.8	...	73.6	70.7	b,d
NLTT 52044	0.232	172.0	36.6	SCR 2146-3543B	0.329	176.5	39.0	11.4	2.3	b,f
NLTT 6939	0.198	070.4	...	SCR 0204-4622B	...	...	...	10.4	214.1	*Hipparcos* distance at 91.58 pc[b,e]
NLTT 7624	0.222	095.7	32.8	SCR 0218-2715B	0.142	115.6	117.9	11.6	302.8	b
ROSS 57	0.201	264.0	30.5	SCR 0721-1139B	...	...	...	7.8	27.2	b,d,e
SCR 0002-4644A	0.197	122.5	[328.3]	SCR 0002-4644B	0.240	112.3	[625.3]	6.9	43.6	b,h
SCR 0051-1409A	0.191	117.3	49.8	SCR 0051-1408B	0.150	118.3	129.5	91.0	283.8	b
SCR 0056-2139A	0.182	125.5	130.2	SCR 0056-2139B	0.102	141.3	157.1	78.8	80.3	b,f
SCR 0123-1404A	0.212	135.5	82.1	SCR 0123-1406B	0.153	134.9	133.1	101.6	191.2	b
SCR 0145-0815A	0.184	140.7	[189.5]	SCR 0145-0813B	0.213	126.8	[423.2]	184.7	320.7	h
				SCR 0146-0815C	0.187	136.4	[39.4]	407.1	90.0	
SCR 0150-0244A	0.147	161.6	89.4	SCR 0150-0241B	0.208	137.4	143.6	248.8	44.7	a,d
SCR 0151-0939A	0.198	138.8	91.0	SCR 0151-0939B	...	...	...	5.0	212.4	b,c,e
SCR 0152-1259A	0.162	159.2	43.7	SCR 0152-1259B	0.213	139.1	56.4	4.3	353.1	a,c,d
SCR 0215-0644A	0.214	157.3	73.0	SCR 0215-0644B	...	...	...	3.8	200.4	b,c,e
SCR 0221-0554A	0.230	102.2	114.0	SCR 0221-0554B	0.083	124.1	213.4	32.1	251.5	b,f
SCR 0225-1829A	0.277	127.3	...	SCR 0225-1829B	0.125	095.9	28.7	12.6	33.7	b,d,f
SCR 0249-2343A	0.172	188.9	57.8	LEHPM 2-2808	0.223	176.9	116.3	218.8	232.6	a,d
				NLTT 9088	0.228	188.8	304.2	134.8	260.9	
SCR 0324-1106A	0.210	179.5	34.9	SCR 0324-1105B	0.153	179.9	75.6	13.0	8.9	b,d
SCR 0330-1212A	0.214	153.1	...	SCR 0330-1212B	...	...	...	5.9	26.1	b,c,e
SCR 0413-1055A	0.199	172.5	52.6	SCR 0413-1055B	...	...	...	5.0	56.6	b,c,d,e
SCR 0425-3329A	0.124	133.8	34.8	LEHPM 2-2133	0.224	170.6	83.2	107.7	11.9	a,d,f
				LEHPM 2-2321	0.192	154.1	343.9	216.5	257.2	d
SCR 0447-4329A	0.185	109.2	96.2	SCR 0447-4329B	...	...	...	...	...	b,c,e,j
SCR 0454-4237A	0.193	162.1	249.9	SCR 0454-4237B	...	...	...	...	...	b,c,e,j
SCR 0455-0143A	0.183	082.2	50.7	SCR 0455-0143B	...	...	...	...	...	b,c,e,j
SCR 0500-2804A	0.248	349.8	26.4	SCR 0500-2804B	...	...	...	5.3	52.8	b,c,d,e
SCR 0507-2847A	0.184	167.9	...	SCR 0507-2848B	...	...	...	53.2	252.2	b,e
SCR 0602-3952A	0.194	024.1	45.8	SCR 0602-3952B	...	...	...	...	...	b,c,e,j

Table 6
(Continued)

Primary	μ ($'' yr^{-1}$)	θ (°)	Distance (pc)	Companion(s)	μ ($'' yr^{-1}$)	θ (°)	Distance (pc)	Separation ($''$)	Position Angle (°)	Notes
SCR 0613-3437A	0.312	042.7	26.2	SCR 0613-3437B	...	...	...	...	...	b,c,e,j
SCR 0655-2341A	0.398	019.2	95.1	SCR 0655-2341B	0.368	017.5	82.7	6.7	68.3	b,d
SCR 0706-0942A	0.187	189.9	31.5	SCR 0706-0942B	...	...	...	6.0	30.5	b,c,d,e
				SCR 0706-0942C	0.195	196.5	62.9	52.1	222.8	b
SCR 0731-3702A	0.192	159.2	51.8	SCR 0731-3702B	...	...	...	...	...	b,e,i,j
SCR 0814-1312A	0.202	136.6	66.2	SCR 0814-1312B	...	...	...	3.8	80.7	b,c,d,e
SCR 0836-3009A	0.188	309.1	60.3	SCR 0836-3009B	...	...	...	...	...	b,c,e,j
SCR 0848-2932A	...	...	...	LP 900-011	0.214	114.5	37.1	3.0	249.9	a,d,e
SCR 0900-3529A	0.250	130.3	107.7	SCR 0900-3529B	0.188	106.9	220.0	19.4	352.9	b
SCR 0908-0321A	0.210	165.4	35.3	SCR 0908-0321B	...	...	...	3.2	207.5	b,c,d,e
SCR 0909-0611A	...	...	...	SCR 0909-0611B	0.202	301.1	56.7	4.1	311.6	a,c,d,e
SCR 0919-4302A	0.197	306.8	67.9	SCR 0919-4302B	...	...	...	...	...	b,c,e,j
SCR 0920-0431A	0.186	141.8	39.9	SCR 0920-0431B	...	...	...	...	...	b,c,e,j
SCR 0922-0454A	0.220	145.6	145.8	SCR 0922-0454B	...	...	...	8.2	238.3	b,d,e
SCR 0928-4403A	0.221	309.8	55.8	SCR 0928-4403B	...	...	...	...	...	b,c,e,j
SCR 0930-4443A	0.223	302.9	46.1	SCR 0930-4443B	...	...	...	...	...	b,c,e,j
SCR 0934-3002A	0.190	312.5	87.8	SCR 0934-3002B	...	...	...	...	...	b,c,e,j
SCR 0934-4407A	0.185	155.1	39.3	SCR 0934-4407B	...	...	...	5.3	350.9	b,d,e
SCR 0957-3454A	0.159	170.7	52.6	SCR 0957-3454B	0.184	175.6	101.5	14.9	50.4	a
SCR 1059-0652A	0.195	277.5	32.1	SCR 1059-0652B	...	...	...	...	...	b,c,e,j
SCR 1107-3728A	0.210	175.5	77.7	SCR 1107-3728B	...	...	...	...	...	b,c,e,j
SCR 1107-4052A	0.190	099.9	56.4	SCR 1107-4052B	...	...	...	...	...	b,c,e,j
SCR 1113-0246A	0.189	257.4	95.7	SCR 1113-0246B	...	...	...	4.4	223.2	b,d,e
SCR 1115-4103A	0.199	244.0	74.3	SCR 1115-4103B	0.164	...	[347.3]	20.8	23.8	h
SCR 1118-4402A	0.203	296.4	51.8	SCR 1118-4402B	...	...	...	7.2	286.1	b,e
SCR 1135-2259A	0.204	245.3	65.6	SCR 1135-2259B	...	...	...	...	...	b,c,e,j
SCR 1142-0549A	0.182	253.1	31.3	SCR 1142-0549B	...	...	...	3.0	351.0	b,e
SCR 1154-0144A	0.195	239.1	[334.7]	SCR 1154-0144B	0.140	...	[109.6]	19.6	237.4	b,f,h
SCR 1210-2213A	0.286	038.2	24.5	SCR 1210-2213B	...	...	...	3.2	0.9	b,c,e
SCR 1212-2042A	0.190	269.4	90.4	SCR 1212-2041B	0.171	267.2	105.0	59.1	347.0	b
SCR 1253-1717A	...	...	...	SCR 1253-1717B	0.213	251.4	82.5	4.2	346.4	a,d,e
SCR 1254-2430A	0.128	264.4	58.9	NLTT 32271	0.189	265.4	90.4	85.3	269.0	a,d
SCR 1254-3811A	0.208	097.5	26.2	SCR 1254-3811B	0.161	121.1	22.0	20.9	60.0	b,d
SCR 1352-0215A	0.248	282.7	...	SCR 1352-0215B	...	...	...	4.5	41.5	b,c,e
SCR 1416-4036A	0.252	208.5	39.3	SCR 1416-4036B	...	...	...	4.5	31.7	b,c,e
SCR 1430-2434A	0.188	188.0	43.8	SCR 1430-2434B	...	...	...	4.8	236.8	b,c,d,e
SCR 1433-2524A	0.196	244.4	70.8	SCR 1433-2524B	...	...	...	9.6	241.2	b,d,e
SCR 1508-1419A	0.181	287.6	35.4	SCR 1508-1419B	...	...	...	3.6	323.5	b,c,d,e
SCR 1512-4014A	0.191	242.1	57.2	SCR 1512-4014B	0.111	097.8	105.1	17.6	78.7	b,d,f
SCR 1558-2820A	0.181	226.8	59.3	SCR 1558-2820B	...	...	...	5.1	216.2	b,d,e
SCR 1606-4346A	...	...	...	SCR 1606-4346B	0.218	226.1	153.7	3.3	65.1	a,c,d,e
SCR 1609-0245A	0.261	197.7	59.0	SCR 1609-0245B	...	...	...	3.6	201.6	b,e
SCR 1613-4539A	0.311	192.5	55.0	SCR 1613-4539B	0.217	293.2	94.7	13.9	257.5	b,d
SCR 1710-4029A	0.316	217.4	34.5	SCR 1711-4025B	0.288	210.4	26.3	566.1	62.6	
SCR 1727-4226A	0.256	191.3	65.1	SCR 1727-4226B	...	...	...	1.3	64.0	b,c,e
SCR 1809-0755A	0.193	193.0	19.9	SCR 1809-0755B	0.124	168.8	30.9	25.0	44.4	b
SCR 1823-1720A	0.270	200.4	...	SCR 1823-1720B	...	...	...	...	...	b,c,e,i,j
SCR 1857-4011A	0.212	177.8	28.9	SCR 1857-4011B	...	...	...	1.5	283.2	b,e
				SCR 1856-4011C	0.219	171.0	21.2	22.4	294.4	
SCR 1920-2241A	0.230	182.7	...	SCR 1920-2241B	...	...	...	9.1	308.0	b,d
SCR 1939-3821A	0.207	200.0	66.2	SCR 1939-3821B	...	...	...	3.3	64.7	b,e
SCR 1945-4036A	0.216	160.8	52.8	SCR 1945-4036B	...	...	...	8.7	74.5	b
SCR 2012-2841A	0.224	157.9	53.9	SCR 2012-2841B	...	...	...	...	...	b,c,e,j
SCR 2017-2826A	0.195	160.0	58.4	SCR 2017-2826B	...	...	...	3.2	46.6	b,c,d,e
SCR 2019-4502A	0.228	140.4	71.1	SCR 2019-4502B	0.287	114.0	58.2	9.2	215.7	b
SCR 2055-3305A	0.225	172.0	47.0	SCR 2055-3305B	...	...	...	4.1	35.5	b,c,d,e
SCR 2056-4039A	0.189	170.3	45.3	SCR 2056-4039B	...	...	...	3.5	38.4	b,c,d,e
SCR 2108-0924A	0.324	120.2	...	SCR 2108-0924B	...	...	...	4.5	46.2	b,e
SCR 2113-3408A	0.367	204.4	82.3	SCR 2113-3408B	0.238	322.1	76.9	5.8	182.9	b,f
SCR 2114-4125A	0.241	113.6	53.5	LEHPM 2-4673	0.201	107.7	68.9	27.3	241.0	b
SCR 2115-4612A	0.184	087.4	64.7	SCR 2115-4611B	0.278	087.0	50.4	9.9	69.8	b,f
SCR 2128-0732A	0.210	177.1	60.1	SCR 2128-0733B	...	...	...	6.7	84.0	b,d,e
SCR 2152-3926A	0.367	090.1	44.2	SCR 2152-3926B	...	...	...	...	...	b,c,e,j
SCR 2235-0223A	0.209	130.8	63.4	SCR 2235-0223B	...	...	...	...	...	b,c,e,j

Table 6
(Continued)

Primary	μ (″ yr^{-1})	θ (°)	Distance (pc)	Companion(s)	μ (″ yr^{-1})	θ (°)	Distance (pc)	Separation (″)	Position Angle (°)	Notes
SCR 2324-2049A	0.132	116.2	55.3	SCR 2324-2047B	0.181	121.7	53.3	88.9	2.8	a,d
SCR 2330-0838A	0.190	090.8	19.9	SCR 2330-0835B	0.208	087.6	137.2	458.5	63.3	
SCR 2352-3113A	0.175	127.4	65.6	NLTT 58216	0.260	142.5	124.5	45.5	21.0	a,f
SCR 2356-0222A	0.194	098.8	84.5	SCR 2356-0222B	...	...	...	4.2	30.0	b,d,e
WT 1136	0.226	149.9	53.7	SCR 0044-1149B	0.185	125.4	60.8	99.0	54.0	
WT 1558A	...	...	...	WT 1558B	...	...	...	4.0	194.5	a,b,c,e
				SCR 0832-2140C	0.214	196.8	216.2	140.4	277.4	
WT 1604	0.183	243.7	26.6	SCR 0921-1554B	...	...	...	8.0	215.9	b,d,e
WT 2441	0.206	149.4	[198.6]	SCR 0548-3617B	0.164	149.0	[500.2]	15.9	43.5	b,h

Notes.
[a] Primary detected by eye during blinking process.
[b] Companion(s) detected by eye during blinking process.
[c] Unresolved pair on plate; no proper motion, position angle, or distance estimate for at least one component.
[b] Fewer than six relations for distance estimate, therefore unreliable (in brackets).
[e] No *BRI* photometry data available, therefore no distance estimate.
[f] Proper motion or position angle suspect.
[g] White dwarf candidate with unreliable distance (in brackets). More accurate estimate in notes if available, see Table 5.
[h] Subdwarf candidate with unreliable distance (in brackets), see Table 4.
[i] No 2MASS data available for component, therefore no distance estimate.
[j] Distance unreliable due to blended photometry.

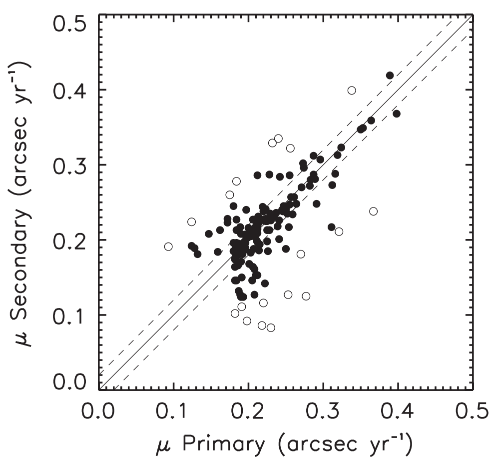

Figure 4. Plot of the proper motion of the primary vs. that of its companion(s) in common proper motion systems. The solid line denotes perfect agreement between the two proper motions, while the dashed lines indicate limits of 0.″020 yr^{-1} in accordance with our uncertainties. Filled circles represent pairs in which both members had data from the automatic phase of the search. Open circles denote pairs in which proper motion data for at least one component were gathered manually.

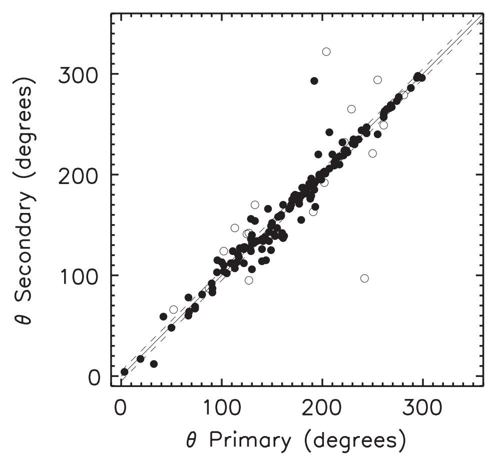

Figure 5. Plot of the position angle of the primary's proper motion vs. that of its companion(s) in common proper motion systems. The solid line denotes perfect agreement between the two, while the dashed lines indicate limits of 5° in accordance with our uncertainties. Filled circles represent pairs in which both members had data from the automatic phase of the search. Open circles denote pairs in which position angle data for at least one component were gathered manually.

stage). Systems marked with solid points are those with both components retrieved during the initial automated search, and tend to have better agreement between these values, particularly for the proper motions. There is more spread in the distribution of points in Figures 4 and 5 here, which compare components in multiple systems, than is seen in comparable Figures 6 and 7 in Finch et al. (2010). The reason is that in order to be circumspect in our search for possible multiple systems, we have relaxed the by-eye criteria in this paper.

5.7. Sky Distribution of SCR Systems

Figure 6 shows the sky distribution of SCR systems, broken into discoveries from the first five proper motion papers and this paper. Of note for this portion of the survey is the dense bar from R.A. = 4^h to 22^h and decl. −33° to −47°, which fills in the sparse area in Figure 7, the southern sky distribution of NLTT systems. A dense patch from R.A. = 6^h to 9^h traces the Galactic plane (represented by a solid line), which has previously been poorly searched in the southern hemisphere. The area from R.A. = 17^h to 19^h centered near decl. −35° corresponds to the Galactic center/bulge region, which is an extraordinarily crowded region on the plates and in the SuperCOSMOS database. Our detection rate is much lower there than in the rest of the Galactic plane, where the crowding is not so extreme. However, some systems have been discovered in this region because they have a backdrop of gas and dust that obscures many of the background stars that would otherwise make unique source identification difficult.

5.8. Comments on Individual Systems

Here, we highlight a few of the 2817 systems reported from this portion of the SCR search. There are many systems

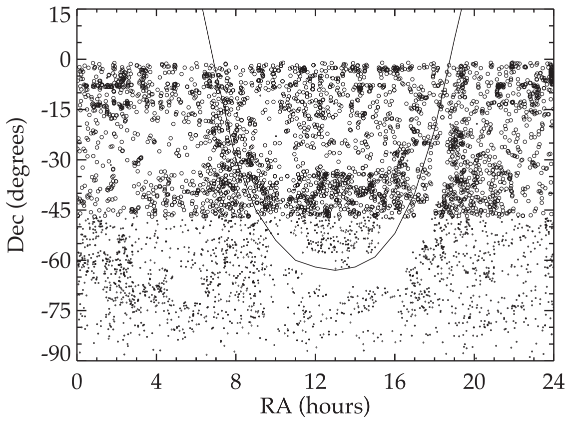

Figure 6. Sky distribution of SCR systems. Large circles represent discoveries from the current paper, while small circles represent discoveries from previous SCR searches. The curve represents the Galactic plane.

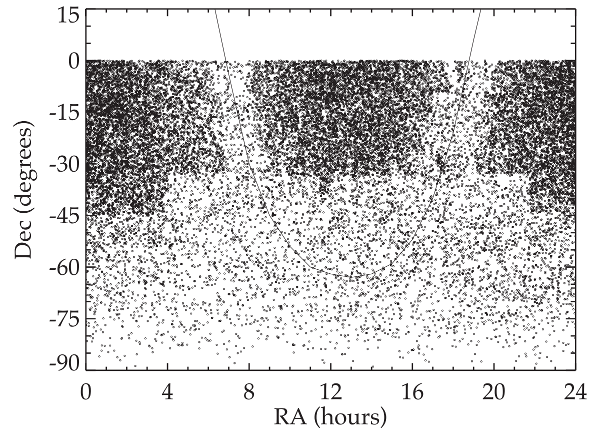

Figure 7. Sky distribution of southern NLTT systems. The curve represents the Galactic plane.

worthy of further investigation, but those selected here represent the most extreme cases in proximity, color, brightness, or complexity. Trigonometric parallax observations are underway for many of these targets.

SCR 0225-1829AB is a binary system in which the primary is the bluest object found in the present search, having $R - J = -1.42$. It is also one of the brightest, with $R = 8.63$. As such, a distance estimate is unavailable. The secondary, however, is a red dwarf estimated to be at 28.7 pc.

SCR 0711-2518 is a hot WD initially estimated to be at 20.3 pc using the single-color photometric distance estimate. However, this is inaccurate because it is a very hot WD. Subasavage et al. (2008) present spectroscopic confirmation and an updated distance estimate of 30.5 pc using CCD photometry and atmospheric models, thus likely placing it beyond the 25 pc horizon.

SCR 1107-3420AB is in a binary system with a red dwarf estimated to be at 19.2 pc. Subasavage et al. (2007) reported spectroscopic confirmation of the WD. The initial photometric distance estimate of 16.0 pc is inaccurate because the WD is hot. Thus, we adopt the distance estimate of 28.2 pc presented by Subasavage et al. (2007) using CCD photometry and atmospheric models. The red dwarf's distance estimate leaves open the possibility that this system lies within 25 pc.

SCR 1337-1046DE is a blended pair and part of a possible quintuple system that includes NLTT 34652 as the primary and the double HD 118512BC. We are obtaining CCD photometry to help confirm or refute the nature of this potentially complex system.

SCR 1731-2452 ($R = 13.39$, $R - J = 4.12$) is the nearest star from this portion of the SCR search, a red dwarf with an estimated distance of 9.5 pc.

SCR 1746-3214 ($R = 15.89$, $R - J = 5.56$) is the second nearest star from this portion of the SCR search, a red dwarf with an estimated distance of 9.9 pc. It is also one of the reddest objects found.

SCR 1843-0146 is the brightest object found in this search at $R = 8.54$. With $R - J = -0.14$, it is too blue for us to estimate a reliable distance using the suite of 11 plate relations.

SCR 1920-3611 is a hot WD initially estimated to be within 25 pc (14.7 pc). This estimate is inaccurate because the WD is too hot for the relation. Subasavage et al. (2008) present spectroscopic confirmation and an updated distance estimate of 41.7 pc using CCD photometry and atmospheric models.

SCR 2354-0352AB is a CPM system that has both exceptionally good agreement on distance estimates ($A = 60.6$ pc, $B = 60.0$ pc) and a very wide separation, 695″.4. This gives a projected separation of ~42,000 AU for the pair, making it an extraordinary candidate for a very wide multiple system.

Table 7
Distance Estimate Statistics for SCR Red Dwarf Systems[a]

Proper Motion	$d \leqslant 10$ pc	10 pc $< d \leqslant 25$ pc	$d > 25$ pc
$\mu \geqslant 1''.00$ yr^{-1}	2 + 0	0 + 0	6 + 0
$1''.00$ yr$^{-1} > \mu \geqslant 0''.80$ yr^{-1}	0 + 0	3 + 0	3 + 0
$0''.80$ yr$^{-1} > \mu \geqslant 0''.60$ yr^{-1}	1 + 0	11 + 0	48 + 0
$0''.60$ yr$^{-1} > \mu \geqslant 0''.40$ yr^{-1}	2 + 0	24 + 0	188 + 0
$0''.40$ yr$^{-1} > \mu \geqslant 0''.18$ yr^{-1}	2 + 2	29 + 77	1542 + 2715
Total	9	144	4502

Notes. [a] Entire SCR sample excluding white dwarf candidates and new common proper motion companions to known objects noticed by eye. The first number is the number of discoveries from previous papers. The second number is the number of discoveries from the current paper. This paper did not search $\mu > 0''.40$ yr^{-1} so no stars were added in those proper motion ranges.

6. DISCUSSION

This paper completes our SCR sweep of the entire southern sky for objects with $R_{59F} \leqslant 16.5$ and $\mu \geqslant 0''.18$ yr^{-1} using the methodology outlined. In total, the SCR search has revealed 4724 new proper motion systems, 2817 of which are from the effort described in this paper. Among these discoveries, we have found 152 red dwarf systems within 25 pc, including nine within 10 pc. Seventy-nine of the 25 pc systems, including two of the 10 pc systems were revealed in the current search. In addition to these red dwarf systems, 46 WD candidates (10 estimated to be within 25 pc) and 598 cool subdwarf candidate systems have been found, with 23 WD candidates and 360 candidate subdwarfs from the current search. Overall, the total of 5042 objects added via the SCR searches constitutes an increase of ~20% over the number of entries in the NLTT south of decl. = 0°.

Table 7 provides the discovery statistics for the SCR sample to date, broken into bins by proper motion and distance. The first number in each column represents the number of systems from previous papers, and the second number is the number of new systems from this paper. The breakdown confirms the trend described in TSN XVIII that slower proper motion bins have comparable numbers of 10 pc objects (although the small numbers of objects in each bin preclude a robust analysis) and many more 25 pc objects. This suggests that more systems exist very near the Sun at even lower proper motions. The nearest systems also tend to be among the faintest and reddest of the red dwarfs. Many of the 25 pc objects, and four of the nine 10 pc objects, have *R* within 1.0 mag of our cutoff of 16.5 mag. This suggests that there are many nearby objects at fainter magnitudes than those we have probed so far. We are currently conducting searches for both slower proper motion and fainter objects to reveal additional nearby systems. Additional searches using both the SuperCOSMOS and other databases will undoubtedly reveal new proper motion systems, as has already been done using UCAC3 in a complementary search of TSN XVIII by Finch et al. (2010).

The SCR survey sample has provided a rich sample of CPM systems, many of which have very wide separations. The sky separations range from less than five to nearly 700 arcsec (e.g., Table 6). Even at relatively close separations, the estimated distances to the systems give projected sky separations of hundreds of AU. The most widely separated systems have extremely large spatial separations, often greater than 10,000 AU. Because most of the systems found by the SCR searches contain red dwarfs of low mass, their binding energies are quite low. We are currently gathering CCD photometry for a sample of the widest pairs to provide better distance estimates and to determine whether or not these systems are, indeed, gravitationally bound. If so, these wide pairs can be used to explore the long-term survival of such systems, and provide clues about the overall mass content of the Galaxy. In addition, because we have found several hundred multiple systems of low mass with reasonably accurate distance estimates, we can begin to map out the distributions of separations and mass ratios that result from the star formation process.

Finally, we are measuring accurate trigonometric parallaxes for ∼60 of the SCR systems as part of our Cerro Tololo Inter-American Observatory Parallax Investigation (CTIOPI), an astrometry program carried out at the CTIO 0.9 m (Jao et al. 2005; Henry et al. 2006; Subasavage et al. 2009; Riedel et al. 2010). We are focusing primarily on the nearest and highest proper motion systems. While we cannot observe the complete samples of nearby red dwarfs, subdwarfs, and WDs found during the SCR search, we hope that by identifying these potentially nearby stars now, we will be poised to take advantage of future large scale parallax efforts such as *Gaia* and LSST, and thereby help to paint a more accurate portrait of the solar neighborhood.

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