

# Photometric identification of emission line sources in the southern photometric local Universe survey (S-PLUS)

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## ABSTRACT

The emission line objects are very important objects in astronomy because reflects different class of objects that evolved physical mechanics that given counts of formation stellar process, presences the gas, shocks, star-burst in galaxies, the finals stage of stars among others process. For this reason we have created a list of H $\alpha$  emitters selected from the S-PLUS data, which is mapping the southern hemisphere at relatively high latitudes. We implemented the (r - J0660) versus (r - i) color-color diagram for that task. We found 9,200 objects that exhibit um excess in emission in the J0660 which we have traduced as the presence of the H $\alpha$  emission line. In addition we have found that by combining the colors: (r - i) and (g - z) with unsupervised (clustering) machine learning it is possible separate our list of emitters in two sub-groups: one with intense blue continuum and another with intense red one.

**Key words:** keyword1 – keyword2 – keyword3

## 1 INTRODUCTION

The existence of an ionizing radiation field can lead to Balmer hydrogen emission lines. From the presence of the H Balmer lines in the optical spectra of some sources it is well known the possible presence of ionized gas. Many important astronomical objects involve the physics of photo-ionized gases and the interpretation of the emission-line spectra. Emission line objects as the H II regions allow us to study the star formation history of the far reaches of our Galaxy and of distant galaxies. Planetary nebulae let us to see the remaining envelope of dying stars. Star-burst galaxies and QSOs are one the most luminous objects and hence the most distant that can be observed. Their spectra can reveal details about of the first generation of star and the formation of heavy elements in the young universe. On the other hand, emission lines can also infer the presence or lack the accretion discs (Schwope et al. 2000; Ratti et al. 2012), the properties of single or double picked line can allow us to infer geometrical characteristics (Horne & Marsh 1986), the nature of donor stars in binary system (Steeghs & Casares 2002; van Spaandonk et al. 2010; Casares 2015) and the compact objects as black holes (Casares 2016).

Emission lines are also associated with stars in very early-type and/or very late evolutionary stage which are short phase. As already mentioned are also associated with binaries that experiencing mass transfer. These group of emission line stars includes young stellar (YSOs) and Herbig-Haro (HH) objects, post-asymptotic and some asymptotic giant branch (AGB), some red giant stars (RGB), Wolf-Rayet (WR) stars, supernova remnants, classical Be stars, active late-type dwarfs, interacting binary system like symbiotic stars

(SySt) and cataclysmic variables (CV). Most of these class of object are in-homogeneous and some contains many few identified members, for instance at the moment around 323 symbiotic system have been identified from which 257 belong to the Galaxy and ~66 are extra-galactic objects (Akras et al. 019a). The same occurs with PNe from witch around 3500 of them are been cataloged (Parker et al. 2016), this current number of PNe represents only about 15-30% of the estimated total of Galactic PNe (Frew, 2008; Jacoby et al., 2010) showing that a small fraction of the PNe have been cataloged. Many galaxies, in addition to harbor Planetary nebulae and H II regions, show characteristic nebular in their spectra. In most of these objects, the gas is photoionized by hot stars in the nucleus, which is thus much like giant H II region, or perhaps many H II regions. The galactic nucleus with very strongest emission lines of this type are often called blue compact galaxies, extragalactic H II regions, star forming or starburst galaxies (Osterbrock & Ferland 2006). There are also spiral galaxies that present emission lines.

In the past H surveys with modest spatial resolutions have been used to identified extended nebular emission to study supernova remnants, galaxy groups and star forming regions (Davies, Elliott Meaburn 1976). More recently, higher resolution surveys such as the INT Photometric H $\alpha$  survey (IPHAS; Drew et al. 2005; Barentsen et al. 2014) have focused in the study of compact emission line sources on the Galactic plane, typically with objects in different stage of stellar evolution. The Anglo-Australian Observatory UKS chmidt Telescope Supercosmos H $\alpha$  Survey (Parker et al. 2005) is another H $\alpha$  survey of the Southern Galactic Plane and Magellanic Cloud which has covered to b ~ 10-13° (verificar esto). Currently ongoing is the VST Photometric H $\alpha$  Survey of the Southern Galactic Plane and Bulge (VPHAS+; Drew et al. 2014) that will cover the Galactic bulge and plane in five filters.

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Like VPHAS+, others ongoing surveys that are used to study the population of emission line objects are the The Javalambre Photometric Local Universe Survey (J-PLUS<sup>1</sup>, Cenarro et al. 2018) and the Southern-Photometric Local Universe Survey (S-PLUS<sup>2</sup>, Mendes de Oliveira et al. 2019) are providing observations of the Galactic halo covering both northern and southern celestial hemispheres in a systematic way with twin telescopes using the same set of multi-band filters. In addition to the H $\alpha$  filter, which is already vastly applied to systematically searching for H $\alpha$  emitters the telescopes offer 11 more filters. And more ambitious yet the JPAS survey that will the same area of J-PLUS in 56 narrow-band filters.

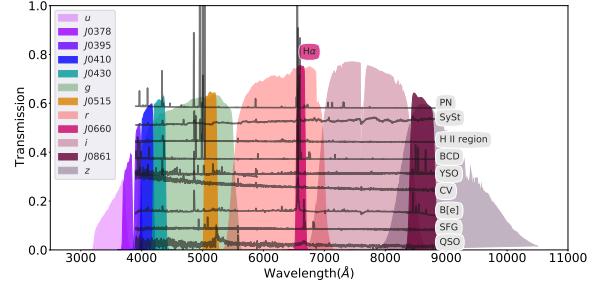
Traditionally, color-color diagrams based in H $\alpha$  filter are been used to identify H $\alpha$  emitters. The analysis the color-color diagram ( $r - H\alpha$ ) versus ( $r - i$ ) has resulted on the discovered of new emission line objects, for instance Witham et al. (2006, 2007) used the ( $r - H\alpha$ ) versus ( $r - i$ ) colour-colour diagram to find for new CV. On the other hand, Vink et al. (2008) reported the discovery of YSOs by using this same colour criteria. In this sense using this methodology a variety of classes of objects are been identified, which include symbiotic stars (Corradi et al. 2008; Corradi & Giannanco 2010; Corradi et al. 2011), early type emission line stars (Drew et al. 2008) and planetary nebulae (Viironen et al. 2009; Sabin et al. 2010). Recently, by using this same color diagram were also identified compact PN candidates in VPHAS+ catalog (Akras et al. 2019). And the same diagram in conjunction with new ones shows to be very efficient to find for PN candidates (Gutiérrez-Soto et al. 2020). In general terms, Witham et al. (2006) presented a methodology and first results in looking for emission line sources in narrow-band surveys.

In this work, we used S-PLUS observations of the southern hemisphere to search for objects with an excess of H $\alpha$  using automatic methods based on the ( $r - H\alpha$ ) versus ( $r - i$ ) color-color diagram we also used color criteria based in ( $g - r$ ) and ( $z - g$ ) in conjunction to unsupervised machine learning techniques to split the final list in those with blue and red continuum. The paper is organized as follows...

## 2 OBSERVATIONS

Particularly, we are implemented data from S-PLUS DR3 (ref) to carried out our study. S-PLUS is 12-band optical photometric survey, which are formed by using seven narrow-band and five broad-band like SDSS filters. The narrow-band set include the filter  $J0660$  which detect the H $\alpha$  emission line. Figure 1 shows the Javalambre filter system (Marín-Franch et al. 2012) overlapping are the optical spectra of several class emission line objects on which it is possible to see that the H $\alpha$  line falls into the  $J0660$  filter, except for the QSOs.

The actual data release contains about 60 millions of objects covering a total area of  $\sim 8000 \text{ deg}^2$ , at high Galactic latitudes ( $> 30 \text{ deg}$ ) using a dedicated 0.83m robotic telescope, the T80-South (T80S), located at Cerro Tololo, Chile. S-PLUS will cover an additional  $1300 \text{ deg}^2$  of the Galactic plane and bulge to enable Galactic studies. In this work, we focus on the aspects that are of particular interest to the second data release of the S-PLUS main survey. Additional information about S-PLUS can be found in Mendes de Oliveira et al. (2019).



**Figure 1.** Transmission curves of the S-PLUS filters set. The narrow-band filter  $J0660$  detects the H $\alpha$  emission line. Over-plotted are different classes of emission line objects, from upper to down PN, SySt ...

## 3 METHODOLOGY

We first constructed a sub-sample from all S-PLUS DR3 from which we applied an iterative and automatic technique to select objects with an excess of H $\alpha$  emission line, as we describe below:

### 3.1 Initial selection sample

The first step in our selection procedure consist in the following criteria to guarantee the quality of the observations of the objects:

- (i) The sources must have detection in the filters:  $r$ ,  $i$  and  $J0660$ . To assure that we select object must have error minor or equal to 0.2 in each of three filter.
- (ii) Must have an  $r$  magnitude until  $r = 21$ .

### 3.2 Finding the main stellar locus and selecting the H $\alpha$ emitters

Once the initial cut were made, we proceed to select the objects with an excess of H $\alpha$  which is represent relatively high value of the filter  $J0660$  in comparison with  $r$ -band filter. For that we first divided our sub-sample in four magnitude bins using the  $r$ -band magnitudes. The bins have the follow distribution:

- 1 bin- objects with magnitude in the  $r$ -band  $r < 16$
- 2 bin- objects with magnitude in the  $r$ -band  $16 \leq r < 18$
- 3 bin- objects with magnitude in the  $r$ -band  $18 \leq r < 20$
- 4 bin- objects with magnitude in the  $r$ -band  $20 \leq r < 21$

To select the  $r - J0660$  colour Wevers et al. (2017) presented a catalogue of point-sources H $\alpha$  emission objects identified in IPHAS.

To select the emission lines we used the same method created and implemented by Witham et al. (2008) its possible to do that because the S-PLUS has similar filters that the IPHAS project, which are  $r$ ,  $J0660$  and  $i$ . This technique was used by Scaringi et al. (2013) to identify blue objects with excess of H $\alpha$  and after that Wevers et al. (2017) also applied this methodology to create catalogue of candidate H $\alpha$  emission showing a high effectiveness. Applying the selection criteria to selecting H $\alpha$  emitters. We used the same procedure in Wevers et al. (2017). The objects with H $\alpha$  excess meet the condition:

$$(r - J0660)_{\text{obs}} - (r - J0660)_{\text{fit}} \geq C \times \sqrt{\sigma_s^2 - \sigma_{\text{phot}}^2} \quad (1)$$

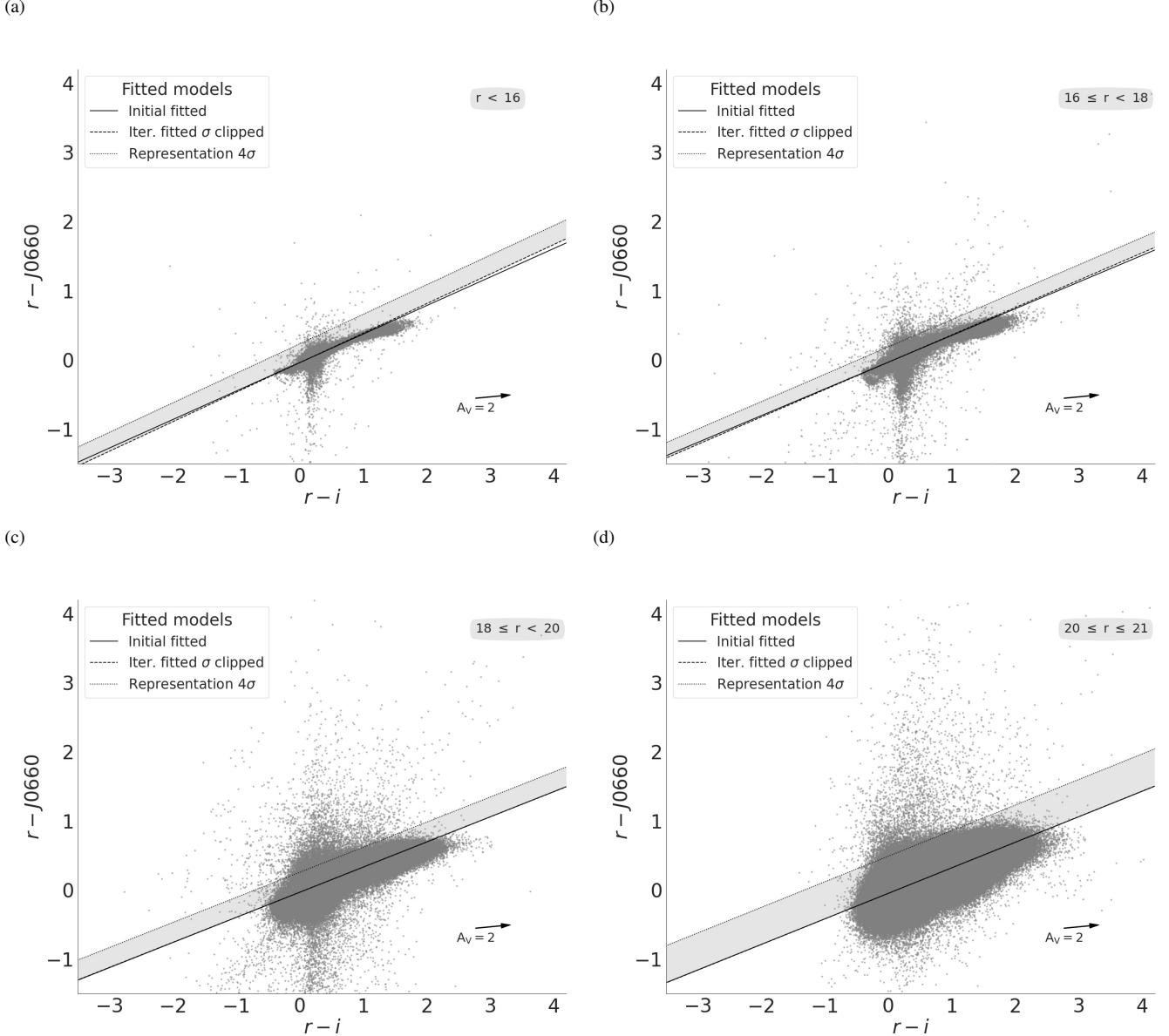
where  $\sigma_s$  is the root mean squared value of the residuals around the fit and  $\sigma_{\text{phot}}$  is the error on the observed  $(r - J0660)$  colour

Firts see an approximation of the  $4\sigma$  cut away from the original fit.

In Figure 2 is illustrate the selection process. The black line represent the fit

<sup>1</sup> <https://www.j-plus.es>

<sup>2</sup> <http://www.splus.iag.usp.br>



**Figure 2.** An illustration of the selection criteria used to identify strong emission-line objects via colour-colour plots. The data shown here are all from the S-PLUS DR3. The data are split up into four magnitude bins, as shown in the four panels. Objects with H $\alpha$  excess should be located near the top of the colour-colour plots. The thin red lines illustrate the original least-squares fit to all the data (grey points). The thin blue lines represent the final fits to the upper locus of points obtained by applying an iterative  $\sigma$ -clipping technique to the initial fit. The actual cuts used to select H $\alpha$  emitters are shown by the thick dashed lines. If the cut was based on the initial (final) fit, it is shown in red (blue). Objects selected as H emitters must be located above the cut and are shown as large triangles. Note that the cut lines shown here are only approximate, as the actual selection criterion also considers the errors on each individual data point. This explains, for example, why an object in the bottom right-hand panel is not selected despite clearly lying above the cut line.

### 3.3 Maths

### 3.4 Figures and tables

## 4 RESULTS

## 5 CONCLUSIONS

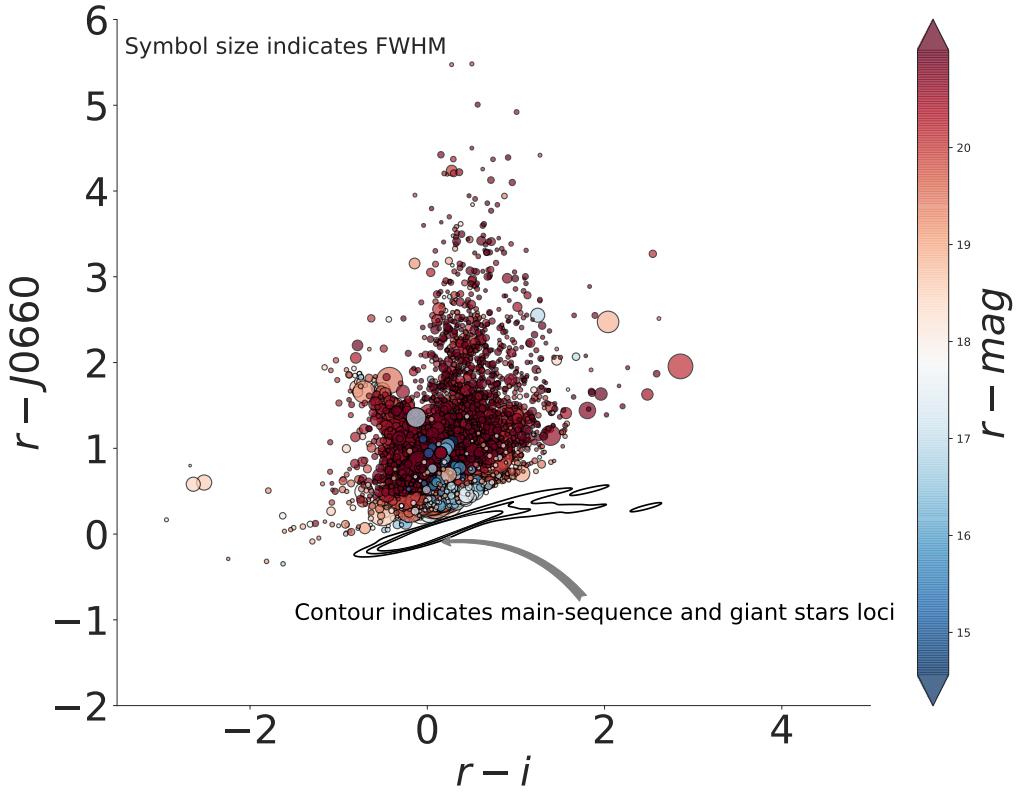
We have found a important sample of emission line objects.

## ACKNOWLEDGEMENTS

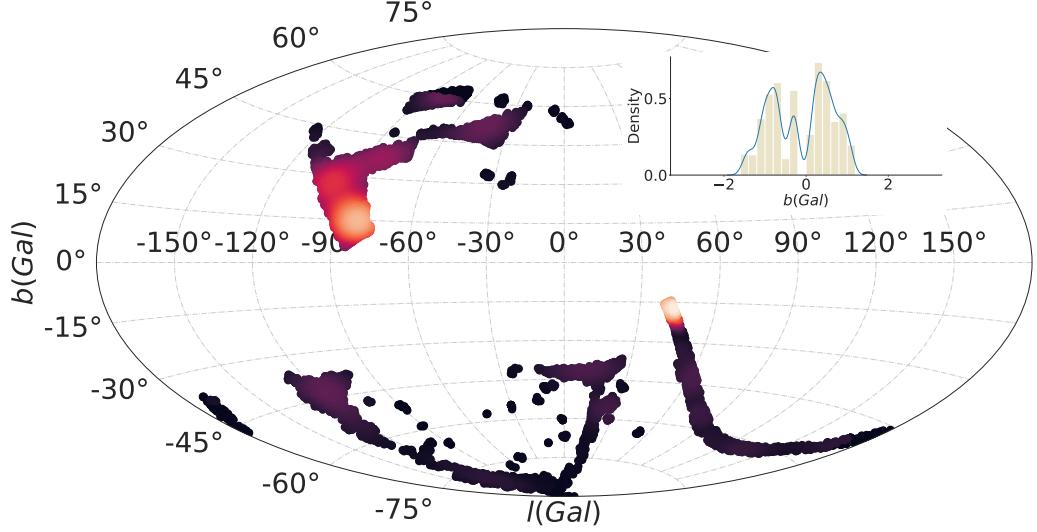
## DATA AVAILABILITY

## REFERENCES

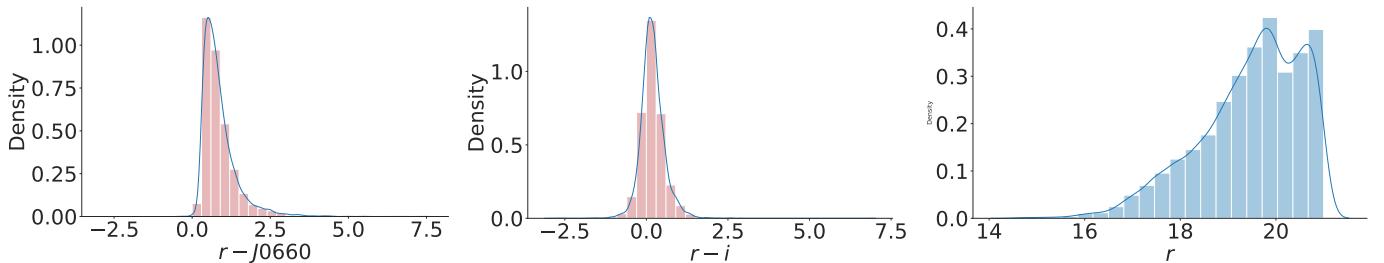
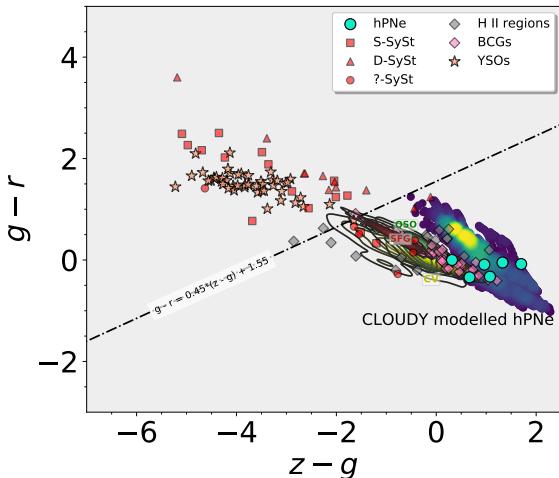
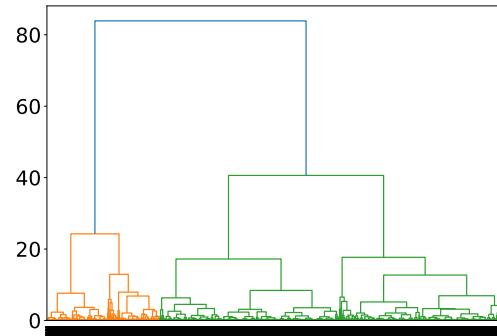
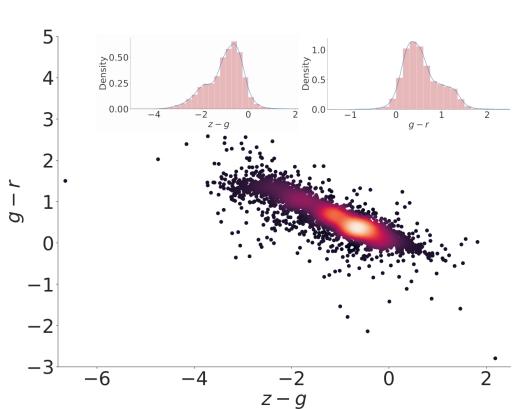
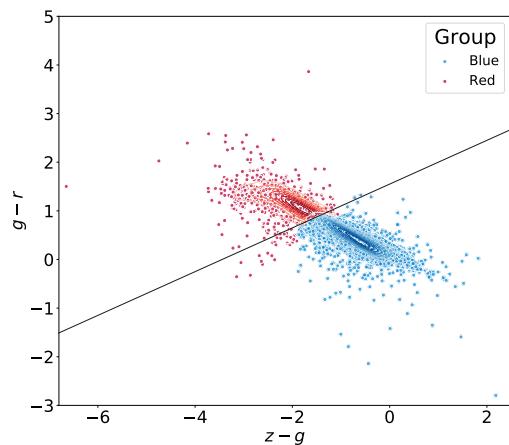
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**Figure 3.** Colour-colour diagram with all the emission line objects selected from S-PLUS DR3. Size of the symbols represent the measured FWHM assuming a Gaussian core (for more detail see Almeida-Fernandes et al. 2021). Colored bar is the magnitude values in the r-band. The contours represent the synthetic main-sequence and giant stars loci from the library of stellar spectral energy distributions of Pickles (1998).

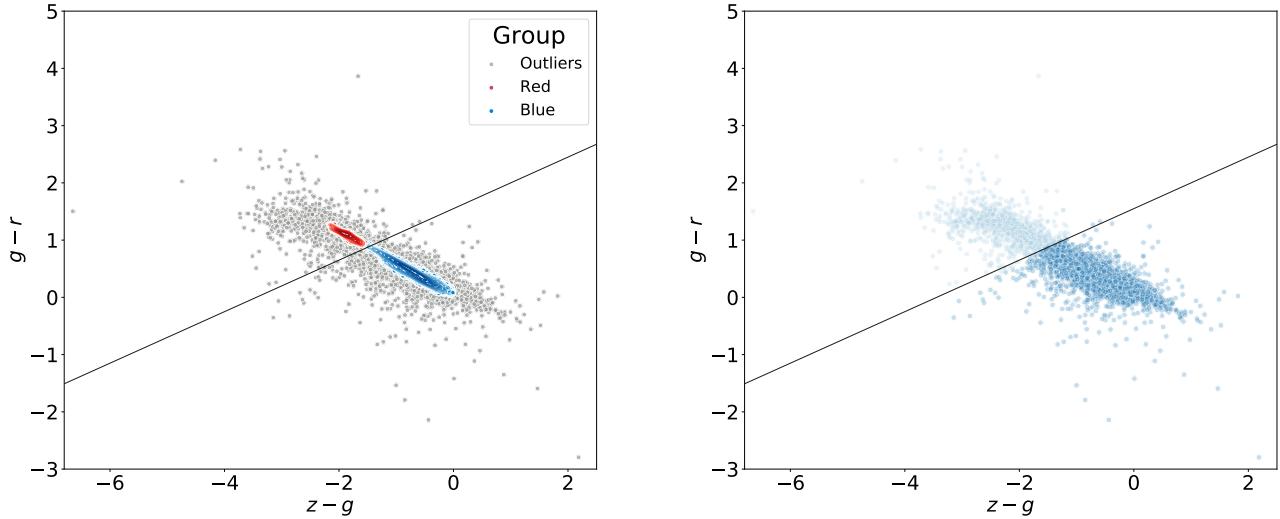


**Figure 4.** The distribution of H emitters in Galactic longitude and latitude. The emitters are shown as red points if brighter than  $r = 18$ , and black points if fainter. The S-PLUS direct fields are shown by green squares (offset fields are not shown). All emitters are shown here, including those with flagged with ‘c’ in Table 1.

**Figure 5.** Emission lines selected...**Figure 6.** Classifying...**Figure 8.** Costomer dendrogram...**Figure 7.** Classifying...**Figure 9.** Costomer dendrogram...

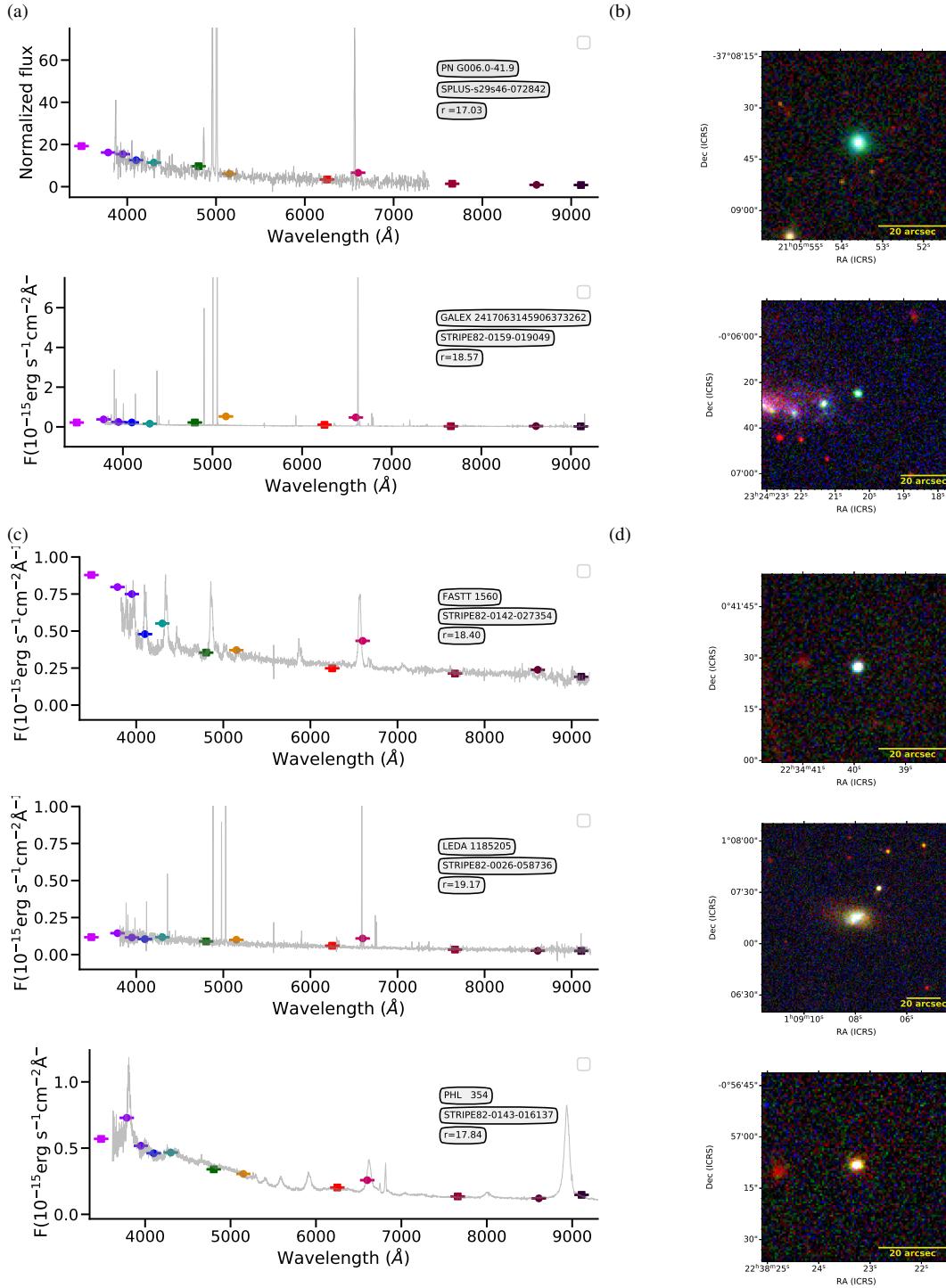
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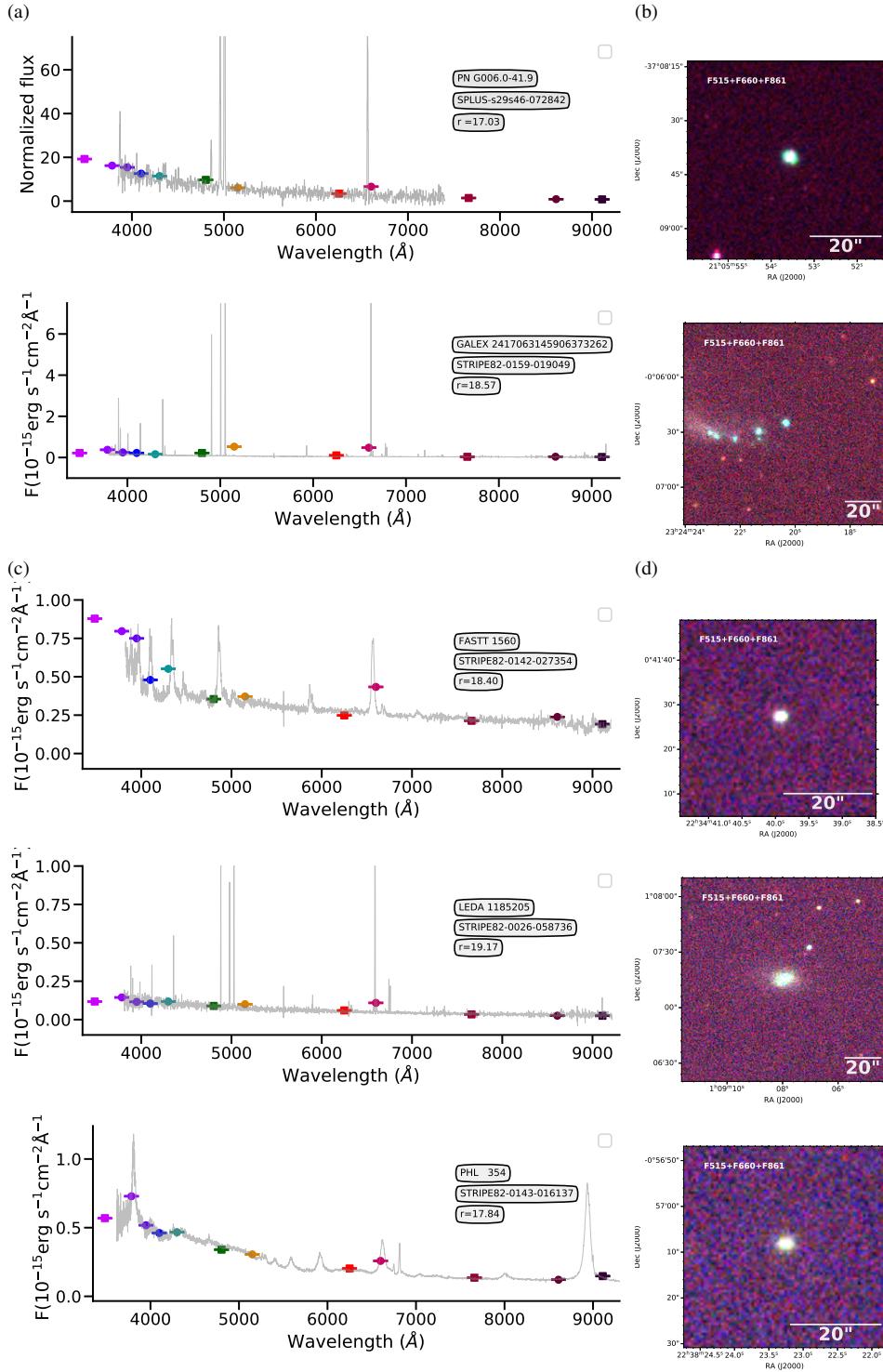


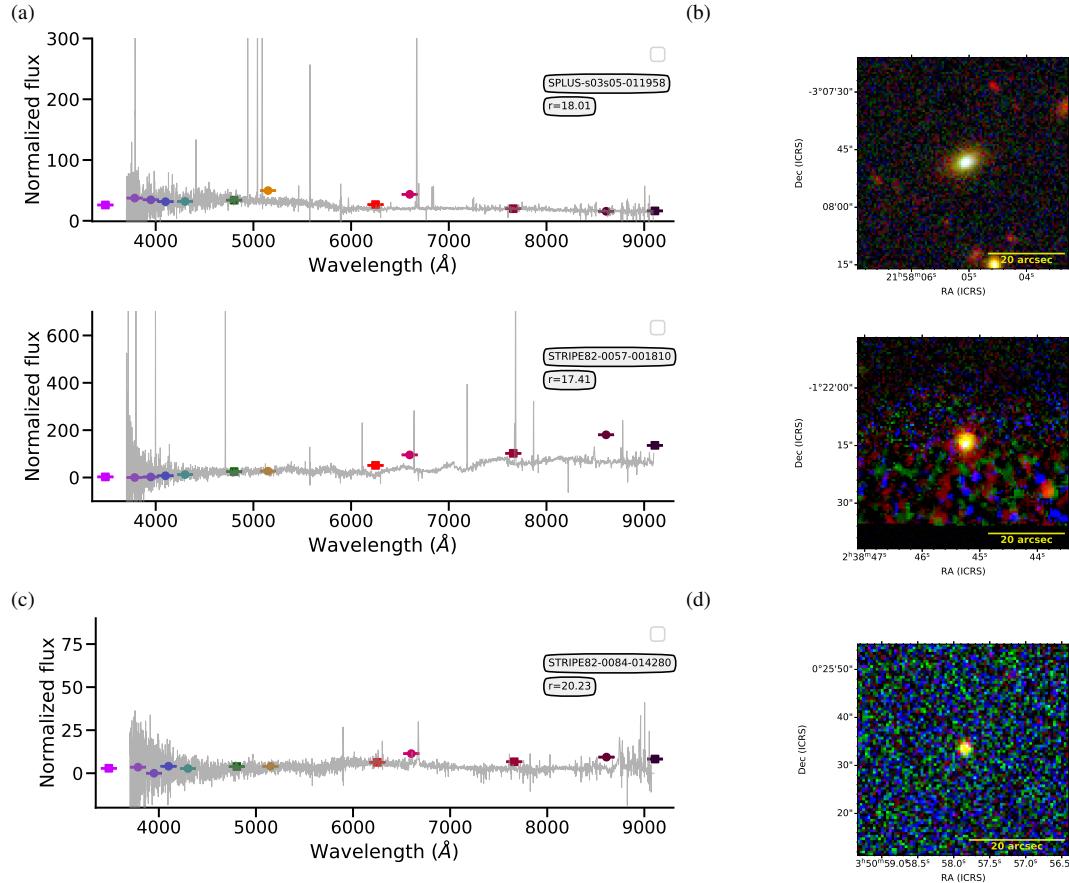
**Figure 10.** New color-color diagram to separate the blue objects from the red ones.

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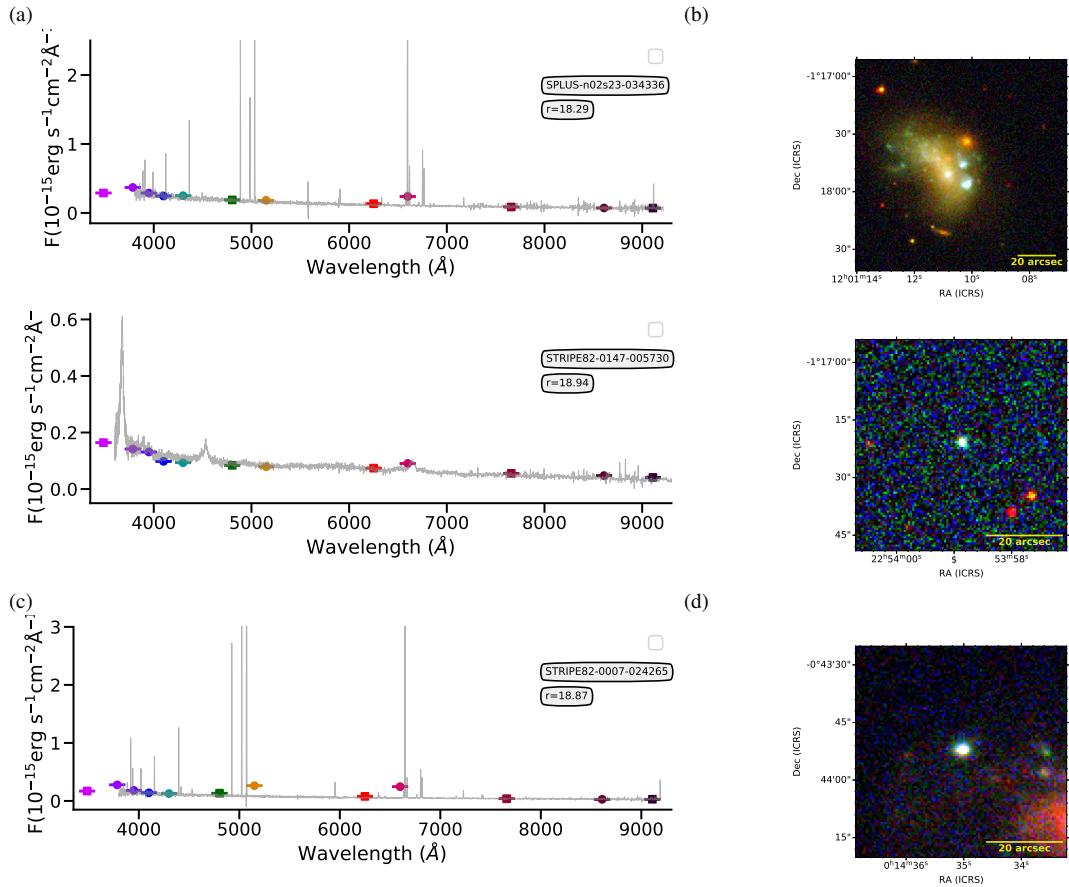


**Figure 11.** Spectra of the known objects select with our algorithm

**Figure 12.** Spectra of the known objects select with our algorithm



**Figure 13.** Spectra of the Lamost

**Figure 14.** Spectra of the SDSS

## APPENDIX A: SOME EXTRA MATERIAL

Table A1: Simbad sources.

Id Simbad	RA	DEC	Type	Group
CTLGD 9478	0:01:59.25	-29:18:40.4	Star	Blue
QSO B2359+005	0:02:30.71	+0:49:59.2	QSO	Blue
[GMB2011] 1808	0:02:47.58	-0:22:23.5	CIG	-
CTLGD 2037	0:05:08.77	-30:51:04.2	Star	Red
SDSS J000637.99-003656.2	0:06:37.99	-0:36:56.2	QSO	-
LBQS 0004+0036	0:07:10.00	+0:53:29.1	QSO	Blue
SDSS J000809.34+004935.5	0:08:09.34	+0:49:35.3	QSO	-
2SLAQ J000918.74-003907.2	0:09:18.76	-0:39:07.0	Galaxy	Blue
[VV2006] J001040.1-294428	0:10:40.08	-29:44:27.3	QSO	Blue
CTLGD 7291	0:10:48.73	-29:47:28.8	Star	Red
2QZ J001055.3-304423	0:10:55.37	-30:44:23.5	Galaxy	Blue
[VV2006] J001228.8-310241	0:12:28.78	-31:02:40.0	QSO	Blue
LBQS 0010+0035	0:13:27.32	+0:52:32.2	Seyfert 1	Blue
[GPM2009] J0014-0044 2	0:14:28.79	-0:44:43.8	EmG	Blue
2SLAQ J001455.99+001903.5	0:14:55.99	+0:19:03.7	Star	Blue
2SLAQ J001526.52+001813.2	0:15:26.52	+0:18:13.4	QSO	Blue
[VV2006] J001535.5+005355	0:15:35.55	+0:53:56.1	QSO	Blue
SDSS J001628.25+010801.9	0:16:28.24	+1:08:02.0	Galaxy	Blue
[VV2006] J001641.9-312657	0:16:41.87	-31:26:56.6	QSO	Blue
2SLAQ J001731.27-004859.3	0:17:31.26	-0:48:59.2	QSO	Blue
LEDA 1156	0:17:39.97	+0:30:22.5	StarburstG	Blue
SDSS J001753.82+005057.6	0:17:53.82	+0:50:57.7	QSO	-
2SLAQ J001912.39+000319.6	0:19:12.39	+0:03:19.8	QSO	Blue
2SLAQ J001940.23-005435.9	0:19:40.24	-0:54:35.8	QSO	Blue
[VV2006] J001950.1-004040	0:19:50.06	-0:40:40.7	QSO	-
2SLAQ J002237.90+000519.0	0:22:37.90	+0:05:19.2	QSO	Blue
UM 240	0:25:07.40	+0:18:45.2	EmObj	Blue
2MASX J00251994+0031312	0:25:19.92	+0:31:31.7	Seyfert 1	Blue
LEDA 3107905	0:27:53.84	-0:58:00.2	Galaxy	Blue
SDSS J002916.79-010021.5	0:29:16.81	-1:00:23.1	Galaxy	Blue
SDSS J002940.01+010528.5	0:29:40.02	+1:05:28.7	QSO	Blue
[VV2010c] J002951.5+004159	0:29:51.45	+0:42:00.0	AGN	Red
SDSS J003117.70+001705.0	0:31:17.69	+0:17:05.1	QSO	-
2QZ J003137.5-292815	0:31:37.50	-29:28:15.3	Unknown	Blue
2dFGRS TGS283Z142	0:31:50.70	-28:55:36.7	Galaxy	Blue
2QZ J003152.5-293534	0:31:52.56	-29:35:33.3	Galaxy	Blue
2SLAQ J003208.53-005303.7	0:32:08.53	-0:53:03.6	QSO	Blue
SDSS J003234.62-001557.1	0:32:34.62	-0:15:57.1	QSO	Blue
LEDA 559945	0:32:34.69	-42:40:10.4	Galaxy	Blue
[VV2006] J003242.7+003111	0:32:42.74	+0:31:11.1	QSO	Blue
2dFGRS TGS365Z059	0:33:54.71	-29:56:12.7	Galaxy	Blue
SWIRE J003517.14-420518.6	0:35:17.11	-42:05:19.0	AGN	Red
[VV2006] J003545.9+002306	0:35:45.86	+0:23:06.0	QSO	Blue
2MASS J00362543-0029075	0:36:25.39	-0:29:07.1	AGN	Red
2dFGRS TGS440Z027	0:36:38.44	-32:34:44.7	Galaxy	Blue
[VV2006] J003714.1-005602	0:37:14.11	-0:56:04.0	QSO	-
[VV2006] J003722.2-001140	0:37:22.17	-0:11:40.6	QSO	Blue
UM 260	0:37:41.13	+0:33:20.0	EmObj	Blue
SDSS J003859.34-004252.2	0:38:59.35	-0:42:52.0	QSO	Blue
SDSS J003930.30+012021.6	0:39:30.28	+1:20:20.9	BlueCompG	Blue
IRAS 00370+0035	0:39:34.78	+0:51:36.9	FIR	Blue
IRAS 00370+0035	0:39:34.78	+0:51:36.9	FIR	Blue
2QZ J004215.6-321257	0:42:15.62	-32:12:57.2	Galaxy	Blue
GALEX 2673249256393934953	0:42:43.87	+1:17:02.2	QSO	Blue
2dFGRS TGS501Z235	0:43:21.88	-33:19:02.9	Galaxy	Blue
2SLAQ J004335.13-003729.7	0:43:35.16	-0:37:29.6	CataclyV*	Blue
SDSS J004415.83-004303.1	0:44:15.81	-0:43:03.1	QSO	-

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
[VV2006] J004544.4-315729	0:45:44.35	-31:57:29.2	QSO	Blue
2SLAQ J004626.30-011417.0	0:46:26.30	-1:14:16.8	Galaxy	Blue
[VV98] J004826.9-341340	0:48:26.97	-34:13:38.7	QSO	Blue
SDSS J004918.52+011308.9	0:49:18.52	+1:13:09.1	QSO	Blue
LEDA 3034	0:51:49.42	+0:33:53.8	Seyfert 1	Blue
QSO B0049-272	0:51:55.64	-26:57:43.3	QSO	Blue
[BKD2008] WR 353	0:51:59.72	-0:29:20.8	PartofG	Blue
ESO 411-27	0:52:51.61	-27:19:32.8	Galaxy	Blue
SDSS J005343.78+012147.6	0:53:43.76	+1:21:47.5	QSO	Blue
RESOLVE rf554	0:54:15.54	-1:04:56.0	Galaxy	Blue
2QZ J005440.1-320042	0:54:40.12	-32:00:42.2	EmG	Blue
QSO B0052-307	0:54:43.95	-30:30:54.1	QSO	Blue
[VV2006] J005532.1-311538	0:55:32.08	-31:15:37.8	QSO	Blue
[TYZ2012] II 11	0:55:41.32	-0:56:30.6	Galaxy	Blue
[CT83] 219	0:55:51.35	-30:56:42.8	UV	Blue
RGO 8439	0:55:53.16	-28:54:57.3	Star	Blue
2dFGRS TGS502Z028	0:55:53.31	-33:39:01.5	Galaxy	Blue
[VV2006] J005609.9-312209	0:56:09.93	-31:22:08.6	QSO	Blue
[VV2006] J005639.0-315759	0:56:39.05	-31:57:58.6	QSO	Blue
[GPM2009] 0057-0022	0:57:12.60	-0:21:57.7	Galaxy	Blue
[VV2000] J005840.5-300203	0:58:40.42	-30:02:00.1	QSO	Blue
LEDA 3530	0:59:04.10	+1:00:04.2	GinCl	Blue
2dFGRS TGS503Z245	0:59:13.57	-34:19:15.7	Galaxy	Blue
2MASX J00593609-3020390	0:59:36.09	-30:20:39.0	Galaxy	Red
LBQS 0057-0135	0:59:48.81	-1:19:05.2	QSO	Blue
QSO B0057-3948	0:59:53.21	-39:31:57.3	QSO	Blue
CAIRNS J005959.59-005157.2	0:59:59.58	-0:51:57.1	GinCl	Red
SCMS 679	1:00:04.44	-33:39:32.5	Star	Blue
2QZ J010009.9-320131	1:00:09.94	-32:01:31.1	Unknown	Blue
2dFGRS TGS561Z059	1:00:16.17	-34:57:40.6	Galaxy	Blue
2SLAQ J010121.76-000301.7	1:01:21.76	-0:03:01.8	Galaxy	Blue
QSO B0059-304B	1:02:14.65	-30:07:53.8	QSO	Blue
2SLAQ J010230.03-003206.8	1:02:30.02	-0:32:06.8	Seyfert 1	Blue
2MASX J01023175+0120363	1:02:31.78	+1:20:36.1	GinCl	Blue
[VV2006] J010336.4-005508	1:03:36.39	-0:55:08.8	QSO	Blue
SDSS J010413.86-011552.1	1:04:13.86	-1:15:52.0	QSO	Blue
QSO B0103+00	1:06:19.23	+0:48:23.4	QSO	Red
6dFGS gJ010653.4-324342	1:06:53.44	-32:43:41.9	AGN	Blue
LIRAS J010658.95+010438.3	1:06:58.93	+1:04:38.2	AGN	Red
[VV2006] J010705.6+000609	1:07:05.55	+0:06:09.0	QSO	Blue
UGC 695	1:07:46.47	+1:03:50.3	LSB G	Blue
SDSS J010748.62+004453.5	1:07:48.62	+0:44:53.7	BCIG	Red
MCG+00-04-011	1:09:01.58	+1:22:41.5	GinCl	Blue
MCG+00-04-011	1:09:01.58	+1:22:41.5	GinCl	Blue
2SLAQ J010907.59+000649.8	1:09:07.59	+0:06:50.0	QSO	Blue
LEDA 1185205	1:09:07.95	+1:07:15.5	HII G	Blue
SDSS J010918.56+005419.3	1:09:18.56	+0:54:19.4	QSO	Blue
2SLAQ J010925.95-003739.0	1:09:25.96	-0:37:39.0	QSO	Blue
2QZ J011014.0-302445	1:10:13.97	-30:24:44.5	EmG	Blue
2QZ J011119.0-300019	1:11:19.02	-30:00:18.2	EmG	Blue
SDSS J011128.38+000143.7	1:11:28.35	+0:01:43.3	QSO	Blue
2dFGRS TGS505Z356	1:12:12.64	-33:56:31.1	Galaxy	Red
2SLAQ J011230.55+001441.5	1:12:30.55	+0:14:41.7	QSO	Blue
PB 6318	1:12:58.01	+0:58:37.0	Star	Blue
2dFGRS TGS447Z027	1:13:13.03	-32:26:09.9	Galaxy	Blue
UGC 772	1:13:40.42	+0:52:39.0	LSB G	-
2SLAQ J011402.35-004750.9	1:14:02.35	-0:47:50.8	Seyfert 1	Blue
[VV2006] J011405.3-310903	1:14:05.25	-31:09:02.8	QSO	Blue
2dFGRS TGS505Z120	1:14:36.11	-32:38:41.0	Galaxy	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
SDSS J011531.90-005144.5	1:15:31.89	-0:51:44.3	HII G	Blue
2SLAQ J011533.07-005134.9	1:15:33.06	-0:51:34.8	Galaxy	Blue
[BKD2008] WR 354	1:15:33.79	-0:51:31.5	HII G	Blue
[BKD2008] WR 354	1:15:33.79	-0:51:31.5	HII G	Blue
2SLAQ J011542.18+002300.2	1:15:42.18	+0:23:00.4	QSO	Blue
2dFGRS TGS505Z064	1:16:38.40	-32:55:39.1	Galaxy	Blue
2dFGRS TGS505Z018	1:17:40.21	-33:04:40.7	Galaxy	Blue
2dFGRS TGS377Z137	1:17:56.44	-30:26:25.8	Galaxy	Blue
2dFGRS TGS506Z276	1:18:05.71	-33:03:09.1	Galaxy	Blue
2SLAQ J011818.13+001455.2	1:18:18.12	+0:14:55.5	QSO	Blue
2SLAQ J011829.63+004549.4	1:18:29.62	+0:45:49.4	Seyfert 1	Blue
2dFGRS TGS506Z243	1:18:49.15	-33:20:13.1	Galaxy	Blue
2MASX J01195427-3414599	1:19:54.23	-34:15:00.0	EmG	Blue
2dFGRS TGS506Z158	1:20:09.99	-33:14:10.7	Galaxy	Blue
2SLAQ J012110.74-005037.2	1:21:10.74	-0:50:37.1	QSO	Blue
[HB93] 0119-341B	1:21:52.19	-33:56:15.8	Star	Red
SDSS J012213.85+005731.4	1:22:13.87	+0:57:31.6	HII G	Blue
2dFGRS TGS565Z149	1:22:17.09	-34:02:41.6	Galaxy	Blue
2SLAQ J012226.76+000327.5	1:22:26.75	+0:03:27.9	QSO	Blue
QSO B0120-002	1:23:01.78	+0:03:23.6	QSO	Blue
2dFGRS TGS297Z222	1:23:50.87	-29:11:46.4	Galaxy	Blue
MCG+00-04-113	1:23:54.75	+0:16:56.4	GinCl	Blue
SDSS J012356.34+001230.6	1:23:56.35	+0:12:31.0	Galaxy	Blue
ESO 352-67	1:23:57.47	-33:48:07.5	Galaxy	Blue
SDSS J012405.73+005905.0	1:24:05.73	+0:59:04.9	Galaxy	-
QSO B0121-324	1:24:16.18	-32:12:21.7	QSO	Blue
2dFGRS TGS507Z113	1:24:30.16	-33:38:45.5	Galaxy	Red
QSO B0122-3232	1:25:04.59	-32:17:14.6	QSO	Blue
2QZ J012526.2-304433	1:25:26.24	-30:44:32.8	EmG	Blue
2QZ J012549.3-280944	1:25:49.29	-28:09:43.6	Galaxy	-
LEDA 1180903	1:26:27.03	+0:58:51.9	Galaxy	Blue
2dFGRS TGS566Z338	1:26:37.73	-34:35:13.8	Galaxy	Blue
6dFGS gJ012646.5-003845	1:26:46.51	-0:38:44.7	HII G	Blue
ESO 413-7	1:27:59.31	-29:05:12.0	GinCl	Blue
6dFGS gJ012926.6-011159	1:29:26.54	-1:11:59.0	GinCl	Red
SDSS J013034.18-002106.6	1:30:34.17	-0:21:06.5	QSO	Blue
2dFGRS TGS509Z295	1:31:21.84	-33:06:06.2	Galaxy	Blue
2dFGRS TGS508Z142	1:31:45.65	-32:56:56.8	Galaxy	Blue
LEDA 679811	1:31:47.24	-33:10:55.1	Galaxy	Blue
2dFGRS TGS509Z242	1:32:53.43	-33:26:42.7	Galaxy	Blue
2MASS J01330450+0003553	1:33:04.52	+0:03:56.1	low-mass*	Red
2SLAQ J013400.41-010358.2	1:34:00.46	-1:03:59.2	Galaxy	Blue
RESOLVE rf246	1:34:52.04	-0:38:55.2	Galaxy	Blue
[VV2006] J013500.8-004054	1:35:00.83	-0:40:54.2	QSO	Blue
FBQS J0135-0019	1:35:17.53	-0:19:39.0	Seyfert 1	Blue
2QZ J013531.1-313651	1:35:31.16	-31:36:51.0	Galaxy	Blue
SDSS J013701.72-012059.3	1:37:01.71	-1:20:59.1	QSO	Blue
[VV2006] J013729.4-320715	1:37:29.40	-32:07:15.7	QSO	Blue
[VV2006] J013837.3+002818	1:38:37.28	+0:28:18.5	QSO	Blue
2SLAQ J013951.07+002537.9	1:39:51.07	+0:25:38.0	QSO	Blue
2E 458	1:40:17.06	-0:50:03.0	Seyfert 1	Blue
SDSS J014125.63+000755.6	1:41:25.64	+0:07:55.8	QSO	Red
[VV2006] J014224.7-320414	1:42:24.73	-32:04:13.7	QSO	Blue
[VV2006] J014303.6-295255	1:43:03.49	-29:52:54.8	QSO	Blue
ESO 353-36	1:43:18.29	-34:12:22.4	EmG	Red
SDSS J014721.12-004505.3	1:47:21.12	-0:45:05.3	QSO	Red
[VV2006] J014739.2-285259	1:47:39.21	-28:52:59.2	QSO	Blue
[VV2006] J014739.2-285259	1:47:39.21	-28:52:59.3	QSO	Blue
SDSS J014806.25-002841.6	1:48:06.25	-0:28:41.6	Galaxy	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
[VV2006] J014812.2+000154	1:48:12.24	+0:01:53.5	QSO	Blue
2QZ J014844.1-275610	1:48:44.17	-27:56:11.0	Star	Blue
IC 1734	1:49:17.03	-32:44:33.1	Galaxy	Blue
[VV2006] J014921.5-003220	1:49:21.53	-0:32:20.9	QSO	Blue
[RGD2013] J015239.744+010557.768	1:52:39.74	+1:05:57.9	Galaxy	Red
[RGD2013] J015253.854+011215.480	1:52:53.85	+1:12:15.5	Galaxy	Red
2QZ J015257.7-284838	1:52:57.76	-28:48:37.8	Seyfert 1	Blue
2SLAQ J015331.85+002252.8	1:53:31.85	+0:22:53.0	QSO	Blue
SDSS J015400.48-004509.5	1:54:00.50	-0:45:10.0	HII G	Blue
2SLAQ J015409.27+002645.2	1:54:09.27	+0:26:45.3	QSO	Blue
[VV2006] J015410.9-285214	1:54:10.94	-28:52:14.6	QSO	Blue
[VV2006] J015415.4-285254	1:54:15.48	-28:52:54.9	QSO	Blue
SDSS J015440.44-000643.9	1:54:40.45	-0:06:43.6	EmG	Blue
2SLAQ J015526.89+000615.4	1:55:26.87	+0:06:15.8	Galaxy	Blue
2SLAQ J015529.12-003927.3	1:55:29.07	-0:39:27.1	Galaxy	Blue
SDSS J015813.75+010143.5	1:58:13.75	+1:01:43.4	RRLyr	Blue
[VV2006] J015832.1-301703	1:58:32.15	-30:17:02.8	QSO	Blue
[VV2006] J015832.1-301703	1:58:32.16	-30:17:02.7	QSO	Blue
[VV2006] J015850.2-300438	1:58:50.22	-30:04:38.1	QSO	-
[VV2006] J015935.4+000401	1:59:35.48	+0:04:01.5	QSO	Blue
SDSS J020025.40+002916.5	2:00:25.40	+0:29:16.8	QSO	Red
[VV2006] J020055.0-293527	2:00:55.02	-29:35:26.5	QSO	Blue
ESO 414-22	2:01:14.49	-31:43:42.9	GinGroup	Blue
[VV98] J020115.4+003136	2:01:15.53	+0:31:35.1	QSO	Blue
2SLAQ J020200.06-000921.2	2:02:00.06	-0:09:21.2	QSO	Blue
[VV96] J020435.5-455923	2:04:35.46	-45:59:24.0	QSO	Blue
LEDA 1193771	2:05:00.83	+1:24:03.7	Galaxy	Blue
2dFGRS TGS514Z164	2:07:20.33	-33:01:54.3	Galaxy	-
2SLAQ J020804.48-000023.2	2:08:04.49	-0:00:23.0	QSO	Blue
2SLAQ J020827.06-005208.1	2:08:27.07	-0:52:07.9	QSO	Blue
SDSS J020921.99-005455.5	2:09:22.00	-0:54:55.4	QSO	Blue
2dFGRS TGS515Z070	2:12:25.05	-33:04:59.0	Galaxy	-
2dFGRS TGS515Z311	2:14:24.22	-33:14:52.0	Galaxy	Blue
2dFGRS TGS461Z092	2:14:47.63	-32:42:35.2	Galaxy	Blue
2SLAQ J021529.02-005314.8	2:15:29.02	-0:53:14.9	QSO	Blue
2dFGRS TGS460Z130	2:16:01.62	-31:36:51.8	Galaxy	Blue
2dFGRS TGS387Z025	2:16:13.75	-30:50:56.8	Galaxy	Blue
SDSS J021617.19-011046.9	2:16:17.19	-1:10:46.7	QSO	Blue
2SLAQ J021810.52-010147.4	2:18:10.52	-1:01:47.2	QSO	Blue
V* AX For	2:19:28.00	-30:45:46.0	CataclyV*	Blue
2QZ J022112.5-302559	2:21:12.54	-30:25:59.0	EmG	Blue
2SLAQ J022316.91-010049.7	2:23:16.93	-1:00:49.6	Galaxy	Blue
SHOC 120	2:24:17.14	+0:06:26.1	Seyfert 1	-
LEDA 667000	2:24:52.74	-34:06:34.3	Galaxy	Blue
SDSS J022530.93-005007.0	2:25:30.92	-0:50:07.1	Galaxy	Blue
[BKD2008] WR 346	2:26:28.28	+1:09:37.6	PartofG	Blue
[BKD2008] WR 346	2:26:28.28	+1:09:37.6	PartofG	Blue
LEDA 546974	2:26:46.27	-43:35:29.6	Galaxy	Blue
SDSS J022714.48+010536.1	2:27:14.47	+1:05:36.3	EmG	Blue
RESOLVE rf668	2:27:19.29	+1:01:32.2	Galaxy	Blue
[VV2006] J022738.3-313627	2:27:38.28	-31:36:26.4	QSO	Blue
[VV2006] J022758.2+000226	2:27:58.20	+0:02:25.6	QSO	-
LCRS B022613.7-392927	2:28:14.52	-39:16:04.0	Galaxy	Blue
[BKD2008] WR 315	2:28:28.73	-1:08:58.6	PartofG	Blue
2SLAQ J022945.34+000856.2	2:29:45.34	+0:08:56.4	Star	Blue
2QZ J022954.6-303558	2:29:54.69	-30:35:58.4	Seyfert 1	Blue
Pul -3 180355	2:29:57.00	-1:00:32.3	Star	Red
2dFGRS TGS463Z130	2:30:09.77	-31:36:18.2	Galaxy	Blue
SDSS J023020.93+001355.5	2:30:20.93	+0:13:55.8	Seyfert 1	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
UGC 2009	2:32:09.34	-1:23:10.3	Galaxy	Red
2dFGRS TGS518Z089	2:32:18.08	-33:50:43.0	Galaxy	Blue
SDSS J023230.63-011654.5	2:32:30.63	-1:16:54.5	QSO	Blue
6dFGS gJ023241.8-391744	2:32:41.88	-39:17:42.8	Galaxy	Blue
SDSS J023248.71+005138.8	2:32:48.71	+0:51:38.8	Galaxy	Blue
V* HP Cet	2:33:22.62	+0:50:59.4	Nova	Blue
NGC 986	2:33:34.29	-39:02:40.9	EmG	Blue
[VV2006] J023335.4-010744	2:33:35.37	-1:07:44.6	QSO	Blue
SDSS J023628.77-005829.7	2:36:28.75	-0:58:30.0	Galaxy	Blue
[VV2006] J023635.7-003203	2:36:35.69	-0:32:03.4	QSO	-
SDSS J024059.15+004545.8	2:40:59.14	+0:45:45.9	QSO	Blue
[VV2006] J024235.0-010351	2:42:34.91	-1:03:51.9	QSO	Blue
[EKS96] NGC 1068 91	2:42:46.94	+0:01:26.2	HII	Blue
[ZBF2015] NGC1073 1	2:43:35.61	+1:22:37.9	HII	Blue
[ZBF2015] NGC1073 16	2:43:37.69	+1:22:22.5	HII	Blue
[ZBF2015] NGC1073 21	2:43:42.74	+1:21:34.4	HII	Blue
[ZBF2015] NGC1073 10	2:43:44.03	+1:22:40.5	HII	Blue
6dFGS gJ024605.3-330500	2:46:05.28	-33:04:59.4	Galaxy	Blue
2MASS J02462415-0029539	2:46:24.14	-0:29:52.9	Star	Blue
Gaia DR2 2497764348684940160	2:46:24.75	-0:30:16.3	QSO	Blue
[BKD2008] WR 316	2:46:25.42	-0:30:09.8	PartofG	Blue
2SLAQ J024626.59-003000.2	2:46:26.57	-0:30:00.4	Star	Blue
2SLAQ J025100.64+001707.2	2:51:00.64	+0:17:07.3	QSO	Blue
2SLAQ J025216.75+001741.2	2:52:16.73	+0:17:41.2	Galaxy	Blue
2SLAQ J025252.02-002211.7	2:52:52.00	-0:22:11.6	QSO	Blue
SHOC 143	2:54:26.13	-0:41:22.7	Seyfert 1	Blue
NVSS J025557+004132	2:55:57.24	+0:41:33.5	RadioG	Red
QSO B0253+0058	2:56:07.25	+1:10:38.8	QSO	Blue
HBQS 0253+0022	2:56:25.32	+0:34:29.4	HII	Blue
LEDA 1170514	2:56:28.43	+0:36:28.2	Galaxy	Blue
2dFGRS TGS522Z138	2:57:45.54	-33:28:55.5	Galaxy	Red
2MASSI J0259103-002239	2:59:10.38	-0:22:39.8	Seyfert 1	Blue
2SLAQ J030309.82+001337.5	3:03:09.83	+0:13:37.8	Galaxy	-
UGC 2517	3:04:12.47	-1:11:33.8	Galaxy	Red
2SLAQ J030417.77-004931.7	3:04:17.77	-0:49:31.5	Galaxy	Blue
LEDA 1142424	3:04:34.76	-0:28:30.7	Seyfert 1	Blue
LBQS 0302-0019	3:04:49.85	-0:08:13.4	QSO	Blue
2MASS J03045799+0057131	3:04:57.98	+0:57:14.0	Blue	Blue
MCG+00-08-089	3:05:18.24	-0:09:34.1	Galaxy	Blue
LBQS 0303+0110	3:06:12.72	+1:21:57.3	QSO	Blue
WISE J030629.21-335332.3	3:06:29.22	-33:53:32.3	AGN	Blue
SDSS J030630.33-000622.9	3:06:30.33	-0:06:22.9	Galaxy	Red
SDSS J030715.63+004352.1	3:07:15.60	+0:43:52.6	Galaxy	Blue
2SLAQ J030757.55+000712.0	3:07:57.55	+0:07:12.1	QSO	Blue
2SLAQ J031129.69-001701.4	3:11:29.70	-0:17:01.5	QSO	Blue
2QZ J031130.9-315250	3:11:30.92	-31:52:51.1	WD*	Blue
ESO 417-20	3:12:48.61	-31:29:10.7	GinGroup	Blue
SDSS J031258.36-000453.6	3:12:58.36	-0:04:53.6	Galaxy	Blue
2dFGRS TGS398Z109	3:13:56.08	-31:28:12.6	Galaxy	Blue
2SLAQ J031428.25+004506.6	3:14:28.25	+0:45:07.0	Galaxy	Blue
2dFGRS TGS471Z114	3:16:15.31	-31:12:33.3	Galaxy	Blue
2SLAQ J031618.00-003025.2	3:16:18.01	-0:30:24.9	Galaxy	Blue
2dFGRS TGS524Z054	3:16:50.65	-33:18:03.8	Galaxy	Blue
2dFGRS TGS524Z054	3:16:50.66	-33:18:04.0	Galaxy	Blue
2SLAQ J031829.06-000040.3	3:18:29.06	-0:00:40.5	Galaxy	Blue
[VV2006] J031845.2-001844	3:18:45.17	-0:18:45.3	QSO	Blue
2SLAQ J031937.30-002641.1	3:19:37.29	-0:26:41.0	QSO	Blue
SDSS J032244.90+004442.4	3:22:44.90	+0:44:42.3	QSO Candidate	Blue
6dFGS gJ032504.2-365540	3:25:04.15	-36:55:39.9	GinPair	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
6dFGS gJ032512.9-362210	3:25:13.07	-36:22:09.7	Galaxy	Blue
[JPB2015] 051.4803133-32.8829964	3:25:55.27	-32:52:58.9	GlCl	Blue
SDSS J033226.29-011126.2	3:32:26.29	-1:11:26.0	QSO	Blue
SDSS J033226.29-011126.2	3:32:26.30	-1:11:26.3	QSO	Blue
SDSS J033310.10+000849.1	3:33:10.08	+0:08:49.2	Seyfert 2	Red
[VV2006] J033458.5-000744	3:34:58.48	-0:07:43.9	QSO	Blue
[VV2006] J033821.6+003106	3:38:21.51	+0:31:06.6	QSO	Blue
2XMM J033841.3-353134	3:38:41.36	-35:31:34.4	BLLac	Blue
2XMM J033841.3-353134	3:38:41.37	-35:31:34.2	BLLac	Blue
[VV2006] J033927.5-344707	3:39:27.45	-34:37:07.0	QSO	Blue
CXO J034012.4-353740	3:40:12.39	-35:37:40.1	HMXB	Blue
SDSS J034019.89+010330.7	3:40:19.89	+1:03:30.7	EmG	Blue
[VV2006] J034023.0-351606	3:40:22.99	-35:16:07.0	QSO	Blue
2XMM J034050.4-352620	3:40:50.48	-35:26:21.7	AGN	Blue
ESO 358-51	3:41:32.55	-34:53:19.0	GinGroup	Blue
2MASS J03424773+0109331	3:42:47.72	+1:09:33.0	Seyfert 1	Blue
2SLAQ J034304.64+002512.1	3:43:04.65	+0:25:12.3	Star	Blue
LCRS B034214.4-381736	3:44:04.68	-38:08:11.9	Galaxy	Red
[VV2006] J034408.3-003106	3:44:08.25	-0:31:05.8	QSO	Blue
SDSS J034427.73-002740.4	3:44:27.73	-0:27:40.2	Galaxy	Red
SDSS J034517.02-001549.8	3:45:17.01	-0:15:49.7	QSO	Blue
6dFGS gJ034545.4-362046	3:45:45.38	-36:20:46.1	GinCl	Blue
SDSS J034602.53-000058.7	3:46:02.53	-0:00:58.6	Seyfert 2	Red
2MASX J03472195-3251054	3:47:21.94	-32:51:05.2	GinCl	Red
SDSS J034907.92+010943.3	3:49:07.93	+1:09:43.2	LSB G	Blue
MCG+00-10-021	3:49:08.87	+1:09:46.3	LSB G	Blue
FASTT 83	3:51:19.36	+0:32:16.6	EB*	Red
LEDA 607287	3:55:02.55	-38:35:40.2	Galaxy	Red
Gaia DR2 4857261601188886016	3:55:16.01	-37:29:44.7	Candidate WD*	-
[ZJM2003] SA 95-2230	3:55:38.45	+0:28:34.9	Star	Blue
2dFGRS TGS817Z154	3:56:05.58	-49:28:40.7	Galaxy	Blue
SDSSCGB 74387.1	3:56:50.79	-0:14:34.9	Galaxy	Red
2dFGRS TGS848Z501	3:57:22.10	-37:01:54.1	Galaxy	Blue
6dFGS gJ035732.5-000047	3:57:32.27	-0:00:47.6	Galaxy	Blue
UGC 2913	3:59:03.91	+1:21:33.6	Galaxy	Blue
UGC 2913	3:59:03.91	+1:21:33.6	Galaxy	Blue
ESO 201-14	4:00:29.38	-49:01:48.4	EmG	Blue
2MASS J04004608-3424277	4:00:46.07	-34:24:27.7	AGN Candidate	Blue
6dFGS gJ040053.2-351416	4:00:53.13	-35:14:16.2	Galaxy	Blue
QSO B0401-3505	4:03:10.56	-34:56:56.8	QSO	Blue
LCRS B040209.0-382209	4:03:56.75	-38:13:58.5	Galaxy	Blue
6dFGS gJ040441.2-345756	4:04:41.14	-34:57:55.8	Galaxy	Blue
6dFGS gJ040520.4-364859	4:05:20.40	-36:48:59.0	Galaxy	Blue
6dFGS gJ040520.4-364859	4:05:20.40	-36:48:58.8	Galaxy	Blue
Gaia DR2 4845009910624639232	4:05:27.97	-38:11:22.1	Star	Blue
[VV96] J041130.5-335331	4:11:30.51	-33:53:31.1	QSO	Blue
2dFGRS TGS894Z351	4:11:58.37	-37:58:44.0	Galaxy	Blue
ESO 420-11	4:12:53.30	-31:18:30.2	GinGroup	Blue
2dFGRS TGS894Z291	4:13:00.00	-38:19:42.5	Galaxy	Blue
Gaia DR2 4872129059981617536	4:20:06.78	-32:51:20.0	Candidate WD*	-
LEDA 685147	4:20:56.84	-32:50:42.8	Galaxy	-
2MASX J04255940-4316225	4:25:59.40	-43:16:22.6	Galaxy	Blue
LEDA 579779	4:26:32.58	-41:01:56.6	Galaxy	Blue
LEDA 125483	4:26:44.34	-42:15:41.2	Galaxy	Blue
LEDA 568379	4:26:44.87	-42:05:40.5	Galaxy	Blue
LEDA 554934	4:26:44.91	-42:58:38.4	Galaxy	Blue
MCG-07-10-009	4:27:42.24	-42:38:20.4	Galaxy	Blue
2MASX J04282877-4314283	4:28:28.71	-43:14:29.1	Galaxy	Blue
6dFGS gJ043139.6-301514	4:31:39.57	-30:15:14.1	CataclyV*	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
LEDA 697927	4:32:44.32	-32:01:20.1	Galaxy	Red
ESO 251-12	4:33:09.79	-43:46:13.6	Galaxy	Blue
ESO 304-2	4:35:19.80	-42:12:11.8	Galaxy	Blue
LEDA 494343	4:35:41.79	-47:52:43.9	Galaxy	Blue
[HM2015b] 236 3	4:37:11.17	-46:41:06.8	Galaxy	Blue
LEDA 692923	4:37:18.21	-32:22:10.3	Galaxy	Blue
Gaia DR2 4790561549357871744	4:37:35.04	-44:20:28.8	Candidate RRLyr	Blue
LEDA 681270	4:38:23.53	-33:05:08.6	Galaxy	Blue
6dFGS gJ043927.4-425912	4:39:27.45	-42:59:11.8	Galaxy	Blue
LEDA 606705	4:45:44.98	-38:38:48.7	Galaxy	Blue
LEDA 88363	4:48:23.05	-44:52:57.7	Galaxy	Blue
2dFGRS TGS880Z325	4:50:02.35	-47:28:39.0	Galaxy	Blue
LEDA 512705	4:51:48.86	-46:37:36.8	Galaxy	Blue
Gaia DR2 4811451372635865984	4:52:31.12	-44:11:04.3	Star	Blue
LEDA 686311	4:53:19.46	-32:46:32.8	Galaxy	Blue
[VV98] J045444.5-481300	4:54:43.04	-48:13:20.2	Seyfert 1	Blue
SN 2012at	4:54:52.74	-37:19:15.5	SN	Blue
2MASX J04550020-3715351	4:55:00.19	-37:15:35.4	GinPair	Blue
LEDA 715392	4:55:26.51	-30:35:28.6	Galaxy	Blue
ESO 499-24	9:57:01.69	-26:29:28.5	Galaxy	Blue
LEDA 859547	9:57:06.62	-19:07:06.1	Galaxy	Blue
LEDA 1022680	9:57:23.46	-7:12:51.4	Galaxy	Blue
2MASX J09583711-4704597	9:58:37.10	-47:05:00.4	Galaxy	Blue
[CMI2006b] H42-f02-1939	9:59:46.82	-19:28:00.0	Galaxy	Blue
CRTS J095950.7-383024	9:59:50.88	-38:30:22.9	RRLyr	Blue
LEDA 605183	10:00:05.44	-38:47:28.7	Galaxy	Blue
NGC 3095	10:00:05.83	-31:33:10.8	GinGroup	Red
LEDA 154528	10:00:49.12	-30:32:41.9	Galaxy	Blue
SDSS J100059.08+032751.4	10:00:59.07	+3:27:51.5	Galaxy	Blue
ESO 567-3	10:01:09.07	-19:26:29.7	LSB G	Blue
LEDA 1011555	10:01:34.08	-7:52:55.7	Galaxy	Blue
Gaia DR2 5670829935783719936	10:02:11.73	-19:25:37.1	Star	Blue
2QZ J100215.7-001056	10:02:15.83	-0:10:55.8	QSO	Blue
VVDS 100108471	10:02:25.38	+1:19:36.8	Galaxy	Blue
ESO 262-15	10:02:38.71	-45:29:53.9	GinGroup	Red
[BCP93] F2 H6	10:02:51.82	-26:09:23.9	HII	Blue
[EBU2007] 7	10:02:54.69	-26:08:59.6	BlueSG*	Blue
[H69] NGC 3109 12	10:02:56.31	-26:08:58.5	HII	Blue
[PRS2007] HII 44	10:02:59.47	-26:08:46.4	HII	Blue
[PRS2007] HII 44	10:02:59.48	-26:08:46.4	HII	Blue
PSO J150.7588-26.1494	10:03:02.10	-26:08:58.7	AGN Candidate	Blue
2MASX J10030450-1949377	10:03:04.51	-19:49:38.1	Galaxy	Blue
2dFGRS TGN094Z280	10:03:15.05	-5:54:32.8	Galaxy	Blue
[EBU2007] 3	10:03:17.64	-26:10:01.7	BlueSG*	Blue
[VV96] J100342.1-150808	10:03:41.93	-15:08:08.9	QSO	Blue
2MASX J10035230-3124480	10:03:52.32	-31:24:48.5	Galaxy	Blue
2MASX J10041992-4425311	10:04:19.86	-44:25:32.6	Galaxy	Blue
2MASX J10050765-1951299	10:05:07.68	-19:51:30.2	Galaxy	Blue
2dFGRS TGN421Z115	10:05:17.31	+1:38:21.7	Galaxy	Blue
2MFGC 7816	10:05:28.51	-38:07:30.1	Galaxy	Blue
[VV2006] J100539.9+040914	10:05:39.88	+4:09:14.7	QSO	Blue
CRTS J100548.9-254146	10:05:48.99	-25:41:47.1	RRLyr	Blue
2MASX J10061715-0634276	10:06:17.20	-6:34:27.7	Galaxy	Blue
6dFGS gJ100622.2-264958	10:06:22.20	-26:49:57.2	Galaxy	Blue
6dFGS gJ100631.4-320236	10:06:31.39	-32:02:35.9	GinGroup	Red
NGC 3125	10:06:33.37	-29:56:07.8	HII G	Blue
1RXH J100633.9-295612	10:06:33.90	-29:56:11.6	X	Blue
2MASX J10071106-1904039	10:07:11.07	-19:04:04.6	Galaxy	Blue
LEDA 699275	10:07:27.24	-31:55:26.9	Galaxy	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
CRTS J100733.7-301921	10:07:33.84	-30:19:19.4	EB*	Blue
RX J1007.5-2017	10:07:34.65	-20:17:32.4	CataclyV*	Blue
RX J1007.5-2017	10:07:34.66	-20:17:32.5	CataclyV*	Blue
2MASX J10081071-3331017	10:08:10.76	-33:31:02.2	Galaxy	Red
2MASX J10082199-1448362	10:08:22.01	-14:48:36.1	Galaxy	Blue
LEDA 768685	10:08:30.09	-26:21:33.0	Galaxy	Blue
2MASX J10091380-4300089	10:09:13.81	-43:00:09.0	GinGroup	Red
LEDA 648630	10:09:50.26	-35:27:43.3	Galaxy	Blue
LEDA 3094360	10:09:58.73	-20:30:59.5	Galaxy	Blue
ESO 435-50	10:10:50.41	-30:25:24.4	Galaxy	Blue
LEDA 654529	10:10:51.81	-35:00:28.1	Galaxy	Blue
NGC 3146	10:11:09.90	-20:52:14.0	EmG	Blue
LEDA 729120	10:11:13.49	-29:27:27.9	Galaxy	Blue
CRTS J101200.8-365725	10:12:00.81	-36:57:25.2	EB*	Red
LEDA 691325	10:12:03.36	-32:28:06.8	Galaxy	Blue
Gaia DR2 5407412036686860672	10:12:47.58	-47:33:51.1	Star	Blue
LEDA 655538	10:12:59.65	-34:56:06.6	Galaxy	Blue
2MASX J10134201-3451194	10:13:41.91	-34:51:18.3	EmG	Blue
LEDA 658182	10:13:54.08	-34:44:23.0	Galaxy	Blue
LEDA 713928	10:14:25.56	-30:42:30.1	Galaxy	Blue
2MASX J10142679-2329036	10:14:26.81	-23:29:04.9	Galaxy	Blue
ESO 263-21	10:14:41.74	-44:51:14.1	EmG	Blue
IC 2559	10:14:45.36	-34:03:33.0	EmG	Red
ESO 263-22	10:14:48.13	-43:31:49.5	Galaxy	Blue
ESO 263-23	10:14:57.32	-43:37:09.2	Galaxy	Red
ESO 567-32	10:15:44.54	-20:17:44.0	EmG	Red
Gaia DR2 5407327747940309248	10:15:58.31	-47:58:09.1	Star	Blue
IC 2560	10:16:18.68	-33:33:49.8	Seyfert 2	Red
ESO 567-39	10:17:13.15	-21:04:00.3	EmG	Blue
LEDA 702814	10:18:05.73	-31:38:49.0	Galaxy	Blue
[VV96] J101821.7-214008	10:18:21.76	-21:40:07.7	QSO	Blue
CRTS SSS120320 J101854-400644	10:18:53.51	-40:06:43.7	Candidate CV*	Blue
ESO 375-7	10:19:01.23	-37:40:19.2	Galaxy	Blue
CTS 1011	10:19:21.17	-22:08:33.4	HII G	Blue
CTS 1011	10:19:21.28	-22:08:35.9	HII G	Blue
NGC 3208	10:19:41.31	-25:48:52.9	EmG	Blue
6dFGS gJ102028.5-232845	10:20:28.52	-23:28:45.3	Galaxy	Blue
LEDA 800754	10:20:32.72	-23:26:54.0	Galaxy	Blue
CRTS SSS120215 J102042-335002	10:20:42.16	-33:50:02.4	Candidate CV*	Blue
Gaia DR2 5668001579559758720	10:20:43.31	-20:47:54.6	Star	Blue
ESO 500-30	10:20:48.90	-23:27:57.1	EmG	Red
6dFGS gJ102109.3-325140	10:21:09.27	-32:51:39.9	Galaxy	Blue
6dFGS gJ102121.0-213628	10:21:21.03	-21:36:27.7	Galaxy	Blue
LEDA 592969	10:22:02.22	-39:52:45.9	Galaxy	Blue
6dFGS gJ102239.9-302931	10:22:39.94	-30:29:30.6	AGN Candidate	Blue
ESO 263-30	10:22:59.54	-42:49:38.9	Galaxy	Blue
ESO 317-19	10:23:02.34	-39:09:59.8	GinGroup	Blue
ESO 375-18	10:23:40.27	-35:49:33.5	EmG	Red
ESO 375-18	10:23:40.27	-35:49:33.5	EmG	Red
ESO 263-32	10:24:21.47	-43:55:01.6	Galaxy	Blue
ESO 500-34	10:24:31.43	-23:33:09.6	Seyfert 2	Red
CRTS J102513.4-354014	10:25:13.46	-35:40:16.7	EB*	Blue
6dFGS gJ102607.5-243321	10:26:07.41	-24:33:20.2	Galaxy	Blue
ESO 436-21	10:26:21.70	-29:11:57.8	GinCl	Blue
NAME OT J102706-434341	10:27:05.83	-43:43:41.3	CataclyV*	Blue
ESO 500-42	10:27:20.27	-23:48:19.6	Galaxy	Blue
SN 2001db	10:27:50.35	-43:54:20.8	SN	Red
SN 2001db	10:27:50.37	-43:54:20.8	SN	Red
[LWZ2002] 5	10:27:51.28	-43:53:58.5	X	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
NGC 3256	10:27:51.29	-43:54:14.0	IG	Red
NGC 3256	10:27:51.30	-43:54:13.7	IG	Red
[LDT2000] R02	10:27:51.73	-43:54:13.6	X	Blue
[LDT2000] R02	10:27:51.73	-43:54:13.3	X	Blue
[EF2003] B3	10:27:52.88	-43:54:11.5	HII	Blue
[EF2003] B3	10:27:52.89	-43:54:11.2	HII	Blue
[EF2003] B3	10:27:52.89	-43:54:11.2	HII	Blue
ESO 436-26	10:28:42.96	-31:02:17.7	AGN	Red
CRTS CSS140309 J102844-161303	10:28:43.86	-16:13:03.3	CataclyV*	Blue
[SHM2017] J157.24190-30.14112	10:28:58.05	-30:08:27.7	RRLyr	Blue
ESO 317-34	10:29:00.71	-40:04:57.9	GinGroup	Blue
IC 2582	10:29:11.07	-30:20:32.7	EmG	Blue
LEDA 636268	10:30:30.59	-36:28:47.1	Galaxy	Blue
LEDA 636268	10:30:30.59	-36:28:47.1	Galaxy	Blue
LEDA 83158	10:30:57.69	-34:42:28.5	GinGroup	Blue
ESO 317-39	10:31:00.18	-40:10:42.5	Galaxy	Red
ESO 436-32	10:31:29.90	-32:42:47.1	EmG	Blue
NGC 3281	10:31:52.11	-34:51:13.0	Seyfert 2	Red
LEDA 571751	10:31:57.37	-41:48:41.1	Galaxy	Blue
[BM98] 2	10:32:59.22	-27:32:36.9	GinCl	Blue
6dFGS gJ103317.5-430444	10:33:17.40	-43:04:43.1	Galaxy	Blue
ESO 375-64	10:34:00.75	-35:16:57.6	GinGroup	Blue
ESO 375-64	10:34:00.75	-35:16:57.3	GinGroup	Blue
LEDA 754029	10:34:26.74	-27:30:04.0	GinCl	Blue
ESO 436-42	10:34:38.75	-28:35:00.1	EmG	Blue
ESO 568-18	10:34:54.59	-20:32:55.6	EmG	Blue
2MASX J10345852-4054438	10:34:58.52	-40:54:43.3	Galaxy	Blue
6dFGS gJ103502.9-293024	10:35:02.88	-29:30:23.8	GinCl	Blue
ESO 437-3	10:35:07.72	-27:59:28.7	EmG	Blue
ESO 375-69	10:35:18.72	-36:52:42.5	EmG	Blue
ESO 501-22	10:35:21.68	-27:41:44.5	GinCl	Blue
LEDA 712419	10:35:31.70	-30:50:00.0	Galaxy	Blue
LEDA 535830	10:35:34.16	-44:34:41.1	Galaxy	Blue
LEDA 784823	10:36:02.66	-24:54:24.1	Galaxy	Blue
LEDA 743415	10:36:06.94	-28:17:45.0	Galaxy	Blue
ESO 501-32	10:36:22.11	-25:22:35.4	EmG	Blue
[CZ2003] 1060C-393 25	10:36:30.34	-27:54:04.0	GinCl	Blue
6dFGS gJ103645.4-281005	10:36:45.48	-28:10:02.7	GinCl	Blue
LEDA 769967	10:36:54.86	-26:14:26.0	HII G	Blue
6dFGS gJ103656.1-265414	10:36:56.08	-26:54:13.6	Galaxy	Blue
LEDA 742546	10:37:01.84	-28:22:01.7	GinCl	Blue
6dFGS gJ103704.4-312157	10:37:04.45	-31:21:57.3	Galaxy	Blue
NGC 3314	10:37:12.87	-27:41:02.2	EmG	Blue
6dFGS gJ103719.9-281420	10:37:19.89	-28:14:19.9	GinCl	Blue
LEDA 753354	10:37:22.21	-27:32:41.9	Galaxy	Blue
WISE J103754.92-242544.5	10:37:54.92	-24:25:44.6	MIR	Red
ESO 501-61	10:38:05.84	-25:05:40.1	IG	Blue
[WLH83] 1036-378A	10:38:14.37	-38:05:25.5	HII	Blue
LEDA 740766	10:38:28.68	-28:30:55.0	GinCl	Blue
2MASX J10383034-2332546	10:38:30.34	-23:32:54.7	Galaxy	Blue
ESO 501-65	10:38:33.42	-27:44:13.8	EmG	Blue
WPVS 78	10:38:41.50	-25:35:32.2	EmG	Blue
6dFGS gJ103857.2-200242	10:38:57.24	-20:02:41.8	Galaxy	Blue
LEDA 838980	10:39:13.02	-20:38:12.5	Galaxy	Blue
MCG-04-25-054	10:39:26.01	-23:45:16.8	EmG	Blue
2MASS J10395999-4701261	10:39:59.97	-47:01:26.3	CataclyV*	Blue
2MASS J10395999-4701261	10:39:59.97	-47:01:26.3	CataclyV*	Blue
ESO 437-37	10:40:31.01	-29:16:10.5	IG	Blue
ESO 568-20	10:40:58.70	-21:47:04.3	EmG	Red

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
6dFGS gJ104102.1-304740	10:41:02.12	-30:47:40.1	Galaxy	Blue
CRTS J104104.0-341120	10:41:03.86	-34:11:23.4	RRLyr	Blue
ESO 568-21	10:41:15.17	-21:01:22.9	Seyfert 1	Blue
ESO 437-42	10:41:27.71	-31:46:49.1	Galaxy	Blue
ESO 437-42	10:41:27.71	-31:46:49.1	Galaxy	Blue
LEDA 3081775	10:41:35.15	-37:28:09.5	Galaxy	Blue
6dFGS gJ104139.4-274638	10:41:39.43	-27:46:38.2	Galaxy	Blue
ESO 568-22	10:42:06.62	-22:06:20.1	IG	Blue
LEDA 31904	10:42:19.50	-36:19:13.7	Galaxy	Blue
6dFGS gJ104238.0-235609	10:42:37.99	-23:56:08.4	Galaxy	Blue
ESO 437-50	10:43:31.00	-30:46:20.0	EmG	Blue
ESO 437-50	10:43:31.00	-30:46:20.0	EmG	Blue
6dFGS gJ104409.7-204909	10:44:09.71	-20:49:09.5	Galaxy	Blue
ESO 569-2	10:45:00.21	-22:09:08.2	IG	Blue
6dFGS gJ104534.8-241702	10:45:34.75	-24:17:01.3	Galaxy	Blue
6dFGS gJ104617.1-282524	10:46:17.11	-28:25:23.6	EmG	Blue
LEDA 718607	10:46:30.26	-30:19:17.8	Galaxy	Blue
ESO 376-20	10:46:38.45	-36:21:11.9	EmG	Blue
ESO 501-96	10:46:47.54	-23:19:39.8	Galaxy	Blue
Gaia DR2 5391507429181636352	10:47:23.91	-41:59:49.3	Star	Blue
EC 10453-2041	10:47:44.36	-20:57:48.8	EmG	Blue
2MASX J10475221-2004542	10:47:52.11	-20:04:53.3	HII G	Blue
2MASX J10475221-2004542	10:47:52.13	-20:04:53.5	HII G	Blue
[KRB2015] A	10:48:23.47	-25:09:43.6	Radio	Red
2MASX J10482527-2151000	10:48:25.30	-21:51:00.5	Galaxy	Blue
SN 2018aqi	10:48:25.45	-25:09:36.1	SN	Red
LEDA 688498	10:48:42.32	-32:38:37.4	Galaxy	Blue
LEDA 738826	10:49:46.88	-28:40:37.1	Galaxy	Blue
2MASX J10503963-1832342	10:50:39.64	-18:32:34.4	Galaxy	Red
LEDA 844461	10:51:00.37	-20:14:21.3	Galaxy	Blue
6dFGS gJ105101.9-282017	10:51:01.81	-28:20:16.5	Galaxy	Blue
LEDA 851789	10:51:27.40	-19:41:37.0	Galaxy	Blue
6dFGS gJ105149.2-215323	10:51:49.07	-21:53:17.5	Galaxy	Blue
6dFGS gJ105233.0-230900	10:52:33.04	-23:08:59.6	Galaxy	Blue
MASTER OT J105440.86-391319.0	10:54:40.84	-39:13:19.0	Candidate SN*	Blue
6dFGS gJ105521.6-232527	10:55:21.62	-23:25:27.3	Galaxy	Blue
6dFGS gJ105521.6-232527	10:55:21.63	-23:25:27.3	Galaxy	Blue
2MASX J10563839-2047119	10:56:38.39	-20:47:12.2	Galaxy	Blue
LEDA 849870	10:56:48.51	-19:50:00.4	Galaxy	Blue
ESO 376-28	10:57:04.32	-33:09:20.3	Galaxy	Red
ESO 264-52	10:57:13.91	-47:40:11.3	Galaxy	Red
LEDA 648093	10:57:36.52	-35:30:15.8	Galaxy	Blue
2MASX J10584423-1909304	10:58:44.25	-19:09:31.1	Galaxy	Blue
EC 10566-3120	10:58:59.03	-31:36:34.1	CataclyV*	Blue
2MASX J10590982-2759589	10:59:09.86	-27:59:59.3	Galaxy	Blue
Gaia DR2 5386613537284200960	11:01:51.26	-46:53:04.5	Candidate RRLyr	Blue
Gaia DR2 3537117430403448320	11:01:57.97	-23:47:27.3	PM*	Blue
V* TU Crt	11:03:36.57	-21:37:45.9	CataclyV*	Blue
NGC 3513	11:03:46.16	-23:14:42.1	GinPair	Blue
FAUST 2807	11:03:59.06	-18:46:36.1	UV	Blue
ESO 570-5	11:07:13.10	-19:49:07.2	IG	Blue
NGC 3529	11:07:19.13	-19:33:20.0	EmG	Blue
NGC 3529	11:07:19.14	-19:33:19.5	EmG	Blue
NGC 3565	11:07:47.84	-20:01:20.2	IG	Blue
ESO 570-10	11:10:50.57	-21:58:28.3	Galaxy	Blue
LEDA 821419	11:10:57.23	-21:56:53.3	Galaxy	Blue
6dFGS gJ111351.0-212655	11:13:50.97	-21:26:54.8	Galaxy	Blue
NGC 3597	11:14:42.00	-23:43:39.9	EmG	Blue
[VV96] J111644.8-171127	11:16:43.58	-17:11:41.5	QSO	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
LEDA 861413	11:17:15.01	-18:58:24.4	Galaxy	-
LEDA 809402	11:17:35.06	-22:45:06.2	Galaxy	Red
CRTS J112256.0-242841	11:22:56.09	-24:28:40.0	EB*	Blue
LEDA 786212	11:29:34.18	-24:46:39.1	Galaxy	Blue
[VV2010c] J113128.4-195903	11:31:28.46	-19:59:02.8	AGN	Blue
CRTS SSS110509 J113219-213943	11:32:19.01	-21:39:42.9	Candidate CV*	-
2dFGRS TGN444Z198	11:34:24.52	+1:09:15.7	Galaxy	Blue
MGC 22410	11:36:12.70	+0:04:54.9	Star	Blue
UGC 6578	11:36:36.73	+0:49:02.1	EmG	Blue
GAMA 6821	11:36:36.79	+0:48:55.8	Galaxy	Blue
V* RZ Leo	11:37:22.18	+1:48:58.9	CataclyV*	Blue
Gaia DR2 3541998025080414336	11:37:49.97	-20:07:37.1	Candidate WD*	Blue
2dFGRS TGN238Z266	11:38:54.33	-1:38:34.1	Galaxy	Blue
CRTS J113855.5-211148	11:38:55.60	-21:11:47.7	RRLyr	Blue
SDSS J113901.39+012017.8	11:39:01.39	+1:20:17.7	Galaxy	Blue
LBQS 1136-0109	11:39:04.35	-1:26:25.0	QSO	Blue
6dFGS gJ114135.0-181141	11:41:35.04	-18:11:40.5	Galaxy	Blue
2dFGRS TGN238Z191	11:41:45.67	-1:54:04.8	HII G	Blue
ESO 571-16	11:42:09.14	-18:10:08.7	Galaxy	Red
SDSS J114212.38+002002.5	11:42:12.33	+0:20:03.4	PartofG	Blue
2QZ J114214.5-023154	11:42:14.64	-2:31:53.3	Galaxy	Blue
CRTS J114238.0-202722	11:42:37.96	-20:27:21.8	RRLyr	Blue
2QZ J114250.9+013057	11:42:50.95	+1:30:58.2	Seyfert 1	Blue
SDSS J114329.34-020319.7	11:43:29.34	-2:03:19.5	QSO	-
SDSS J114329.34-020319.7	11:43:29.35	-2:03:19.9	QSO	-
SDSSCGB 59619.2	11:43:46.11	-1:16:34.0	Galaxy	-
GAMA 396970	11:43:47.41	+1:30:53.9	Galaxy	Blue
LINEAR 2118419	11:44:08.82	+1:24:20.7	RRLyr	Blue
2QZ J114450.8+014324	11:44:50.95	+1:43:24.8	EmG	Blue
Gaia DR2 3544179185567992320	11:44:55.76	-17:56:39.4	Candidate WD*	Blue
2dFGRS TGN310Z256	11:45:08.04	-0:59:18.2	Galaxy	Blue
SDSS J114511.70-005402.6	11:45:11.72	-0:54:02.5	Galaxy	Red
2MASX J11451524-2044471	11:45:15.26	-20:44:47.5	Galaxy	Blue
Z 12-78	11:45:26.30	+0:00:14.8	Galaxy	Blue
SDSS J114600.44+001037.4	11:46:00.45	+0:10:37.0	Galaxy	Red
2dFGRS TGN310Z211	11:46:07.72	-0:27:28.7	Galaxy	Blue
SDSS J114643.10+011118.6	11:46:43.12	+1:11:18.8	QSO	Blue
2QZ J114711.4-002706	11:47:11.47	-0:27:05.8	EmG	Blue
2MASX J11481815-0138230	11:48:18.21	-1:38:23.8	Seyfert 1	Blue
SDSS J114818.33-013830.8	11:48:18.35	-1:38:30.5	Galaxy	Blue
[VV2006] J114939.6+014624	11:49:39.60	+1:46:25.5	QSO	Blue
2dFGRS TGN378Z115	11:50:23.78	-0:31:41.9	HII G	Blue
[P78] ACO 1392 C	11:50:36.30	-0:34:06.6	GinCl	Blue
SDSS J115036.42-003402.0	11:50:36.39	-0:34:02.6	Galaxy	Blue
[VV2006] J115049.2-005149	11:50:49.29	-0:51:49.1	QSO	Blue
LEDA 807513	11:51:13.02	-22:53:25.2	Galaxy	Red
SDSS J115129.42-000333.8	11:51:29.45	-0:03:33.6	Galaxy	Red
2dFGRS TGN242Z154	11:51:32.96	-2:22:21.9	Galaxy	Blue
LEDA 37102	11:51:33.35	-2:22:21.7	Seyfert 1	Blue
SDSS J115216.86+012327.2	11:52:16.88	+1:23:27.5	Galaxy	Red
2QZ J115217.3-025303	11:52:17.34	-2:53:02.7	EmG	Blue
ESO 572-7	11:52:27.62	-20:06:14.1	GinGroup	Blue
Mrk 1307	11:52:37.30	-2:28:09.4	Seyfert 1	Blue
SDSS J115237.67-022806.3	11:52:37.67	-2:28:06.8	HII G	Blue
2dFGRS TGN311Z206	11:52:47.52	-0:40:07.7	Seyfert 1	Blue
2dFGRS TGN311Z206	11:52:47.53	-0:40:07.8	Seyfert 1	Blue
2dFGRS TGN176Z274	11:53:14.07	-3:24:32.6	Galaxy	Blue
2dFGRS TGN243Z103	11:53:28.66	-3:13:48.9	Galaxy	Blue
[VV2006] J115345.5-024320	11:53:45.44	-2:43:20.4	QSO	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
UM 465B	11:54:12.31	+0:08:12.4	GinPair	Blue
SDSS J115456.54+001106.0	11:54:56.59	+0:11:05.5	Galaxy	-
SDSS J115511.13+002905.1	11:55:11.19	+0:29:05.5	Galaxy	Blue
SDSS J115511.67+002925.0	11:55:11.70	+0:29:25.0	Galaxy	Blue
2dFGRS TGN243Z202	11:57:11.86	-2:41:12.9	Galaxy	Blue
SDSS J115712.38-024111.2	11:57:12.29	-2:41:11.3	Galaxy	Blue
ESO 572-25	11:57:28.04	-19:37:26.5	Galaxy	Blue
2QZ J115737.0-020138	11:57:37.08	-2:01:37.3	Galaxy	Blue
2QZ J115737.0-020138	11:57:37.09	-2:01:37.2	Galaxy	Blue
[VV2006] J115748.0+014320	11:57:48.02	+1:43:20.9	QSO	Blue
[VV2006] J115754.2-013815	11:57:54.26	-1:38:16.0	QSO	-
LEDA 839904	11:57:56.69	-20:33:56.4	Galaxy	Blue
2MASX J11580803-1753363	11:58:08.00	-17:53:36.2	Galaxy	Blue
6dFGS gJ115823.8-193103	11:58:23.80	-19:31:03.2	Galaxy	Blue
ESO 572-34	11:58:58.18	-19:01:47.7	EmG	Blue
GAMA 137854	11:59:23.49	-1:43:22.3	Galaxy	Blue
SN 1996W	11:59:28.93	-19:15:22.8	SN	Blue
LEDA 836770	12:00:19.81	-20:48:07.5	Galaxy	Blue
2MASX J12002013-0106229	12:00:20.20	-1:06:23.8	Galaxy	Blue
SDSS J120021.76-024331.0	12:00:21.77	-2:43:30.9	QSO	Blue
[BKD2008] WR 14	12:00:26.30	-1:06:07.0	PartofG	Blue
[VV2006] J120038.3+011246	12:00:38.29	+1:12:46.5	QSO	Blue
QSO B1158-1842	12:00:44.95	-18:59:44.5	QSO	Blue
2dFGRS TGN244Z048	12:00:47.47	-3:25:12.1	Galaxy	Blue
[RDS2004] MGS sure 22	12:00:47.72	-0:01:24.3	HI	Blue
UGC 7000	12:01:10.85	-1:17:50.2	GinPair	Blue
QSO B1158+007	12:01:23.26	+0:28:28.5	QSO	Blue
LEDA 802182	12:01:30.48	-23:19:06.8	Galaxy	Blue
[CEB2007] Cluster 2	12:01:50.41	-18:52:12.4	Cl*	Blue
CXOU J120150.4-185221	12:01:50.41	-18:52:19.8	HMXB	Blue
[ZBF2015] Arp244 82	12:01:50.49	-18:52:02.5	HII	Blue
[NU2000] 9 3	12:01:51.13	-18:52:28.8	Radio	Blue
[NU2000] 13 5	12:01:51.24	-18:51:45.3	Radio	Blue
[MLT2008] S2-2	12:01:51.90	-18:52:28.2	Cl*	Blue
[ZBF2015] Arp244 123	12:01:52.28	-18:52:19.4	HII	Blue
[ZBF2015] Arp244 80	12:01:52.96	-18:52:03.5	HII	Red
[ZBF2015] Arp244 5	12:01:52.98	-18:52:08.7	HII	Blue
[ZBF2015] Arp244 14	12:01:53.52	-18:51:44.2	HII	Blue
[WZ2002] 1	12:01:53.57	-18:53:09.0	Radio	Red
[BEK2006] Complex 6	12:01:54.54	-18:52:07.5	Cl*	Blue
[WS95] 89	12:01:54.54	-18:53:03.8	PartofG	Blue
[WBC2014] 180.48062-18.88025	12:01:55.35	-18:52:48.7	MolCld	Blue
[ZBF2015] Arp244 6	12:01:55.54	-18:52:22.9	HII	Blue
[ZFB2014] GMC 98	12:01:55.68	-18:52:14.0	MolCld	Blue
[WZ2002] 9	12:01:55.70	-18:52:42.8	Radio	Blue
[ZBF2015] Arp244 10	12:01:56.29	-18:52:38.8	HII	Blue
CRTS J120206.7-230305	12:02:06.75	-23:03:06.0	EB*	Blue
SDSS J120250.38+001931.6	12:02:50.39	+0:19:31.5	Galaxy	Red
SDSS J120515.80-024222.6	12:05:15.80	-2:42:22.6	WD*	Blue
LEDA 913203	12:06:37.73	-15:17:17.2	Galaxy	Blue
6dFGS gJ120650.7-141256	12:06:50.66	-14:12:55.9	Galaxy	Blue
[VV2006] J120700.4+011155	12:07:00.41	+1:11:56.4	QSO	Blue
SDSS J120920.53-002855.3	12:09:20.55	-0:28:55.3	QSO	Blue
[VV2006] J121010.8-003909	12:10:10.82	-0:39:09.7	QSO	Blue
SDSS J121026.38-000513.2	12:10:26.41	-0:05:13.2	Galaxy	Blue
SDSS J121043.55-003907.2	12:10:43.59	-0:39:08.5	Seyfert 1	Red
2QZ J121101.0+012024	12:11:01.05	+1:20:25.0	EmG	Blue
Mrk 1313	12:12:14.73	+0:04:20.6	Seyfert 1	Blue
2dFGRS TGN246Z007	12:12:15.90	-0:33:53.2	Galaxy	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
2MASS J12125978+0149231	12:12:59.78	+1:49:23.2	EB*	Red
SDSS J121304.91-003901.2	12:13:04.93	-0:39:01.2	Galaxy	Red
2dFGRS TGN247Z167	12:13:38.79	-1:17:36.3	Galaxy	Blue
6dFGS gJ121348.2-143140	12:13:48.16	-14:31:39.8	Galaxy	Blue
SDSS J121435.24-015924.4	12:14:35.26	-1:59:24.4	QSO	Blue
[VV2006] J121515.2-013542	12:15:15.23	-1:35:40.8	QSO	Blue
2QZ J121539.4-022149	12:15:39.47	-2:21:47.2	Galaxy	Blue
2QZ J121607.5-022559	12:16:07.54	-2:25:57.6	Galaxy	Blue
SDSS J121759.99+002558.1	12:18:00.05	+0:25:57.7	Galaxy	-
2dFGRS TGN181Z079	12:18:07.07	-3:06:28.8	Galaxy	Red
LEDA 927634	12:18:19.06	-14:12:19.9	Galaxy	Blue
LEDA 927634	12:18:19.06	-14:12:20.0	Galaxy	Blue
QSO B1216+0216	12:18:55.80	+2:00:02.1	QSO	Blue
[VV2006] J121942.5-001821	12:19:42.47	-0:18:21.4	QSO	Blue
2dFGRS TGN385Z034	12:19:53.13	+1:46:24.0	HII G	Blue
SDSS J122003.72+010632.0	12:20:03.73	+1:06:32.4	Galaxy	Red
2dFGRS TGN385Z025	12:20:11.53	+1:57:31.1	LSB G	Blue
2dFGRS TGN181Z173	12:20:28.80	-1:50:21.0	Galaxy	Blue
LEDA 1143004	12:20:30.39	-0:27:03.0	Galaxy	-
[VV2006] J122130.9+010727	12:21:30.97	+1:07:28.1	QSO	Blue
Gaia DR2 3521773745637847552	12:21:34.41	-14:57:50.5	Star	Blue
LEDA 3294456	12:21:55.83	-1:35:36.0	Galaxy	Blue
Gaia DR2 3521681421020417408	12:22:39.34	-15:29:12.1	Star	Blue
SDSS J122322.39-000801.6	12:23:22.39	-0:08:01.7	Galaxy	Blue
MCG+00-32-004	12:24:12.47	+0:34:01.0	Galaxy	Blue
2SLAQ J122421.12+002354.1	12:24:21.13	+0:23:54.4	QSO	Blue
NGC 4385	12:25:42.74	+0:34:21.9	AGN	Blue
2QZ J122547.3-012007	12:25:47.38	-1:20:05.7	Galaxy	Blue
SHOC 373a	12:26:22.64	-1:15:17.3	HII G	Blue
SHOC 373b	12:26:22.73	-1:15:12.3	HII G	Blue
[VV2006] J122625.7+011604	12:26:25.67	+1:16:04.6	QSO	Blue
2SLAQ J122641.43-002005.1	12:26:41.45	-0:20:05.1	Seyfert 1	Blue
MCG+00-32-013	12:27:04.54	-0:54:21.5	GinPair	Blue
MCG+00-32-013	12:27:04.56	-0:54:22.0	GinPair	Blue
[VV2006] J122707.1+010811	12:27:07.13	+1:08:11.3	QSO	Blue
[MIO2012] R1	12:27:46.07	+1:36:01.5	Cl*	Blue
2dFGRS TGN387Z059	12:28:15.92	+1:49:43.7	Galaxy	Blue
2QZ J122851.2-022630	12:28:51.34	-2:26:29.2	EmG	Blue
2dFGRS TGN250Z094	12:29:14.65	-1:21:55.2	Galaxy	Blue
2dFGRS TGN250Z087	12:29:46.33	-1:17:42.0	LSB G	Blue
2dFGRS TGN321Z099	12:29:58.88	+0:01:37.9	RadioG	Red
2dFGRS TGN388Z078	12:30:54.31	+0:57:50.5	Galaxy	Blue
[BKD2008] WR 29	12:31:48.01	-2:58:13.0	PartofG	Blue
2QZ J123202.6+003124	12:32:02.70	+0:31:24.7	EmG	Blue
2dFGRS TGN251Z016	12:32:23.64	-1:44:24.3	HII G	Blue
GALEX 2414740977348515009	12:32:36.17	-3:18:39.4	Blue	Blue
MGC 34804	12:32:41.58	+0:03:26.4	Star	Blue
[DCD2013] CSS J123702.3-151643	12:37:02.41	-15:16:43.5	RRLyr	Blue
Gaia DR2 3527007524064861312	12:39:19.45	-14:47:31.1	Star	-
2MASX J12442692-1252359	12:44:26.92	-12:52:35.9	Galaxy	Blue
LEDA 924051	12:50:47.04	-14:29:01.5	Galaxy	Blue
LEDA 932206	12:58:59.15	-13:51:42.3	Galaxy	Blue
CRTS SSS120721 J125901-133442	12:59:00.82	-13:34:42.0	Candidate CV*	Blue
6dFGS gJ125904.7-144623	12:59:04.67	-14:46:23.5	Galaxy	Blue
2MASX J12593269-1514196	12:59:32.75	-15:14:19.3	Galaxy	Blue
LEDA 914340	13:00:03.04	-15:12:17.2	Galaxy	Blue
NGC 4887	13:00:39.30	-14:39:59.3	GinPair	Blue
LEDA 936912	13:01:07.09	-13:31:02.4	Galaxy	Blue
[VV96] J130243.5-135553	13:02:43.59	-13:55:52.8	QSO	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
LEDA 45114	13:03:33.44	-14:19:23.1	EmObj	Blue
2MASX J13044961-1311288	13:04:49.65	-13:11:28.2	Galaxy	Blue
LCRS B130214.7-120615	13:04:52.39	-12:22:18.7	Galaxy	Blue
LEDA 949391	13:05:58.52	-12:40:08.5	Galaxy	Blue
LEDA 105081	13:10:08.77	-12:12:20.4	Galaxy	Blue
UGCA 332	13:11:58.29	-12:03:51.4	EmG	Blue
LEDA 976320	13:12:28.41	-10:35:24.4	Galaxy	Blue
LCRS B131057.8-121222	13:13:36.14	-12:28:15.2	EmObj	Blue
LEDA 126038	13:15:07.97	-12:31:05.1	Galaxy	Blue
LEDA 981336	13:17:40.89	-10:10:59.5	Galaxy	Blue
SDSS J131742.35-002015.8	13:17:42.37	-0:20:15.7	Galaxy	-
6dFGS gJ131743.9-010002	13:17:43.96	-1:00:01.1	AGN	Blue
2MASX J13192221-1509232	13:19:22.29	-15:09:23.6	Galaxy	Blue
MCG-02-34-029	13:19:42.72	-11:28:28.5	GinGroup	Blue
2SLAQ J131957.59-003446.7	13:19:57.60	-0:34:46.6	Star	Blue
QSO B1317-122	13:19:59.20	-12:29:16.8	QSO	Blue
NGC 5088	13:20:20.33	-12:34:18.1	Galaxy	Blue
SDSS J132023.46-004730.9	13:20:23.47	-0:47:30.8	QSO	-
6dFGS gJ132134.7-151056	13:21:34.68	-15:10:55.5	Galaxy	Blue
6dFGS gJ132137.8-145120	13:21:37.83	-14:51:19.7	Galaxy	Blue
2dFGRS TGN263Z056	13:22:17.11	-0:32:54.4	EmG	-
[SHM2017] J200.93368-12.05326	13:23:44.09	-12:03:11.8	RRLyr	Blue
LEDA 46982	13:25:48.67	-11:36:37.8	BlueCompG	Blue
LEDA 46982	13:25:48.68	-11:36:38.0	BlueCompG	Blue
LEDA 991902	13:26:05.10	-9:22:12.6	Galaxy	Blue
BPS CS 22889-0007	13:31:59.47	-9:53:02.6	RRLyr	Blue
NVSS J133618-072251	13:36:18.64	-7:22:51.8	Radio	Blue
LCRS B133356.3-061328	13:36:33.05	-6:28:45.2	Galaxy	Red
GALEX 2697385722761974216	13:39:09.19	-8:19:40.8	Blue	Blue
LEDA 1025584	13:41:04.99	-7:01:05.8	Galaxy	Blue
[DCD2013] CSS J134330.9-151858	13:43:31.01	-15:18:58.9	RRLyr	Blue
V* HS Vir	13:43:38.44	-8:14:03.7	CataclyV*	Blue
SN 2018evt	13:46:39.20	-9:38:36.0	SN	Blue
GALEX 2697315366902694354	13:47:49.82	-4:10:10.6	Blue	Blue
2dFGRS TGN202Z201	13:49:42.20	-2:11:59.1	Galaxy	Blue
GALEX 2699039396840082228	13:50:33.33	-12:16:42.9	Blue	Blue
6dFGS gJ135123.7-060412	13:51:23.70	-6:04:11.7	Galaxy	Blue
2dFGRS TGN202Z136	13:51:35.65	-2:33:15.0	Galaxy	Blue
SDSSCGB 287.4	13:52:03.90	-2:07:22.3	Galaxy	Blue
SDSSCGB 287.2	13:52:04.24	-2:07:48.9	Galaxy	Blue
LEDA 126156	13:54:11.29	-3:26:27.2	Galaxy	Blue
LEDA 126156	13:54:11.40	-3:26:27.0	Galaxy	Blue
QSO B1352-104	13:54:46.53	-10:41:02.6	QSO	Blue
VV 99b	13:55:33.98	-5:58:17.0	GinPair	Blue
2dFGRS TGN141Z158	13:55:37.68	-4:11:43.8	Galaxy	Blue
VV 100a	13:55:45.46	-6:00:15.9	Galaxy	Blue
VV 100d	13:55:46.68	-6:00:40.8	Galaxy	Blue
[VV2006] J135602.8-022624	13:56:02.79	-2:26:23.3	QSO	-
2dFGRS TGN203Z232	13:56:53.48	-2:38:52.2	Galaxy	Blue
2dFGRS TGN142Z266	13:58:08.62	-4:08:43.6	Galaxy	Blue
SDSSCGB 16922.1	13:58:41.49	-1:31:15.7	Galaxy	Red
LEDA 1020082	14:02:45.08	-7:22:25.8	Galaxy	Blue
2MASS J14265388+0525172	14:26:53.89	+5:25:17.4	QSO	Blue
UGC 9252	14:27:10.82	+5:07:59.3	Galaxy	Blue
[LAM2019] J1428+0500 B	14:28:55.39	+5:00:21.9	Possible lensImage	Blue
GALEX 2429518413625830432	14:28:55.46	+5:00:19.9	Blue	Blue
DES J142943.42+052122.7	14:29:43.44	+5:21:22.9	GinCl	Red
SDSS J142958.66+044611.0	14:29:58.65	+4:46:11.3	BCIG	Red
LEDA 1290447	14:41:28.04	+5:51:52.3	Galaxy	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
SDSS J145344.51+045645.8	14:53:44.52	+4:56:46.0	QSO	Blue
SDSSCGB 43444.3	14:55:33.70	+4:46:43.2	AGN	Red
SDSS J200143.74+004918.4	20:01:43.73	+0:49:18.4	QSO	Blue
SDSS J200432.38+001041.3	20:04:32.39	+0:10:41.4	low-mass*	-
[SHM2017] J302.70083-00.21773	20:10:48.20	-0:13:03.9	RRLyr	Blue
[SHM2017] J302.70083-00.21773	20:10:48.20	-0:13:03.9	RRLyr	Blue
[SSV2012] 4869177	20:22:35.51	-0:40:09.9	RRLyr	Blue
[SSV2012] 4472518	20:22:37.80	-0:02:50.5	RRLyr	Blue
UGC 11566	20:28:12.02	+0:17:18.2	Galaxy	Blue
SDSS J202906.80+005453.5	20:29:06.81	+0:54:53.6	QSO	Blue
2SLAQ J204340.03+002853.4	20:43:40.04	+0:28:53.6	Seyfert 1	Blue
SDSS J204626.10+002337.7	20:46:26.11	+0:23:37.8	QSO	Red
2SLAQ J204720.76+000007.7	20:47:20.76	+0:00:07.8	CataclyV*	Blue
2SLAQ J204720.76+000007.7	20:47:20.76	+0:00:07.7	CataclyV*	Blue
2SLAQ J204910.96+001557.2	20:49:10.95	+0:15:57.5	Seyfert 1	Blue
[VV2006] J204956.6-001201	20:49:56.62	-0:12:01.7	QSO	Blue
[VV2006] J204956.6-001201	20:49:56.62	-0:12:01.7	QSO	Blue
[VV2006] J205316.7+005920	20:53:16.77	+0:59:21.1	QSO	-
2SLAQ J205352.03-001601.5	20:53:52.04	-0:16:01.5	QSO	Blue
2SLAQ J205614.55-004050.9	20:56:14.55	-0:40:50.6	Star	-
2SLAQ J205712.69+001211.3	20:57:12.69	+0:12:11.4	QSO	Blue
SDSS J205740.76+005418.5	20:57:40.75	+0:54:19.0	QSO	Red
Gaia DR2 6794425304909258752	20:58:06.45	-30:08:18.1	Candidate WD*	Blue
LEDA 687146	20:58:24.54	-32:43:22.5	Galaxy	Blue
2MASX J20584976-4420243	20:58:49.69	-44:20:24.7	Galaxy	Blue
6dFGS gJ205957.5-213935	20:59:57.53	-21:39:34.9	Galaxy	Blue
SDSS J210014.12+004446.0	21:00:14.11	+0:44:45.9	CataclyV*	Blue
SDSSCGB 52599.6	21:01:55.95	-0:31:24.9	Galaxy	Red
LEDA 598660	21:01:56.43	-39:23:40.3	Galaxy	Blue
QSO B2059-330	21:02:41.71	-32:52:44.1	QSO	Blue
QSO B2059-330	21:02:41.72	-32:52:44.4	QSO	Blue
LEDA 528866	21:03:02.23	-45:14:41.1	Galaxy	Blue
Gaia DR2 6808104805812408064	21:03:56.66	-21:47:27.1	Star	Blue
ESO 286-33	21:04:08.52	-43:32:03.2	IG	Blue
ESO 286-35	21:04:11.17	-43:35:33.8	GinGroup	Blue
LEDA 720203	21:04:21.46	-30:11:50.0	Galaxy	Red
[GPM2009] J2104-0035 1	21:04:55.31	-0:35:21.8	EmG	Blue
LEDA 520361	21:05:20.69	-45:59:19.3	Galaxy	Blue
ESO 286-44	21:05:38.68	-42:46:52.4	Galaxy	Blue
PN G006.0-41.9	21:05:53.57	-37:08:40.4	PN	Blue
EC 21035-4032	21:06:48.02	-40:20:03.7	Star	Blue
2MASX J21071198-4733258	21:07:11.98	-47:33:25.2	GinPair	Blue
2MASX J21071385-4733258	21:07:13.86	-47:33:25.3	GinPair	Blue
[GPM2009] J2112-0016 2	21:12:00.92	-0:16:49.2	EmG	Blue
6dFGS gJ211224.6-412854	21:12:24.59	-41:28:53.3	AGN	Blue
CRTS J211328.1+000332	21:13:28.17	+0:03:32.6	EB*	Blue
ESO 402-20	21:15:19.13	-33:13:34.6	Galaxy	Blue
CTCV J2118-3412	21:18:04.28	-34:13:43.5	CataclyV*	Blue
AT20G J212302-291504	21:23:02.82	-29:15:04.0	Radio(cm)	Blue
CRTS CSS120613 J212655-012054	21:26:54.54	-1:20:54.1	Candidate CV*	Blue
LEDA 710984	21:27:08.26	-30:57:08.4	Galaxy	Blue
2SLAQ J212954.20-010323.3	21:29:54.22	-1:03:23.3	EmG	Blue
LBQS 2128-4555	21:31:29.53	-45:41:50.5	QSO	Blue
2SLAQ J213242.28-010309.0	21:32:42.29	-1:03:09.2	Galaxy	Blue
2SLAQ J213245.24+000146.4	21:32:45.26	+0:01:46.8	Seyfert 1	Blue
2MASS J21333817+0126291	21:33:38.14	+1:26:29.0	QSO	Blue
SDSS J213455.08+001056.9	21:34:55.09	+0:10:56.8	QSO	Blue
WISEA J213649.75-012852.2	21:36:49.75	-1:28:52.2	QSO	Blue
QSO B2134-453	21:38:07.49	-45:08:18.0	QSO	-

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
2MASS J21381896+0112224	21:38:18.96	+1:12:22.5	Seyfert 1	Blue
CRTS J213937.6-023913	21:39:37.58	-2:39:13.0	Candidate CV*	Blue
2SLAQ J214106.46+004733.3	21:41:06.44	+0:47:33.5	QSO	Blue
SDSSCGB 15831.2	21:41:42.73	+0:45:34.9	Galaxy	Blue
SDSS J214155.04-011734.3	21:41:55.04	-1:17:34.2	QSO	Blue
SDSS J214155.04-011734.3	21:41:55.04	-1:17:34.3	QSO	Blue
SN 2017hxv	21:44:22.94	-29:54:59.0	SN	Red
2SLAQ J214455.94+002305.8	21:44:55.92	+0:23:06.1	EmG	Blue
6dFGS gJ214540.0-291937	21:45:40.01	-29:19:36.9	Galaxy	Red
2SLAQ J214830.60-004752.6	21:48:30.61	-0:47:52.6	EmG	Blue
2SLAQ J214830.60-004752.6	21:48:30.61	-0:47:52.5	EmG	-
SDSS J215002.69+011343.8	21:50:02.70	+1:13:43.8	QSO	Blue
2SLAQ J215010.52-001000.6	21:50:10.53	-0:10:00.6	QSO	Blue
2dFGRS TGS406Z223	21:53:05.55	-31:28:17.9	Galaxy	Blue
2dFGRS TGS406Z223	21:53:05.55	-31:28:17.9	Galaxy	Blue
2dFGRS TGS406Z223	21:53:05.55	-31:28:17.9	Galaxy	Blue
2dFGRS TGS406Z223	21:53:05.55	-31:28:17.9	Galaxy	Blue
2MASX J21541799+0056318	21:54:18.00	+0:56:31.9	Galaxy	Blue
LEDA 214792	21:56:13.83	-1:09:42.8	Galaxy	Blue
LEDA 214792	21:56:13.85	-1:09:43.2	Galaxy	Blue
SDSSCGB 16345.1	21:56:19.79	-1:10:03.6	Galaxy	Blue
SDSSCGB 16345.1	21:56:19.81	-1:10:03.7	Galaxy	Blue
2dFGRS TGS059Z257	21:57:20.89	-25:08:02.4	Galaxy	Blue
SDSS J215824.23-004413.7	21:58:24.28	-0:44:13.7	HII G	Blue
SDSS J215902.90-003318.4	21:59:02.89	-0:33:18.0	Galaxy	Blue
LEDA 214793	21:59:03.11	-1:57:18.3	Galaxy	Blue
LEDA 1136721	22:01:50.08	-0:42:26.7	Galaxy	Blue
2dFGRS TGS114Z230	22:02:07.08	-26:26:38.0	Galaxy	Blue
PB 5049	22:03:15.14	+1:17:21.0	Star	Blue
2dFGRS TGS115Z105	22:04:53.68	-25:03:05.2	Galaxy	Blue
2SLAQ J220529.34-003110.6	22:05:29.34	-0:31:10.7	QSO	Blue
NGC 7204	22:06:55.31	-31:03:10.6	IG	Red
2dFGRS TGS251Z159	22:07:34.55	-28:39:29.3	Galaxy	Blue
NGC 7208	22:08:24.43	-29:03:03.6	GinGroup	Blue
2dFGRS TGS333Z140	22:08:51.96	-30:38:58.8	Galaxy	-
[VV2006] J220852.0-010603	22:08:51.97	-1:06:03.7	QSO	Blue
[VV2006] J220852.0-010603	22:08:51.97	-1:06:03.7	QSO	Blue
MCG-05-52-033a	22:08:55.90	-27:13:22.0	GinPair	Blue
2dFGRS TGS061Z180	22:09:19.05	-24:07:12.4	QSO	Red
2dFGRS TGS116Z088	22:09:22.91	-25:25:04.6	Galaxy	Blue
2QZ J220948.6-301357	22:09:48.63	-30:13:55.8	WD*	Blue
SDSSCGB 41857.2	22:09:51.35	+1:09:00.0	Galaxy	Red
SDSS J220954.57-012717.6	22:09:54.57	-1:27:17.6	QSO	Blue
2QZ J221000.7-311400	22:10:00.75	-31:14:00.0	EmG	Blue
2dFGRS TGS116Z082	22:10:03.74	-25:20:07.3	Galaxy	Blue
2QZ J221005.7-275439	22:10:05.76	-27:54:38.7	Galaxy	Blue
6dFGS gJ221058.1-250431	22:10:58.01	-25:04:31.1	Galaxy	Blue
2QZ J221058.3-273930	22:10:58.33	-27:39:29.4	Galaxy	Blue
LSQ 12dwl	22:12:41.57	+0:30:43.1	SN	Blue
[VV2006] J221335.7-282542	22:13:35.65	-28:25:41.7	QSO	Blue
2dFGRS TGS175Z009	22:14:02.86	-27:32:21.4	Galaxy	Blue
2dFGRS TGS175Z009	22:14:02.88	-27:32:21.5	Galaxy	Blue
NGC 7229	22:14:03.23	-29:22:57.8	EmG	Blue
2dFGRS TGS254Z244	22:14:05.10	-29:22:52.9	Galaxy	Blue
ESO 467-25	22:14:24.23	-29:58:51.5	EmG	Blue
2dFGRS TGS254Z138	22:14:41.93	-28:26:39.6	Galaxy	Blue
2dFGRS TGS334Z074	22:14:47.16	-29:41:12.4	Galaxy	Blue
2QZ J221517.1-285358	22:15:17.10	-28:53:57.5	EmG	Blue
[VV2006] J221532.6-281805	22:15:32.58	-28:18:03.9	QSO	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
2QZ J221630.0-290054	22:16:30.07	-29:00:53.3	EmG	Red
6dFGS gJ221706.5-303447	22:17:06.52	-30:34:46.1	Galaxy	Red
[VV2006] J221722.5+010436	22:17:22.44	+1:04:36.3	QSO	Blue
2dFGRS TGS176Z011	22:17:41.15	-27:21:54.6	Galaxy	Blue
SDSS J221813.90+001625.1	22:18:13.91	+0:16:25.3	Galaxy	-
2MASX J22181503+0115169	22:18:15.03	+1:15:16.9	Galaxy	Blue
SDSS J221817.26+003623.6	22:18:17.26	+0:36:23.7	AGN	Red
2QZ J221819.4-271544	22:18:19.39	-27:15:44.2	Seyfert 1	Blue
2SLAQ J221846.76-011119.0	22:18:46.74	-1:11:18.8	Galaxy	Blue
2SLAQ J221846.76-011119.0	22:18:46.74	-1:11:18.8	Galaxy	Blue
SDSS J221852.63-010310.1	22:18:52.65	-1:03:10.5	Galaxy	Blue
2QZ J221925.9-305108	22:19:25.92	-30:51:07.7	EmG	Blue
SDSSCGB 28259.2	22:19:44.75	-0:14:40.0	Galaxy	Red
2QZ J221945.1-293414	22:19:45.08	-29:34:13.4	EmG	Blue
[DD2013] W4+2-1 115196	22:19:53.86	+0:29:04.8	Galaxy	Blue
2SLAQ J222021.37+004040.2	22:20:21.36	+0:40:40.5	Star	Blue
2QZ J222113.6-280421	22:21:13.62	-28:04:20.9	Seyfert 1	Red
2dFGRS TGS337Z130	22:22:54.92	-30:42:28.4	Galaxy	Blue
6dFGS gJ222313.7-285844	22:23:13.70	-28:58:44.6	Galaxy	Blue
2SLAQ J222332.83-010614.8	22:23:32.84	-1:06:14.8	QSO	Blue
2QZ J222336.0-283140	22:23:36.03	-28:31:39.6	EmG	Blue
2SLAQ J222403.36-005724.2	22:24:03.35	-0:57:24.2	QSO	Blue
2SLAQ J222403.36-005724.2	22:24:03.36	-0:57:24.1	QSO	Blue
2QZ J222416.2-292421	22:24:16.26	-29:24:21.7	Candidate CV*	Blue
2dFGRS TGS338Z083	22:27:38.90	-31:08:10.3	Galaxy	Blue
2SLAQ J222825.11-002217.4	22:28:25.12	-0:22:17.2	Galaxy	Red
LEDA 711478	22:28:47.80	-30:54:43.2	Galaxy	Blue
LEDA 711478	22:28:47.82	-30:54:43.2	Galaxy	Blue
2dFGRS TGS337Z266	22:28:53.67	-30:58:51.4	Galaxy	Blue
2dFGRS TGS337Z266	22:28:53.67	-30:58:51.4	Galaxy	Blue
SDSS J222923.00-020042.7	22:29:23.00	-2:00:42.4	QSO	-
2SLAQ J222956.53+003126.5	22:29:56.54	+0:31:26.5	QSO	Blue
2dFGRS TGS338Z165	22:30:01.84	-29:35:52.7	Galaxy	Blue
2dFGRS TGS338Z165	22:30:01.85	-29:35:52.6	Galaxy	Blue
NAME Kinman Dwarf	22:30:36.83	-0:06:35.8	BlueCompG	Blue
LEDA 1149494	22:31:06.00	-0:11:43.9	Galaxy	Blue
2QZ J223114.0-312005	22:31:13.95	-31:20:04.4	Star	Blue
[VV2006] J223251.7-303250	22:32:51.74	-30:32:49.6	QSO	Blue
2QZ J223342.5-301936	22:33:42.56	-30:19:35.4	Galaxy	Blue
2MASS J22340663+0001199	22:34:06.67	+0:01:20.8	Star	Red
FASTT 1560	22:34:39.93	+0:41:27.5	CataclyV*	Blue
2dFGRS TGS414Z208	22:34:56.56	-31:08:44.1	Galaxy	Blue
2dFGRS TGS414Z208	22:34:56.57	-31:08:44.1	Galaxy	Blue
SDSS J223508.41-005359.3	22:35:08.42	-0:53:59.4	Seyfert 2	Red
SDSS J223508.41-005359.3	22:35:08.43	-0:53:59.4	Seyfert 2	Red
2QZ J223532.2-294634	22:35:32.24	-29:46:33.0	EmG	Blue
2SLAQ J223543.05-005436.5	22:35:43.04	-0:54:36.6	Galaxy	Blue
2SLAQ J223543.05-005436.5	22:35:43.05	-0:54:36.6	Galaxy	Blue
2SLAQ J223543.05-005436.5	22:35:43.06	-0:54:36.4	Galaxy	Blue
SDSS J223543.94-003931.4	22:35:43.93	-0:39:32.1	low-mass*	Red
[EKS96] NGC 7314 28	22:35:44.87	-26:02:27.4	HII	Blue
[EKS96] NGC 7314 43	22:35:45.40	-26:02:10.8	HII	Blue
[EKS96] NGC 7314 71	22:35:46.29	-26:04:29.1	HII	Blue
[EKS96] NGC 7314 130	22:35:48.23	-26:01:24.0	HII	Blue
[VV2006] J223633.5+002652	22:36:33.54	+0:26:52.8	QSO	Blue
SDSS J223649.60+005413.5	22:36:49.60	+0:54:13.8	QSO	-
2SLAQ J223723.84-010120.3	22:37:23.88	-1:01:19.2	Galaxy	Blue
SDSS J223729.86-010549.1	22:37:29.86	-1:05:49.3	HB*	-
PHL 354	22:38:23.25	-0:57:08.2	QSO	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
PHL 354	22:38:23.26	-0:57:08.1	QSO	Blue
2SLAQ J223844.30-005655.3	22:38:44.29	-0:56:55.3	QSO	Blue
LEDA 131686	22:41:19.49	-39:58:23.3	Galaxy	Blue
2QZ J224149.5-301945	22:41:49.50	-30:19:44.5	Galaxy	Blue
[GDB2008] 503	22:43:16.38	-39:51:39.9	Galaxy	Blue
[GDB2008] 504	22:43:19.40	-39:52:44.4	Galaxy	Blue
[GDB2008] 509	22:43:25.11	-39:55:20.0	Galaxy	Red
SDSS J224352.11-002259.7	22:43:52.21	-0:22:59.9	Galaxy	Blue
2SLAQ J224531.20-004509.4	22:45:31.20	-0:45:09.4	QSO	Blue
2SLAQ J224531.20-004509.4	22:45:31.20	-0:45:09.3	QSO	Blue
SDSS J224539.94-002419.7	22:45:39.94	-0:24:19.6	QSO	Blue
2MASS J22495608+0002182	22:49:56.08	+0:02:18.4	QSO	Blue
2SLAQ J225012.91-003959.0	22:50:12.92	-0:39:58.9	Galaxy	Blue
SDSS J225149.74-002811.7	22:51:49.75	-0:28:11.4	QSO	Blue
2QZ J225157.1-292451	22:51:57.10	-29:24:50.8	EmG	Blue
2SLAQ J225257.45+002731.5	22:52:57.44	+0:27:31.6	Star	Blue
2QZ J225352.9-300944	22:53:52.96	-30:09:43.7	Seyfert 1	Blue
[VV2006] J225411.2-312712	22:54:11.15	-31:27:11.3	QSO	Blue
SDSS J225411.96-004949.5	22:54:11.96	-0:49:49.4	QSO	Blue
SDSS J225411.96-004949.5	22:54:11.96	-0:49:49.3	QSO	Blue
2QZ J225503.9-301914	22:55:03.89	-30:19:13.3	EmG	Blue
2QZ J225908.1-312717	22:59:08.12	-31:27:16.7	Star	Blue
2SLAQ J230030.09-003005.9	23:00:30.09	-0:30:05.8	Galaxy	Blue
2SLAQ J230201.20+003047.2	23:02:01.20	+0:30:47.3	QSO	Blue
[VV2006] J230235.5-285630	23:02:35.44	-28:56:29.7	QSO	Blue
2SLAQ J230316.40-001211.5	23:03:16.41	-0:12:11.4	QSO	Blue
V* HY Psc	23:03:51.63	+1:06:51.4	CataclyV*	Blue
SDSS J230428.31+005701.2	23:04:28.34	+0:57:01.2	QSO	Blue
2SLAQ J230444.16-010251.7	23:04:44.16	-1:02:51.5	QSO	Blue
LEDA 1122038	23:08:10.78	-1:17:58.5	Galaxy	Blue
SDSS J230855.49+003705.6	23:08:55.49	+0:37:05.7	QSO	Blue
ESO 469-15	23:08:55.60	-30:51:28.2	GinGroup	Blue
[VV2006] J230914.4-305913	23:09:14.31	-30:59:12.5	QSO	Blue
2MASS J23094616+0000496	23:09:46.15	+0:00:49.1	Seyfert 1	Blue
2MASS J23094616+0000496	23:09:46.16	+0:00:49.0	Seyfert 1	Blue
[GPM2009] J2310-0109 2	23:10:41.99	-1:09:48.0	EmG	Blue
[VV2006] J231135.1-312644	23:11:35.12	-31:26:44.1	QSO	Blue
2dFGRS TGS422Z155	23:12:08.96	-31:04:13.3	Galaxy	Red
2SLAQ J231231.36-011137.5	23:12:31.36	-1:11:37.3	QSO	Blue
SDSS J231259.07+010805.6	23:12:59.06	+1:08:05.9	QSO	Blue
[VV2006] J231311.9-004538	23:13:11.91	-0:45:38.0	QSO	Blue
SDSS J231351.87-011031.9	23:13:51.86	-1:10:30.8	HII G	Blue
2MASX J23145046+0123280	23:14:50.52	+1:23:26.7	LSB G	Blue
[VV2006] J231519.4-303857	23:15:19.39	-30:38:57.2	QSO	Blue
V* CC Scl	23:15:31.78	-30:48:48.7	CataclyV*	Blue
[VV2006] J231652.0+005125	23:16:52.04	+0:51:25.9	QSO	Blue
3XMM J231742.5+000535	23:17:42.61	+0:05:35.3	Seyfert 1	Blue
[VV2006] J231942.8-302629	23:19:42.76	-30:26:29.5	QSO	Blue
LEDA 71137	23:20:35.21	-0:52:50.9	Galaxy	Blue
LEDA 71137	23:20:35.22	-0:52:50.8	Galaxy	Blue
2QZ J232126.5-310730	23:21:26.51	-31:07:29.5	Galaxy	Blue
[SIG2010] 389821	23:23:31.32	+1:08:06.0	RRLyR	Blue
GALEX 2417063145906373262	23:24:20.34	-0:06:25.0	HII	Blue
[GPM2009] J2324-0006	23:24:21.37	-0:06:29.4	HII G	Blue
2SLAQ J232457.75+002153.2	23:24:57.75	+0:21:53.4	QSO	Blue
2SLAQ J232524.40+004612.0	23:25:24.43	+0:46:12.2	Galaxy	Blue
2MASS J23255145-0140232	23:25:51.48	-1:40:23.8	CataclyV*	Blue
[VV2006c] J232555.5-003710	23:25:55.51	-0:37:10.7	Seyfert 1	-
SDSS J232743.68-020055.8	23:27:43.70	-2:00:55.7	BlueCompG	Blue

Table A1: –continued

Id Simbad	RA	DEC	Type	Group
6dFGS gJ232744.4-020047	23:27:44.38	-2:00:46.8	Galaxy	Blue
LEDA 1127711	23:28:12.30	-1:03:44.8	HII G	Blue
GD 1662	23:29:00.44	-29:46:46.0	CataclyV*	Blue
SDSS J233104.38-004237.2	23:31:04.40	-0:42:37.1	QSO	Red
2MASS J23315973-0048192	23:31:59.77	-0:48:18.5	Galaxy	Blue
2QZ J233254.8-305844	23:32:54.78	-30:58:43.8	EmG	Blue
SDSS J233256.68+011122.9	23:32:56.68	+1:11:23.1	BCIG	-
SDSS J233300.21-002030.5	23:33:00.22	-0:20:30.5	QSO	Blue
[VV2006] J233438.5+002341	23:34:38.55	+0:23:41.9	QSO	Blue
2MASX J23352102+0110271	23:35:20.98	+1:10:27.4	Galaxy	Red
2SLAQ J233522.69-000635.2	23:35:22.69	-0:06:35.2	QSO	Blue
LEDA 135900	23:36:46.97	+0:37:23.8	LSB G	Blue
[VV2006] J233722.0+002239	23:37:22.02	+0:22:39.2	QSO	Blue
2XMM J233731.7+002559	23:37:31.79	+0:25:59.9	AGN	Blue
DES J233747.57+001742.6	23:37:47.57	+0:17:42.8	GinCl	-
RESOLVE rf772	23:40:38.43	-0:53:30.6	Galaxy	Blue
[VV2006] J234329.1-300200	23:43:29.16	-30:02:00.1	QSO	Blue
2SLAQ J234440.53-001205.8	23:44:40.53	-0:12:06.1	CataclyV*	Blue
LEDA 1109937	23:48:23.99	-1:47:31.1	Galaxy	Blue
2dFGRS TGS356Z227	23:50:01.55	-30:11:07.1	Galaxy	Blue
2SLAQ J235115.66-000000.0	23:51:15.66	-0:00:00.0	Galaxy	Blue
2SLAQ J235115.66-000000.0	23:51:15.68	-0:00:00.2	Galaxy	Blue
[VV2006] J235546.2-002342	23:55:46.14	-0:23:42.8	QSO	Blue
[VV2006] J235718.4+004350	23:57:18.37	+0:43:50.5	QSO	Red
SDSS J235805.25-012153.9	23:58:05.25	-1:21:53.9	QSO	Blue

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