# AGA0414
## Métodos Observacionais em Astrofísica I

**Prof. Jorge Meléndez**

Observações no OPD

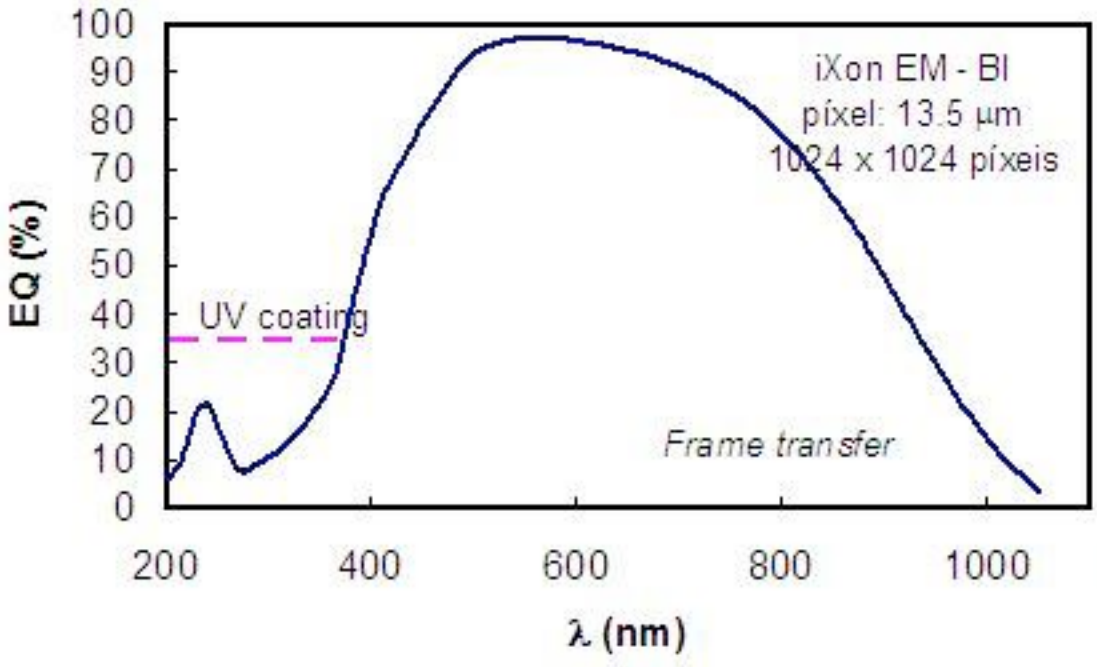
Coordenadas

Longitude : -45° 34' 57"
Latitude : -22° 32' 04"
Altitude : 1864m

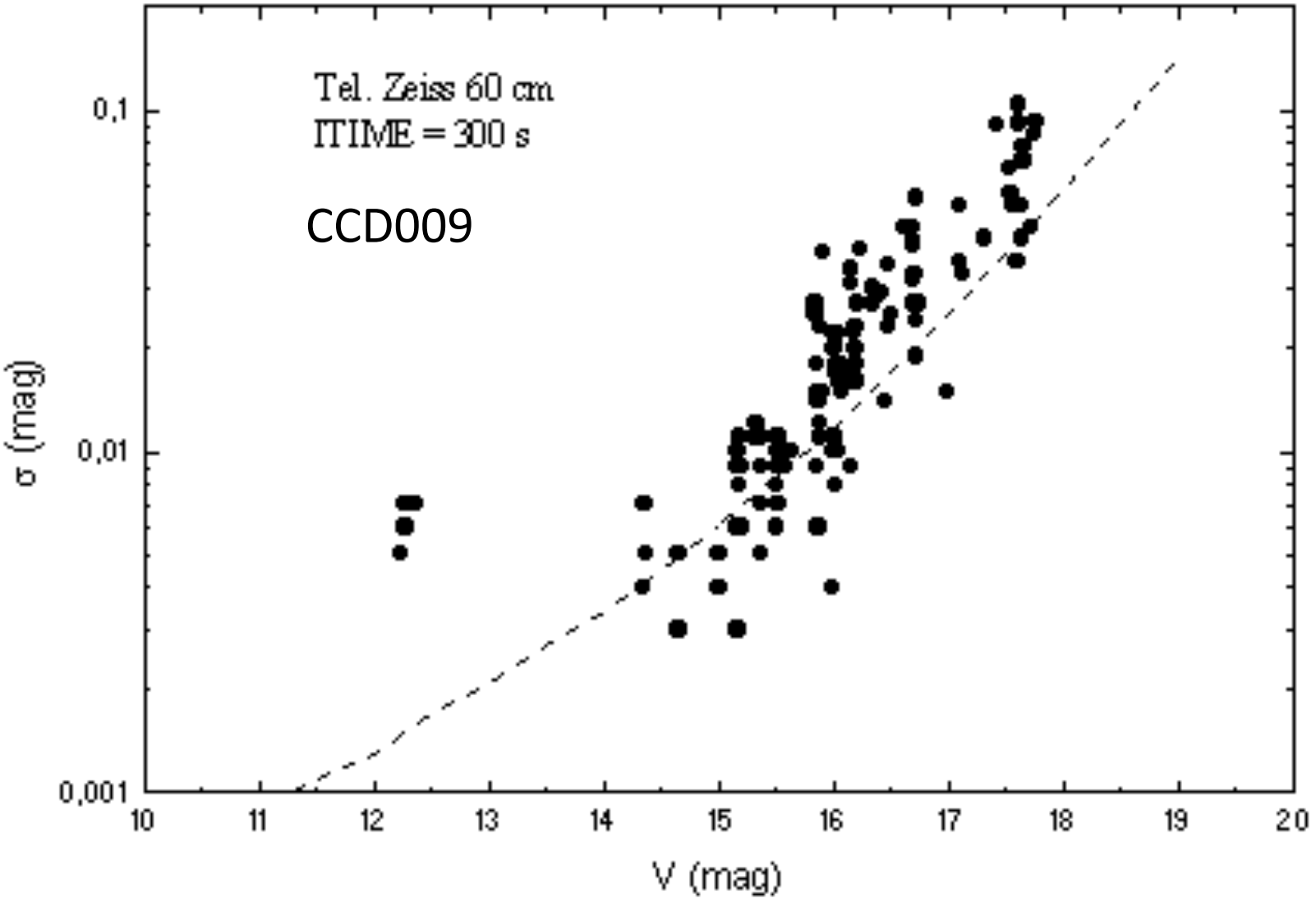
# Tel. IAG + CCD Ixon, Asistente Mauro

Campo: 5’ x 5’

| TIPO | E2V CCD201-20<br>Fino, back-illuminated |
|---|---|
| TAMANHO IMAGEM [pixels] | 1024 x 1024 |
| TAMANHO PIXEL [microns] | 13.5 x 13.5 |



# Erro em V para tel. 60cm, 300 s



# Exoplanet transits

- Previsões:
- http://var2.astro.cz/ETD/index.php


**ETD - Exoplanet Transit Database**

Observers community | How to contribute to ETD | Model-fit your data | **Transit predictions** | *KEPLER* Transit predictions | *KEPLER* Candidates | *CoRoT* Transit predictions | *CoRoT* Candidates

Your ELONGITUDE (in deg): 315 *0° - 360°*
Your LATITUDE (in deg): -22.5 *90° - 0° - -90°*
submit

**Available predictions:** (UT evening date)

**2014-04-** 08, **09**, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30,
**2014-05-** 01, 02, 03, 04, 05, 06, 07, 08, 09,

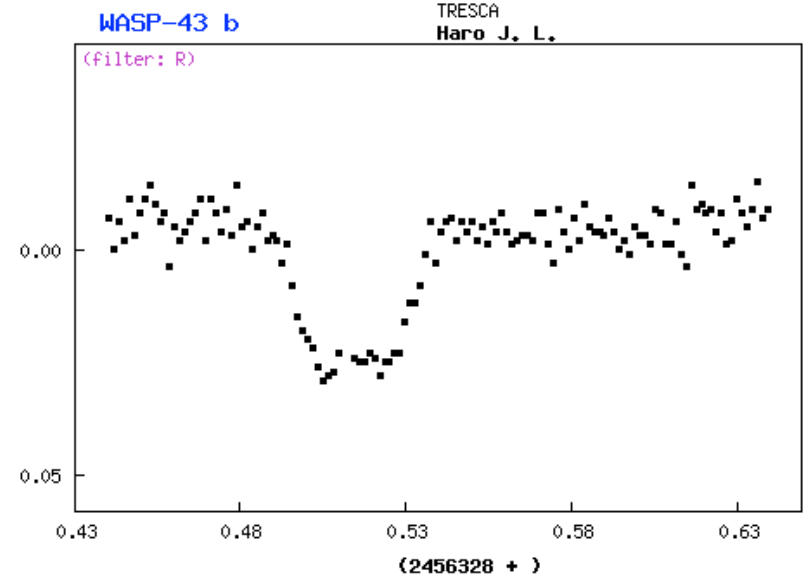
**User defined time span:** From: YYYY-MM-DD Till: YYYY-MM-DD Show

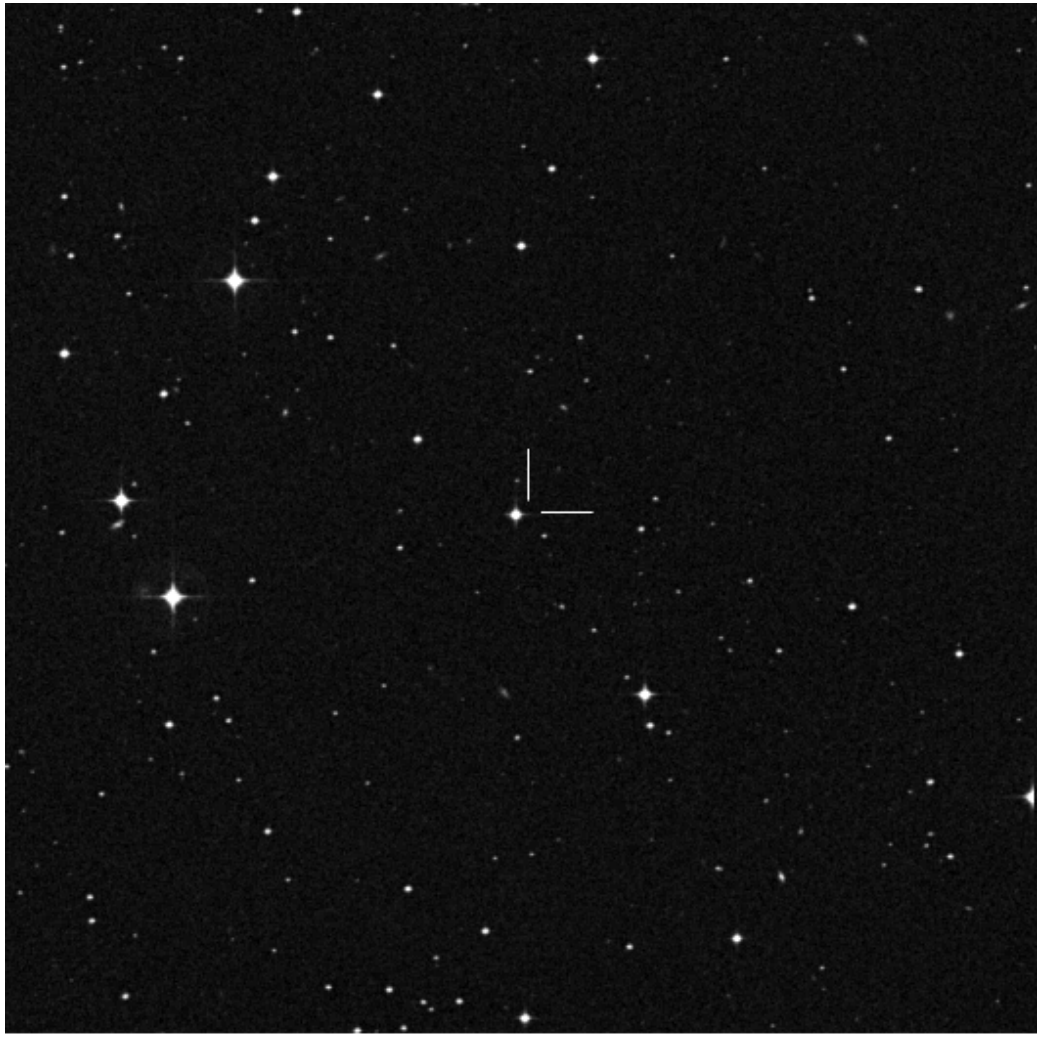
# WASP-43

RA (J2000): **10 19 38.01**, DE (J2000): **-09 48 21.9**,
V = **12.4 mag**, dV = **0.029 mag**, duration = **69.5 min**

P = 0.813475d,

T0 = 2455528.86774 (JD)



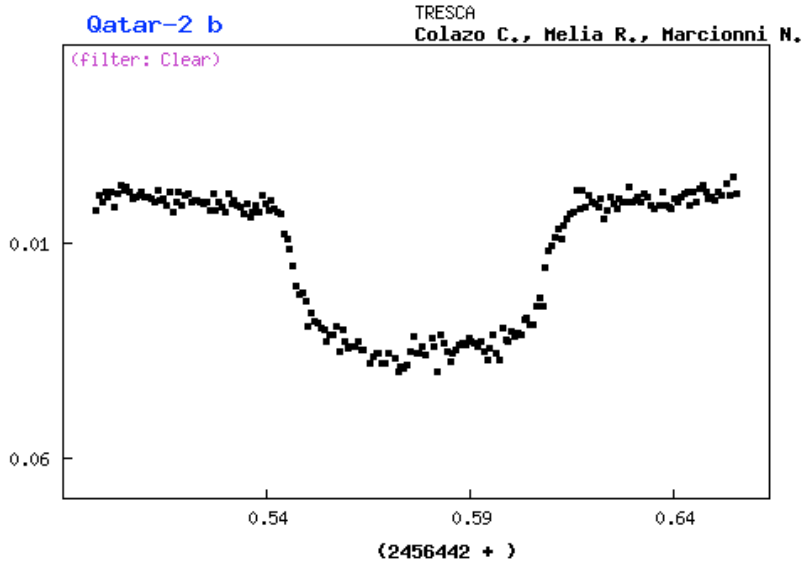



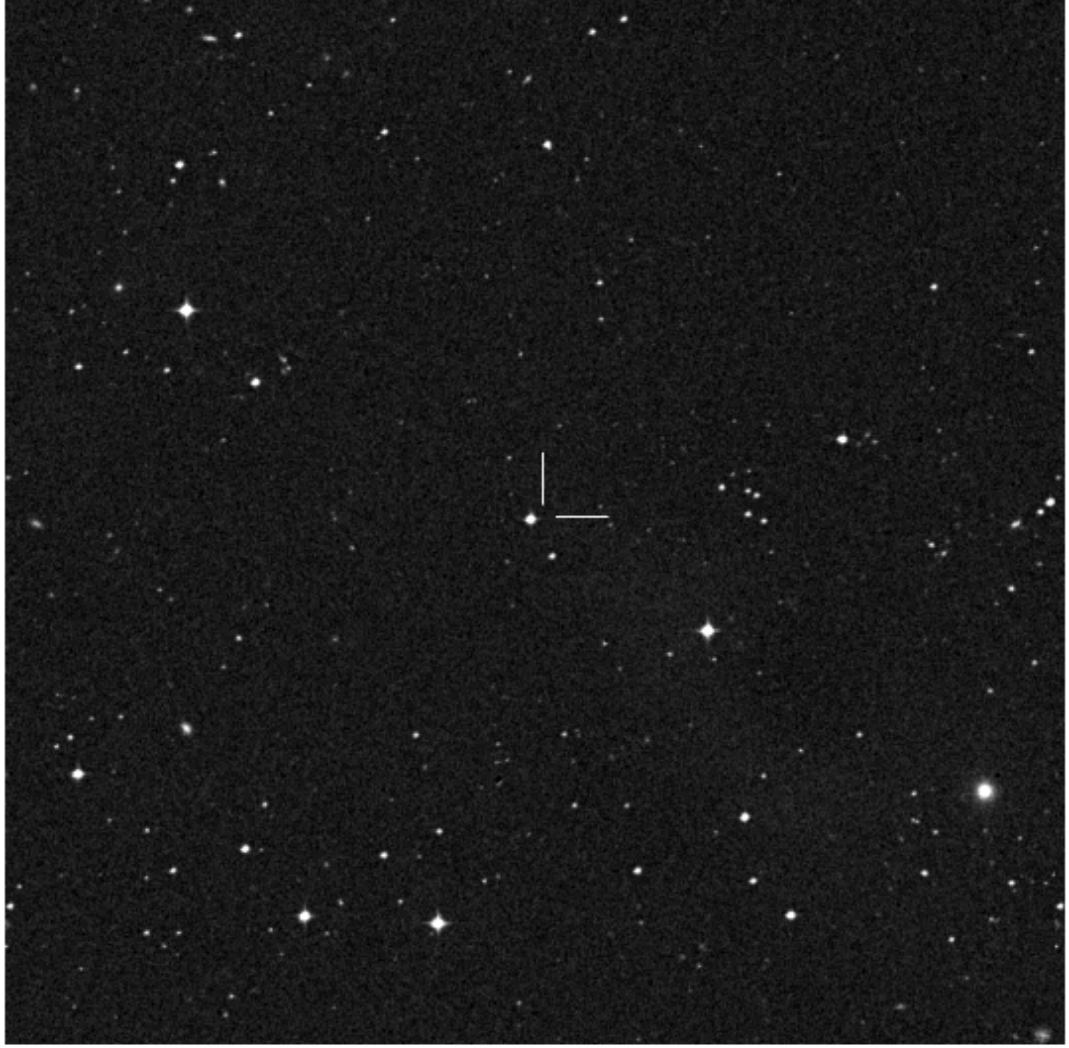
15' x 15' image from the Digitized Sky Survey at the STScI Archive.

| Tmid (HJD) | BEGIN (UT/h,A) | CENTER (DD.MM. UT/h,A) | END (UT/h,A) |
|---|---|---|---|
| 2456760.469 | 12.04 22:40 (68°,NE) | 12.04. 23:15 (74°,NE) | 12.04 23:49 (76°,N) |

- **Qatar-2**

RA (J2000): **13 50 37.41**,
DE (J2000): **-06 48 14.4**,
V = **13.3 mag**, dV = **0.0374 mag**, duration = **108.6 min**
P = 1.3371182 d,
T0 = 2455624.26679 (JD)



15' x 15' image from the Digitized Sky Survey at the STScI Archive.

| Tmid (HJD) | BEGIN (UT/h,A) | CENTER (DD.MM. UT/h,A) | END (UT/h,A) |
|---|---|---|---|
| **2456760.817** | 13.04 6:42 (40°,W) | **13.04. 7:36 (28°,W)** | 13.04 8:31 (15°,W) |

# Novas

- KQ Mon

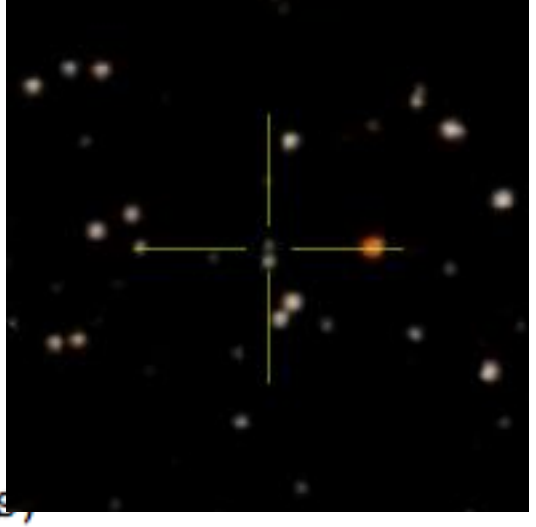
**V* KQ Mon** -- Nova-like Star

| | |
|---|---|
| Other object types: | NL* () ,V* (V*,AN,CSV) ,* (GSC) |
| **ICRS** coord. (ep=J2000) : | 07 31 21.09 -10 21 50.0 ( ~ ) [ ~ ~ ~ ] |
| **FK5** coord. (ep=J2000 eq=2000) : | 07 31 21.09 -10 21 50.0 ( ~ ) [ ~ ~ ~ ] |
| **FK4** coord. (ep=B1950 eq=1950) : | 07 28 58.58 -10 15 25.8 ( ~ ) [ ~ ~ ~ ] |
| **Gal** coord. (ep=J2000) : | 226.7246 +03.9949 ( ~ ) [ ~ ~ ~ ] D 199 |
| Fluxes (1) : | B 12.1 [~] V3 E 2003AstL...29..468S |

Period = 0.128 d

Magnitude range: 12.1 - 13.0

# Novas



- DT Pyx

**V* DT Pyx** -- Dwarf Nova

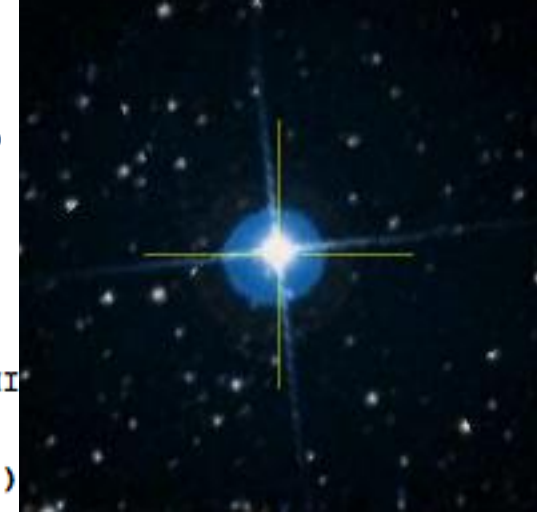
| | |
|---|---|
| Other object types: | No* () ,DN* () ,V* (V*,ASAS) |
| **ICRS** coord. (ep=J2000) : | 09 18 58.50 -29 42 37.0 ( ~ ) [ ~ ~ ~ ] |
| **FK5** coord. (ep=J2000 eq=2000) : | 09 18 58.50 -29 42 37.0 ( ~ ) [ ~ ~ ~ ] |
| **FK4** coord. (ep=B1950 eq=1950) : | 09 16 49.43 -29 29 55.1 ( ~ ) [ ~ ~ ~ ] |
| **Gal** coord. (ep=J2000) : | 257.2683 +13.7661 ( ~ ) [ ~ ~ ~ ] D 200 |
| Fluxes (1) : | V 11.6 [~] E 2003AstL...29..468S |

Period = 0.061 d

Magnitude range: 11.6 - 16.0

# Delta Scuti stars

- ER Cha



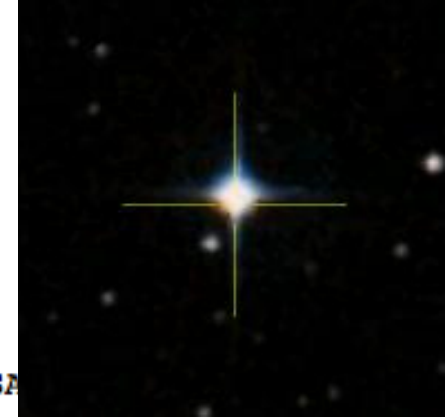
**V* ER Cha** -- Variable Star of delta Sct type

| | |
|---|---|
| Other object types: | dS* () ,UV () ,* (CD,CPC,CPD,GC,GSC,HD,HI (V*,NSV) ,IR (2MASS) |
| **ICRS** coord. (ep=J2000) : | 10 05 13.64071 -79 03 44.0562 ( Optical ) 2007A&A...474..653V |
| **FK5** coord. (ep=J2000 eq=2000) : | 10 05 13.641 -79 03 44.06 ( Optical ) [ 5.01 4.74 130 ] A |
| **FK4** coord. (ep=B1950 eq=1950) : | 10 05 25.38 -78 49 07.6 ( Optical ) [ 28.94 27.41 0 ] A 2 |
| **Gal** coord. (ep=J2000) : | 295.2944 -18.7433 ( Optical ) [ 5.01 4.74 0 ] A 2007A&A.. |
| Proper motions *mas/yr* [error ellipse]: | -81.21 65.06 [0.57 0.54 0] A 2007A&A...474..653V |
| Parallaxes *mas*: | 6.02 [0.47] A 2007A&A...474..653V |
| Spectral type: | A4III/IV C 1975MSS...C01....0H |
| Fluxes (5) : | B 7.55 [0.01] D 2000A&A...355L..27H<br>V 7.31 [0.01] D 2000A&A...355L..27H |

Period = 0.063 d

Magnitude range: 7.30 – 7.35

# Delta Scuti stars



- KZ Hya

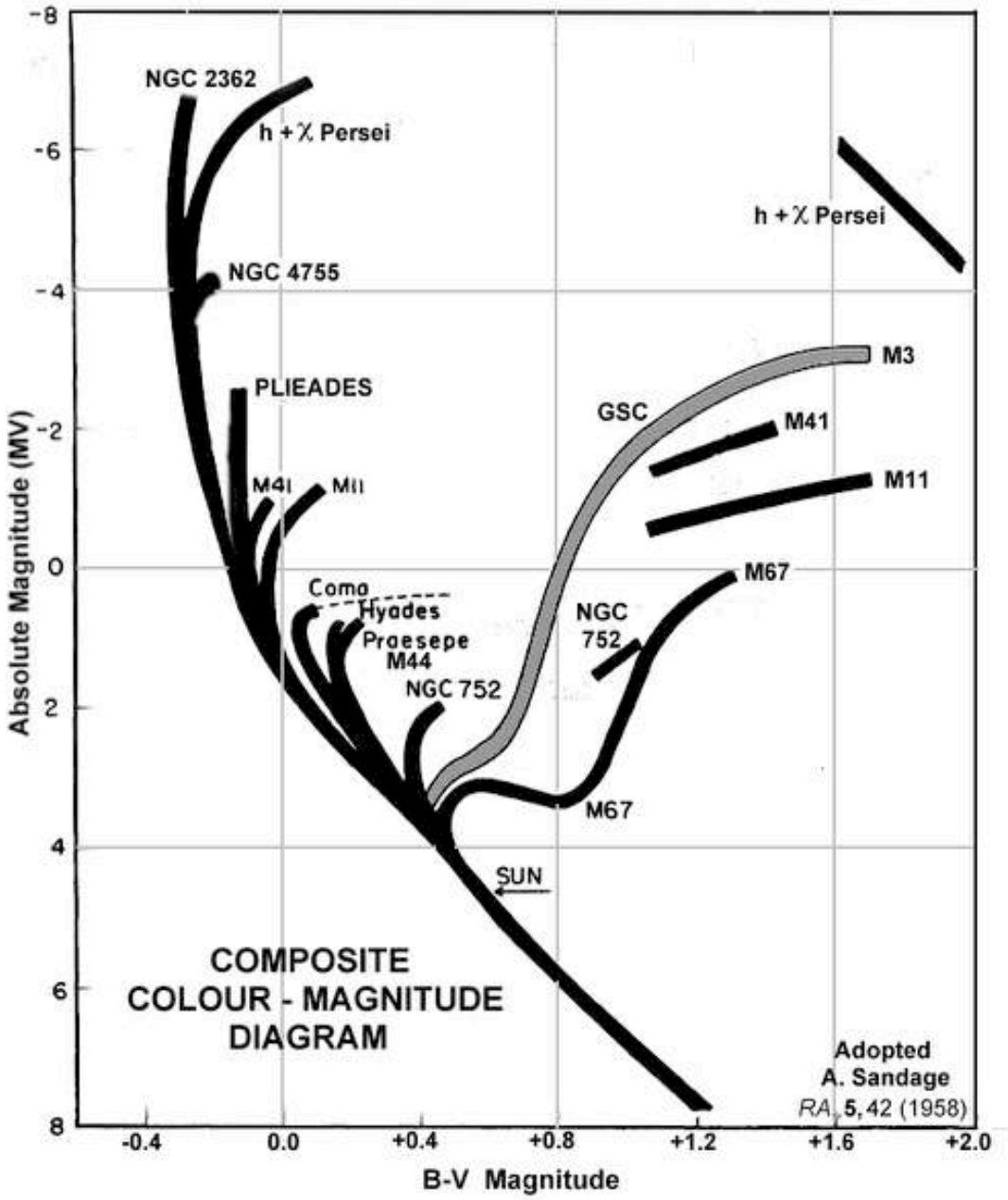
**V* KZ Hya** -- Variable Star of SX Phe type (subdwarf)

| | |
|---|---|
| Other object types: | cC* () ,SX* () ,* (CD,CPD,GSC,HD,PPM,SA<br>V* (V*) ,IR (2MASS) |
| **ICRS** coord. (ep=J2000) : | 10 50 54.0755 -25 21 14.711 ( ~ ) [ 45.60 32.90 90 |
| **FK5** coord. (ep=J2000 eq=2000) : | 10 50 54.076 -25 21 14.71 ( ~ ) [ 45.60 32.90 90 ] |
| **FK4** coord. (ep=B1950 eq=1950) : | 10 48 29.75 -25 05 10.8 ( ~ ) [ 92.08 81.90 90 ] B |
| **Gal** coord. (ep=J2000) : | 271.3335 +30.0206 ( ~ ) [ 45.60 32.90 90 ] B 1998A& |
| Proper motions *mas/yr* [error ellipse]: | 20.7 -167.3 [1.6 1.5 90] B 2000A&A...355L..27H |
| Radial velocity / Redshift / cz : | V(km/s) 2.68 [~] / z(~) 0.000009 [~] / cz 2.68 [~] |
| Spectral type: | B9III/IV D 1988MSS...C04....0H |
| Fluxes (5) : | B 10.19 [0.03] D 2000A&A...355L..27H<br>V 10.06 [0.03] D 2000A&A...355L..27H |

Period = 0.059 d

Magnitude range: 9.46 – 10.26

# Open clusters

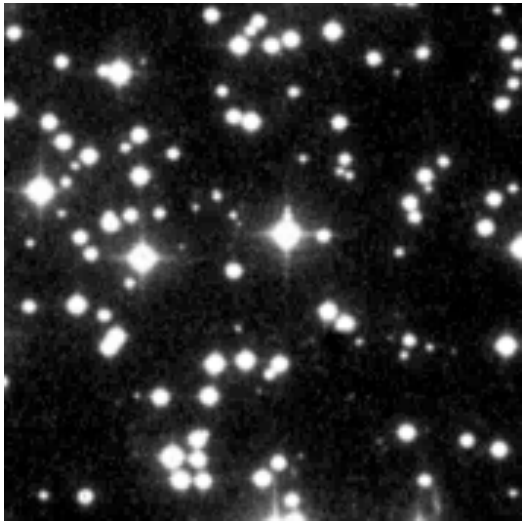


# http://www.astro.iag.usp.br/ocdb/


Dias W. S., Alessi B. S., Moitinho A. and Lépine J. R. D., 2002, A&A 389, 871

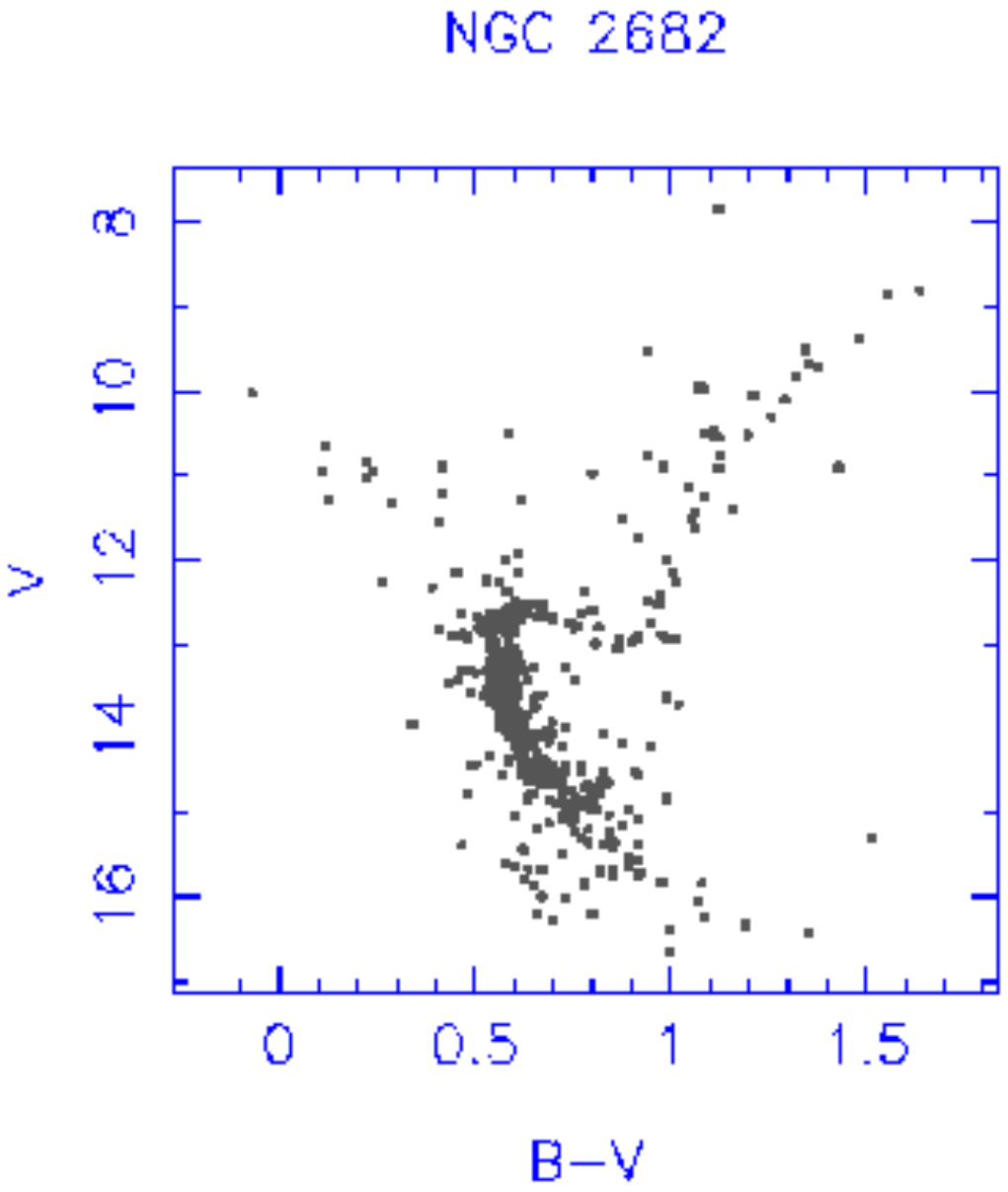
# M67

## M 67 -- Open (galactic) Cluster



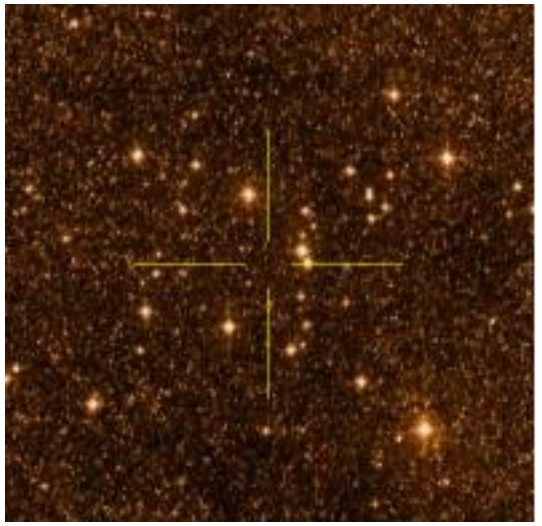
| | |
|---|---|
| Other object types: | *iC () ,Cl* (C,[KPR2004b]) |
| **ICRS** coord. (ep=J2000) : | 08 51 18 +11 48.0 ( ~ ) [ |
| **FK5** coord. (ep=J2000 eq=2000) : | 08 51 18 +11 48.0 ( ~ ) [ |
| **FK4** coord. (ep=B1950 eq=1950) : | 08 48 34 +11 59.3 ( ~ ) [ |
| **Gal** coord. (ep=J2000) : | 215.696 +31.896 ( ~ ) [ ~ |
| Proper motions *mas/yr* [error ellipse]: | -6.51 -4.54 [0.30 0.28 90] |
| Radial velocity / Redshift / cz : | V(km/s) 32.30 [1.10] / z(~ 2005A&A...438.1163K |
| Fluxes (2) : | B 7.6 [~] E ~ |
| | V 6.9 [~] D ~ |

# M67

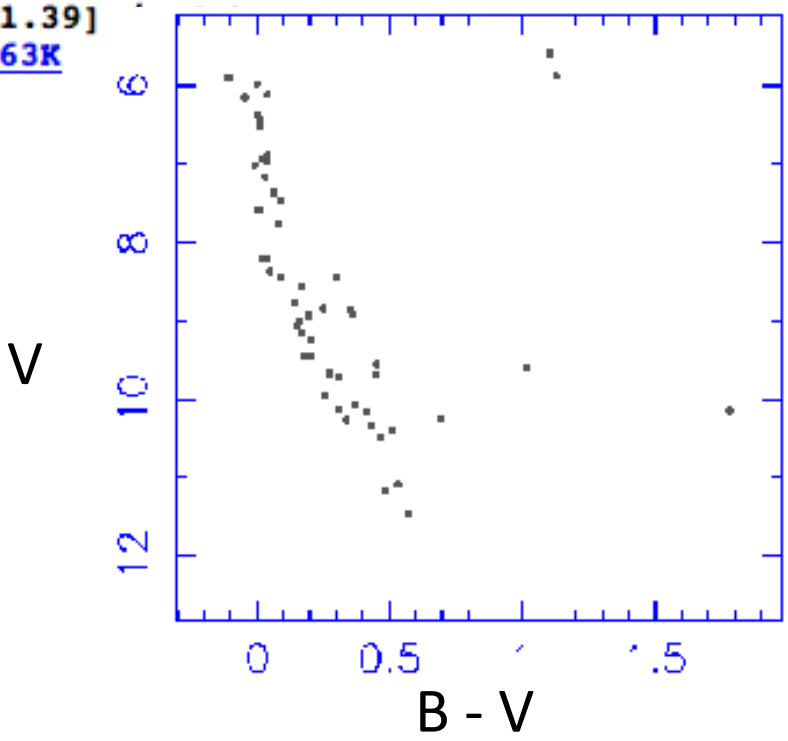


# M 7 -- Cluster of Stars

NGC 6475

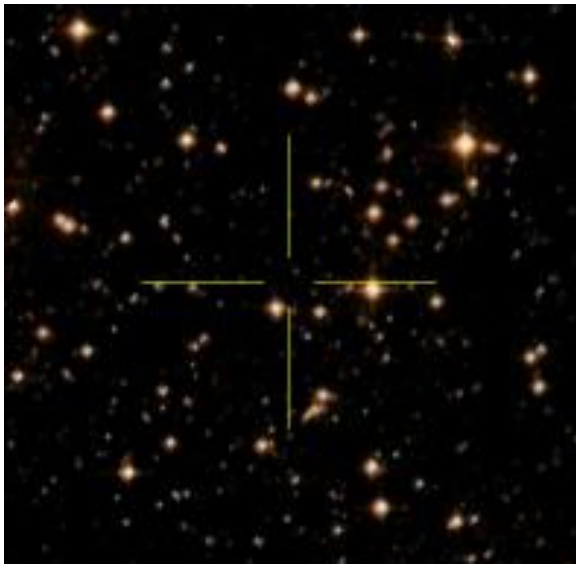


| | |
|---|---|
| Other object types: | *iC () ,Cl* (C,Cl,[KPR2004b]) |
| **ICRS** coord. (ep=J2000) : | 17 53 51 -34 47.6 ( Optical ) |
| **FK5** coord. (ep=J2000 eq=2000) : | 17 53 51 -34 47.6 ( Optical ) |
| **FK4** coord. (ep=B1950 eq=1950) : | 17 50 31 -34 47.0 ( Optical ) |
| **Gal** coord. (ep=J2000) : | 355.861 -04.501 ( Optical ) [ |
| Proper motions *mas/yr* [error ellipse]: | 2.58 -4.54 [0.08 0.07 90] C 20 |
| Radial velocity / Redshift / cz : | V(km/s) -14.21 [1.39] 2005A&A...438.1163K |
| Fluxes (2) : | B 3.45 [~] E ~ |
| | V 3.3 [~] D ~ |

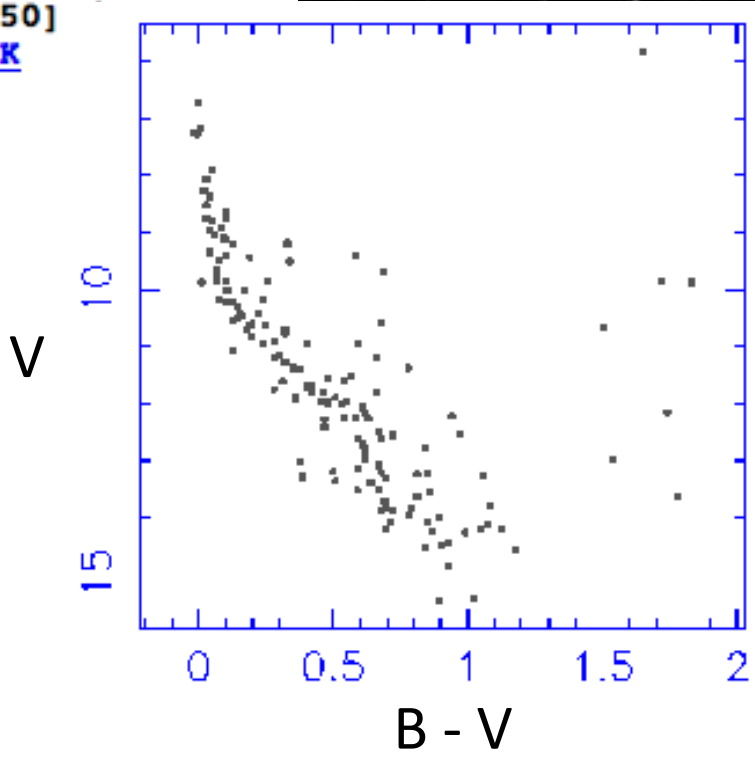


# M 6 -- Association of Stars

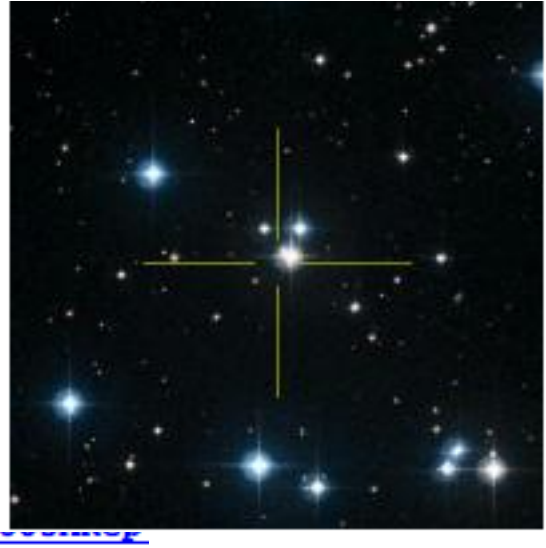
NGC 6405
Borboleta



| | |
|---|---|
| Other object types: | As* () ,*iC () ,Cl* (C,Cl |
| **ICRS** coord. (ep=J2000) : | 17 40 20 -32 15.2 ( Optic |
| **FK5** coord. (ep=J2000 eq=2000) : | 17 40 20 -32 15.2 ( Optic |
| **FK4** coord. (ep=B1950 eq=1950) : | 17 37 04 -32 13.6 ( Optic |
| **Gal** coord. (ep=J2000) : | 356.580 -00.777 ( Optical |
| Proper motions *mas/yr* [error ellipse]: | -2.38 -7.19 [0.16 0.15 0] |
| Radial velocity / Redshift / cz : | V(km/s) -11.50 [3.50] 2005A&A...438.1163K |
| Fluxes (2) : | B 4.48 [~] E ~ |
| | V 4.2 [~] D ~ |

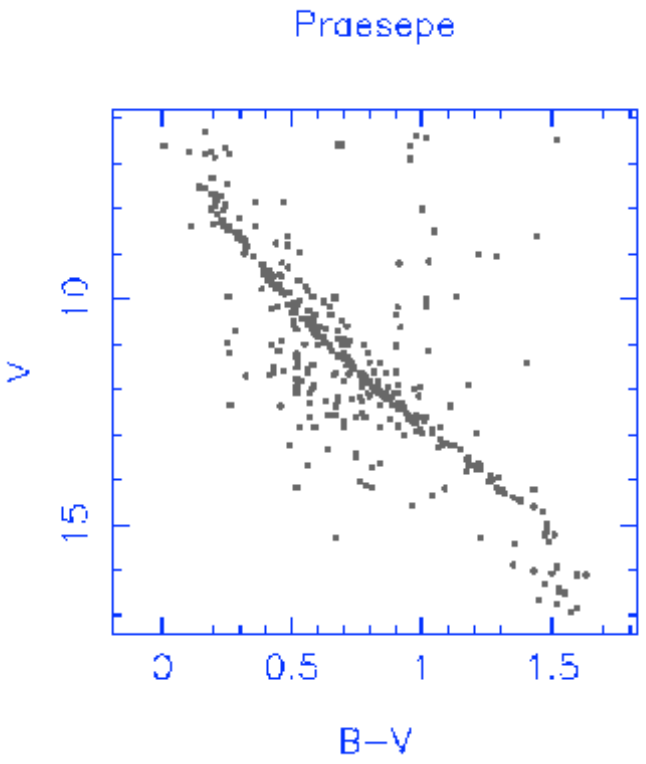


# M 44 -- Open (galactic) Cluster



| | |
|---|---|
| Other object types: | **Cl*** (C,Cl,[KPR2004b]) ,**OpC** (OCl) |
| **ICRS** coord. (ep=J2000) : | **08 40 24 +19 40.0 ( Optical ) [** |
| **FK5** coord. (ep=J2000 eq=2000) : | **08 40 24 +19 40.0 ( Optical ) [** |
| **FK4** coord. (ep=B1950 eq=1950) : | **08 37 32 +19 50.7 ( Optical ) [** |
| **Gal** coord. (ep=J2000) : | **205.920 +32.484 ( Optical ) [ ~** |
| Proper motions *mas/yr* [error ellipse]: | **-35.99 -12.92 [0.14 0.14 45] C** |
| Radial velocity / Redshift / cz : | **V(km/s) 33.57 [1.21] / z(~) 0.000112 [0** **2005A&A...438.1163** |
| Fluxes (2) : | **B 3.46 [~] E ~** **V 3.1 [~] D ~** |

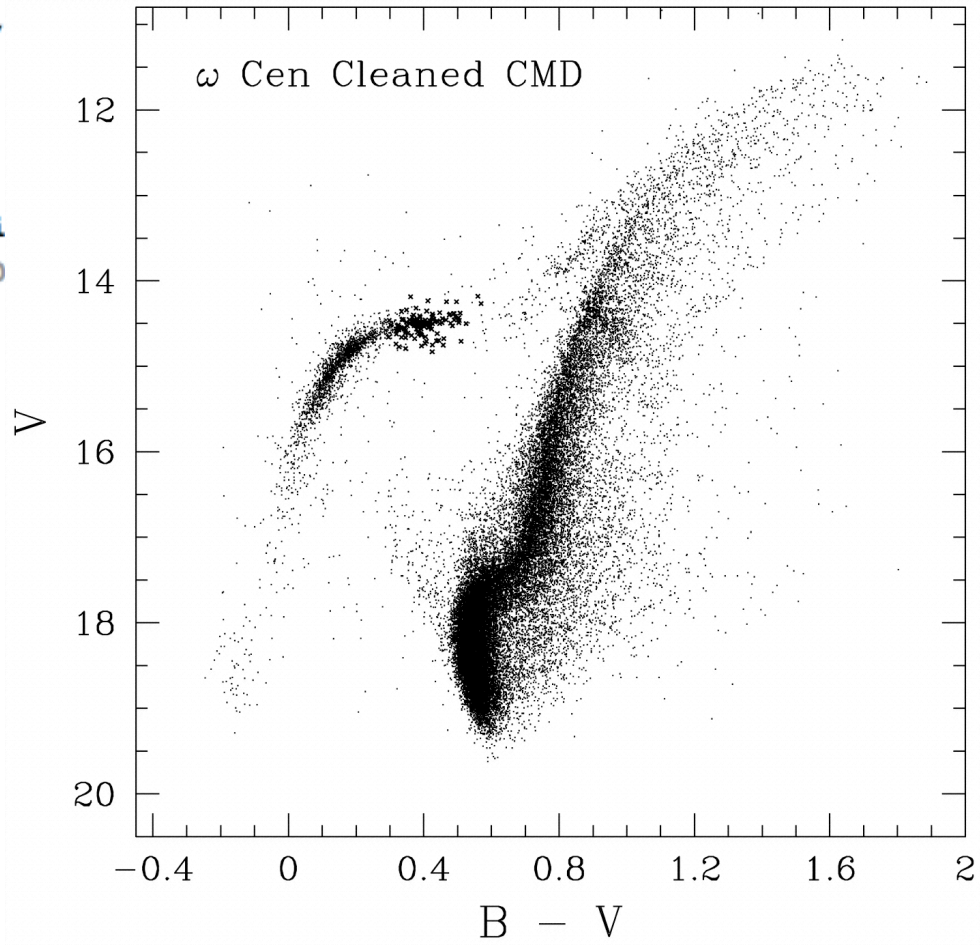
PRAESEPE cluster
Tambem conhecido como
**BEEHIVE**



# Globular clusters: omega Cen

**NGC 5139** -- Globular Cluster

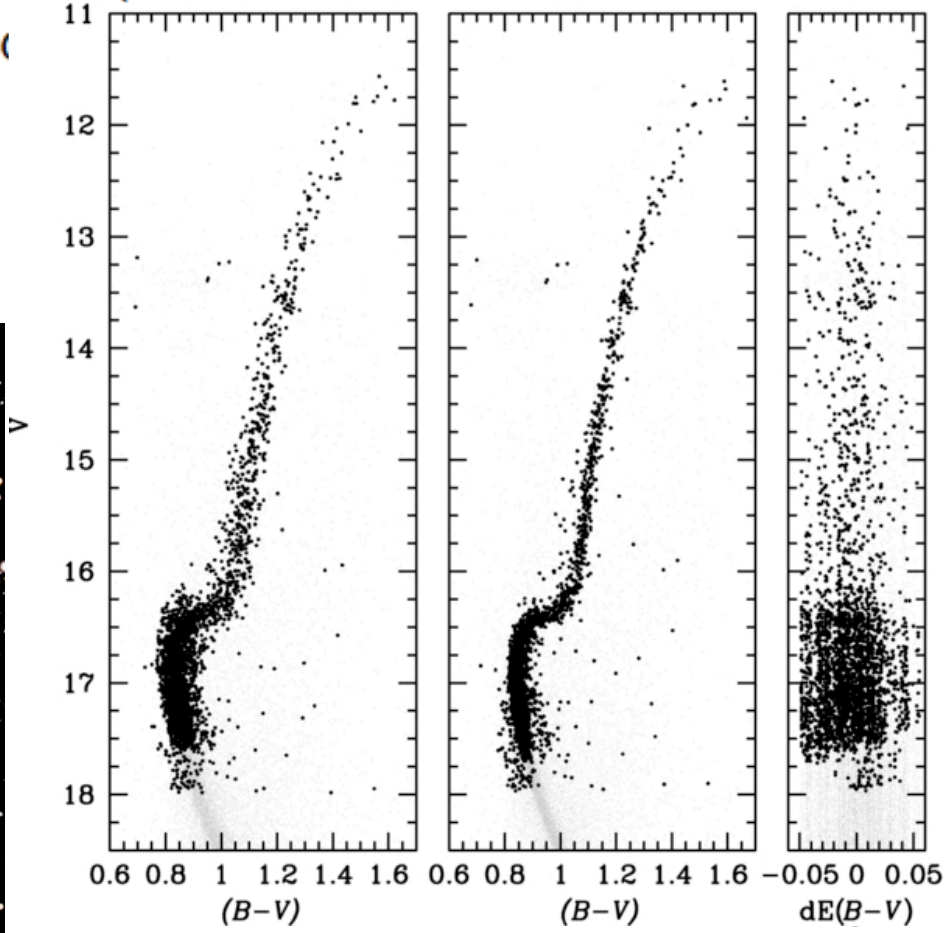
| | |
|---|---|
| Other object types: | G? () ,* (*,CD,CPD,GCRV, |
| **ICRS** coord. (ep=J2000) : | 13 26 47.28 -47 28 46.1 |
| **FK5** coord. (ep=J2000 eq=2000) : | 13 26 47.28 -47 28 46.1 |
| **FK4** coord. (ep=B1950 eq=1950) : | 13 23 47.14 -47 13 12.2 |
| **Gal** coord. (ep=J2000) : | 309.1020 +14.9683 ( Opti |
| Radial velocity / Redshift / cz : | V(km/s) 238 [5] / z(~) 0<br>1979IAUS...30...57E |
| Fluxes (2) : | B 6.12 [~] D ~<br>V 5.33 [~] D ~ |



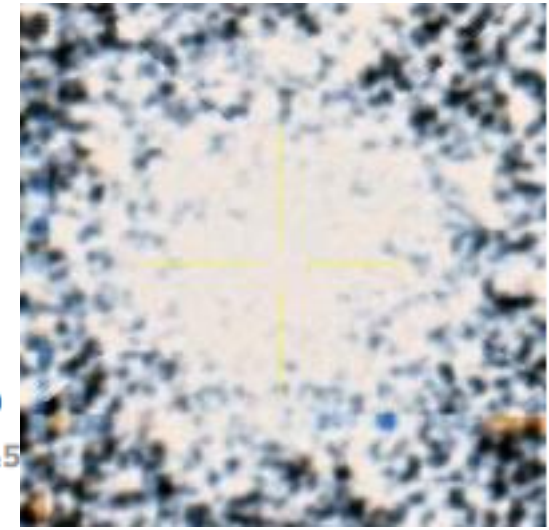
# Globular clusters: M4 / NGC 6121

**M 4** -- Globular Cluster

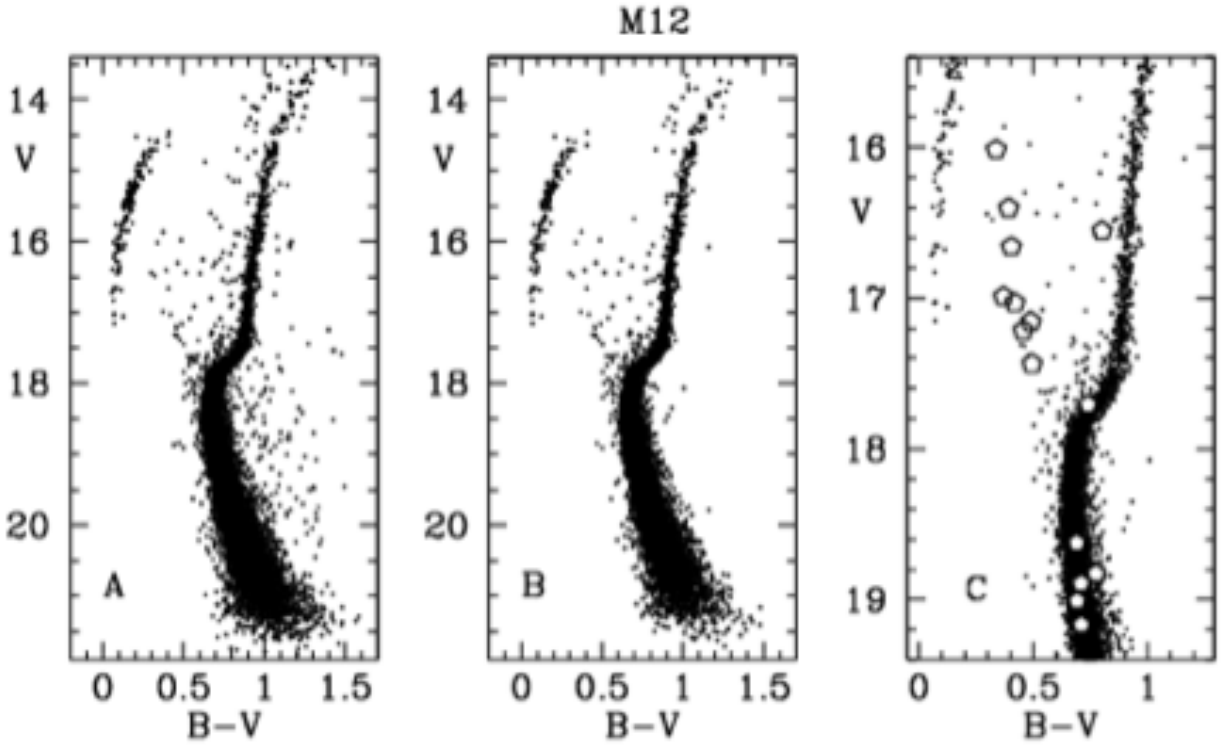
| | |
|---|---|
| Other object types: | *iC () ,GlC (GCl) ,Cl* (C) |
| **ICRS** coord. (ep=J2000) : | 16 23 35.22 -26 31 32.7 ( |
| **FK5** coord. (ep=J2000 eq=2000) : | 16 23 35.22 -26 31 32.7 ( |
| **FK4** coord. (ep=B1950 eq=1950) : | 16 20 31.16 -26 24 37.2 ( |
| **Gal** coord. (ep=J2000) : | 350.9729 +15.9722 ( |
| Radial velocity / Redshift / cz : | V(km/s) 70.4 [0.4] |
| Fluxes (2) : | B 8.13 [~] D ~ |
| | V 7.12 [~] D ~ |



# M 12 -- Globular Cluster



| | |
|---|---|
| Other object types: | *iC () ,GlC (GCl) ,Cl* (C) |
| **ICRS** coord. (ep=J2000) : | 16 47 14.18 -01 56 54.7 ( Optical ) |
| **FK5** coord. (ep=J2000 eq=2000) : | 16 47 14.18 -01 56 54.7 ( Optical ) |
| **FK4** coord. (ep=B1950 eq=1950) : | 16 44 38.29 -01 51 36.4 ( Optical ) |
| **Gal** coord. (ep=J2000) : | 015.7152 +26.3133 ( Optical ) [ 800 |
| Radial velocity / Redshift / cz : | V(km/s) -43.5 [0.6] / z(~) -0.000145<br>1996AJ....112.1487H |
| Fluxes (2) : | B 8.52 [~] D ~<br>V 6.07 [~] D 2012AJ....144..126D |



# Pretty pictures

- Solar twins, 18 Sco

*** 18 Sco** -- Variable Star

| | |
|---|---|
| Other object types: | * (*,BD,CSI,GC,GCRV,GEN#,GJ,HD,HIC,HIP,HR,LPM,N30,PLX,PPM, [B10]) ,**PM*** (Ci,LFT,LHS,LTT,NLTT,PM) ,** (CCDM,IDS,WDS) (CSV,NSV) ,**UV** (TD1) |
| **ICRS** coord. (ep=J2000) : | 16 15 37.26946 -08 22 09.9870 ( Optical ) [ 4.48 2.90 0 |
| **FK5** coord. (ep=J2000 eq=2000) : | 16 15 37.269 -08 22 09.99 ( Optical ) [ 4.48 2.90 0 ] A |
| **FK4** coord. (ep=B1950 eq=1950) : | 16 12 53.98 -08 14 19.0 ( Optical ) [ 25.89 16.75 0 ] A |
| **Gal** coord. (ep=J2000) : | 004.6952 +29.1570 ( Optical ) [ 4.48 2.90 0 ] A 2007A&A. |
| Proper motions *mas/yr* [error ellipse]: | 230.77 -495.53 [0.51 0.33 0] A 2007A&A...474..653V |
| Radial velocity / Redshift / cz : | V(km/s) 11.79 [0.09] / z(~) 0.000039 [0.000000] / cz 11. 2002ApJS..141..503N |
| Parallaxes *mas*: | 71.94 [0.37] A 2007A&A...474..653V |
| Spectral type: | G2Va C 2011ARep...55...31S |
| Fluxes (5) : | B 6.15 [~] C ~<br>V 5.50 [~] C ~<br>J 4.667 [0.260] D 2003yCat.2246....0C<br>H 4.162 [0.178] D 2003yCat.2246....0C<br>K 4.186 [0.292] D 2003yCat.2246....0C |

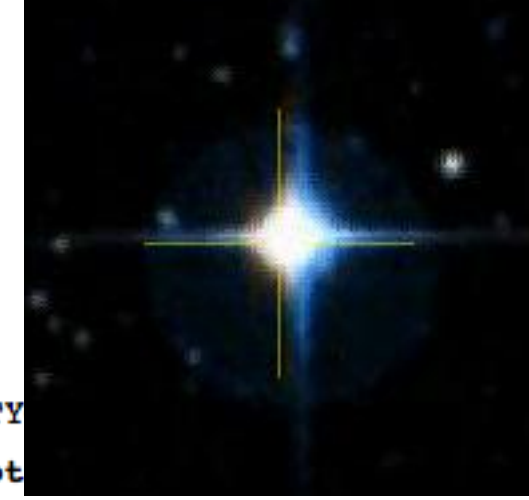
# Pretty pictures

- Solar twins, **HIP 114328**

**HD 218544** -- Star

| | |
|---|---|
| Other object types: | * (HD,CD,CPC,CPD,GSC,HIC,HIP,PPM, |
| **ICRS** coord. (ep=J2000) : | 23 09 16.62076 -40 59 28.3192 ( Optical ) [ 6 |
| **FK5** coord. (ep=J2000 eq=2000) : | 23 09 16.621 -40 59 28.32 ( Optical ) [ 6.94 |
| **FK4** coord. (ep=B1950 eq=1950) : | 23 06 29.19 -41 15 45.0 ( Optical ) [ 40.10 3 |
| **Gal** coord. (ep=J2000) : | 352.9151 -64.8540 ( Optical ) [ 6.94 6.15 0 ] |
| Proper motions *mas/yr* [error ellipse]: | 113.95 0.24 [0.79 0.70 0] A 2007A&A...474..65 |
| Radial velocity / Redshift / cz : | V(km/s) -19.5 [1.6] / z(~) -0.000065 [0.00000 2011A&A...531A...8J |
| Parallaxes *mas*: | 14.39 [0.79] A 2007A&A...474..653V |
| Spectral type: | G3V C 1978MSS...C02....0H |
| Fluxes (2) : | B 9.41 [0.02] D 2000A&A...355L..27H<br>V 8.73 [0.01] D 2000A&A...355L..27H |

# Pretty pictures



- Solar twins, **HIP 102152**

| | |
|---|---|
| Other object types: | * (CD,CPD,GSC,HD,HIC,HIP,PPM,SAO,TY |
| **ICRS** coord. (ep=J2000) : | 20 41 54.63165 -27 12 57.4143 ( Opt |
| **FK5** coord. (ep=J2000 eq=2000) : | 20 41 54.632 -27 12 57.41 ( Optical ) |
| **FK4** coord. (ep=B1950 eq=1950) : | 20 38 53.81 -27 23 42.3 ( Optical ) [ |
| **Gal** coord. (ep=J2000) : | 017.3961 -35.1307 ( Optical ) [ 12.11 |
| Proper motions *mas/yr* [error ellipse]: | 172.91 -15.41 [1.38 0.90 0] A 2007A&A |
| Radial velocity / Redshift / cz : | V(km/s) -43.90 [0.3] / z(~) -0.000146 2006AstL...32..759G |
| Parallaxes *mas*: | 12.84 [0.97] A 2007A&A...474..653V |
| Spectral type: | G3V C ~ |
| Fluxes (5) : | B 9.80 [0.03] D 2000A&A...355L..27H |
| | V 9.15 [0.02] D 2000A&A...355L..27H |

# Pretty pictures

PLANETS

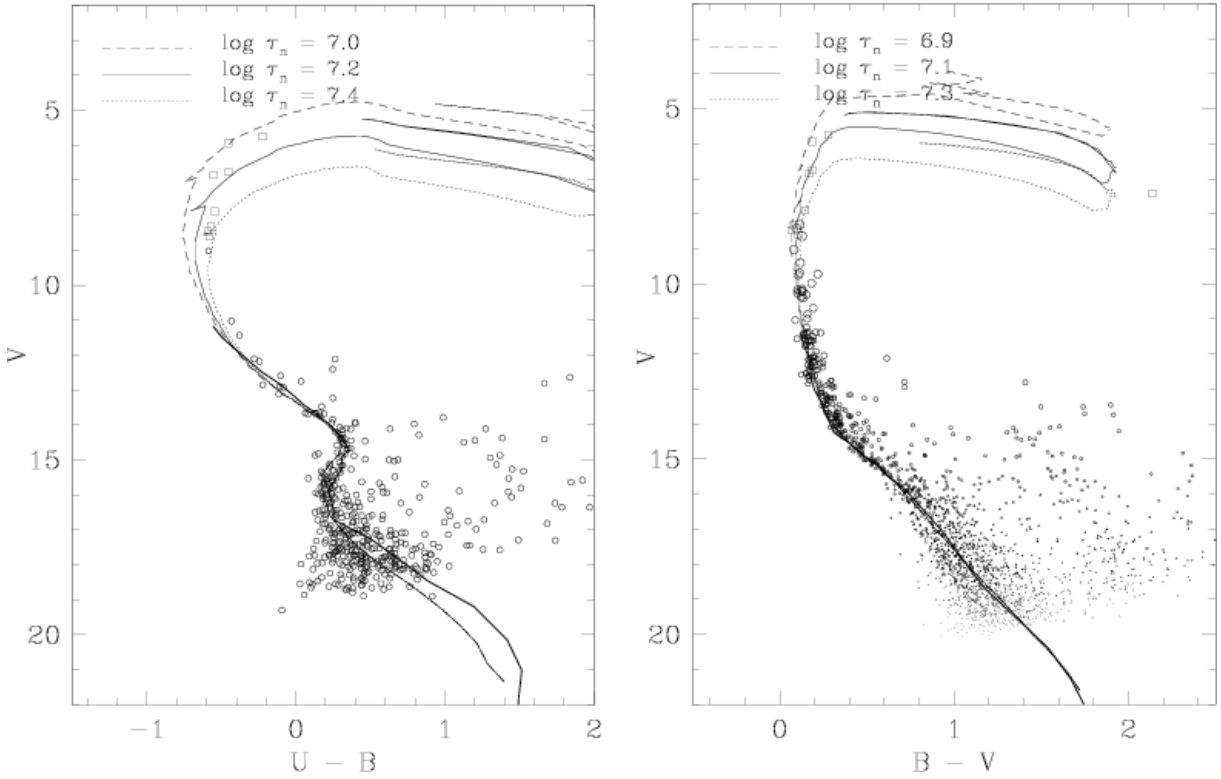
- Jupiter (moons)
- Mars
- Saturn
- M 42 (orion nebula) 05 35 17.3 -05 23 28
- M27 (planetary nebula) 19 59 36.3 +22 43 16

# Jewel Box: imagem + CMD

**NGC 4755** -- Open (galactic) Cluster

| | |
|---|---|
| Other object types: | OpC () ,*iC () ,Cl* (C,Cl |
| **ICRS** coord. (ep=J2000) : | 12 53 39 -60 21.7 ( Optic |
| **FK5** coord. (ep=J2000 eq=2000) : | 12 53 39 -60 21.7 ( Optic |
| **FK4** coord. (ep=B1950 eq=1950) : | 12 50 39 -60 05.4 ( Optic |
| **Gal** coord. (ep=J2000) : | 303.206 +02.509 ( Optical |
| Proper motions *mas/yr* [error ellipse]: | -4.44 -0.67 [0.15 0.13 90 |
| Radial velocity / Redshift / cz : | V(km/s) -12.50 [3.21] / z |

2005A&A...438.1163K



# Padrões fotométricas

THE ASTRONOMICAL JOURNAL, 137:4186–4269, 2009 May doi:10.1088/0004-6256/137/


## *UBVRI* PHOTOMETRIC STANDARD STARS AROUND THE CELES ADDITIONS

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*Received 2008 November 10; accepted 2008 December 24; publis*

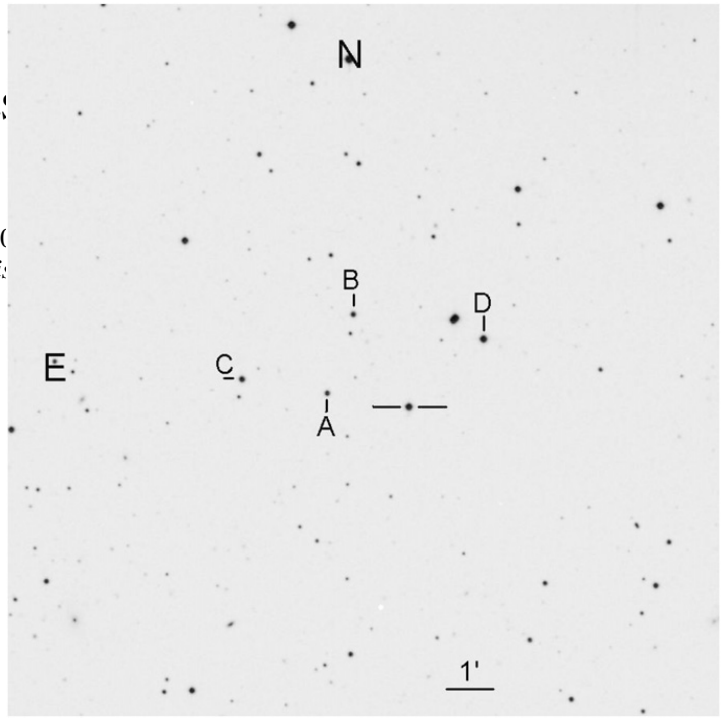


**Figure 46.** Field, 15′ on a side, of the sequence in the vicinity of the star PG0918+029.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| PG0918+029D | 09 21 21.936 | +02 47 28.28 | 12.272 | +1.044 | +0.821 | +0.575 | +0.535 | +1.108 |
| PG0918+029 | 09 21 28.217 | +02 46 02.27 | 13.327 | −0.271 | −1.081 | −0.129 | −0.159 | −0.288 |
| PG0918+029B | 09 21 32.924 | +02 47 59.08 | 13.963 | +0.765 | +0.366 | +0.417 | +0.370 | +0.787 |
| PG0918+029A | 09 21 35.107 | +02 46 19.43 | 14.490 | +0.536 | −0.032 | +0.325 | +0.336 | +0.661 |
| PG0918+029C | 09 21 42.306 | +02 46 37.07 | 13.537 | +0.631 | +0.087 | +0.367 | +0.357 | +0.722 |

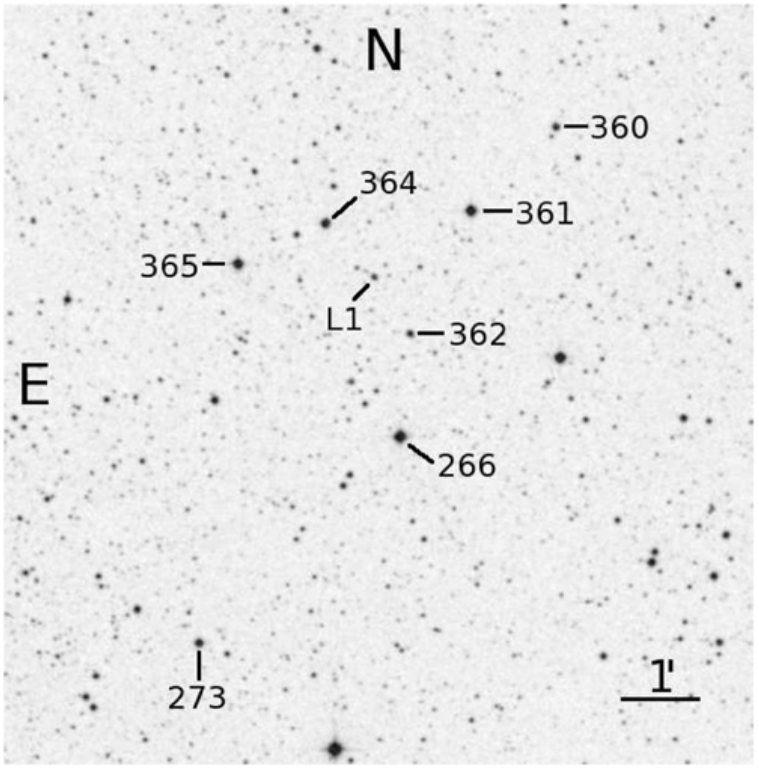


**Figure 103.** Field, 10′ on a side, of SA 110 SF2.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 110 360 | 18 42 40.477 | +00 09 10.71 | 14.618 | +1.197 | +0.539 | +0.715 | +0.717 | +1.432 |
| 110 361 | 18 42 45.010 | +00 08 04.70 | 12.425 | +0.632 | +0.035 | +0.361 | +0.348 | +0.709 |
| 110 362 | 18 42 48.277 | +00 06 27.77 | 15.693 | +1.333 | +3.919 | +0.918 | +0.885 | +1.803 |
| 110 266 | 18 42 48.798 | +00 05 06.44 | 12.018 | +0.889 | +0.411 | +0.538 | +0.577 | +1.111 |
| 110 L1 | 18 42 50.187 | +00 07 12.76 | 16.252 | +1.752 | +2.953 | +1.066 | +0.992 | +2.058 |
| 110 364 | 18 42 52.785 | +00 07 54.89 | 13.615 | +1.133 | +1.095 | +0.697 | +0.585 | +1.281 |
| 110 157 | 18 42 56.472 | −00 08 58.45 | 13.491 | +2.123 | +1.679 | +1.257 | +1.139 | +2.395 |
| 110 365 | 18 42 57.444 | +00 07 23.12 | 13.470 | +2.261 | +1.895 | +1.360 | +1.270 | +2.631 |
| 110 496 | 18 42 59.294 | +00 31 09.13 | 13.004 | +1.040 | +0.737 | +0.607 | +0.681 | +1.287 |
| 110 273 | 18 42 59.542 | +00 02 23.92 | 14.686 | +2.527 | +1.000 | +1.509 | +1.345 | +2.856 |

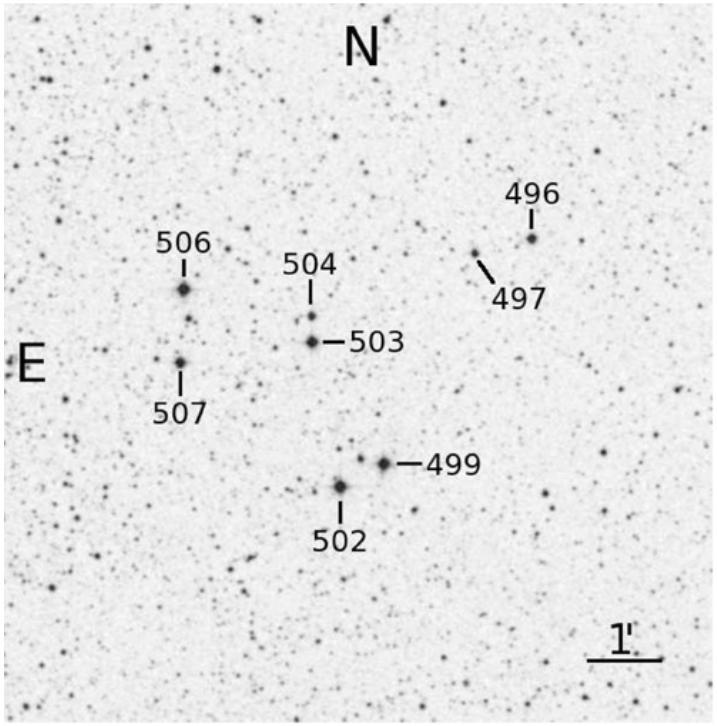


**Figure 104.** Field, 10′ on a side, of SA 110 SF3.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 110 496 | 18 42 59.294 | +00 31 09.13 | 13.004 | +1.040 | +0.737 | +0.607 | +0.681 | +1.287 |
| 110 273 | 18 42 59.542 | +00 02 23.92 | 14.686 | +2.527 | +1.000 | +1.509 | +1.345 | +2.856 |
| 110 497 | 18 43 02.506 | +00 30 56.79 | 14.196 | +1.052 | +0.380 | +0.606 | +0.597 | +1.203 |
| 110 280 | 18 43 06.960 | −00 03 41.52 | 12.996 | +2.151 | +2.133 | +1.235 | +1.148 | +2.384 |
| 110 499 | 18 43 07.663 | +00 28 01.47 | 11.737 | +0.987 | +0.639 | +0.600 | +0.674 | +1.273 |
| 110 502 | 18 43 10.111 | +00 27 42.37 | 12.330 | +2.326 | +2.326 | +1.373 | +1.250 | +2.625 |
| 110 503 | 18 43 11.696 | +00 29 42.95 | 11.773 | +0.671 | +0.506 | +0.373 | +0.436 | +0.808 |
| 110 504 | 18 43 11.712 | +00 30 04.57 | 14.022 | +1.248 | +1.323 | +0.797 | +0.683 | +1.482 |
| 110 506 | 18 43 18.927 | +00 30 27.14 | 11.312 | +0.568 | +0.059 | +0.335 | +0.312 | +0.652 |
| 110 507 | 18 43 19.126 | +00 29 26.00 | 12.440 | +1.141 | +0.830 | +0.633 | +0.579 | +1.206 |

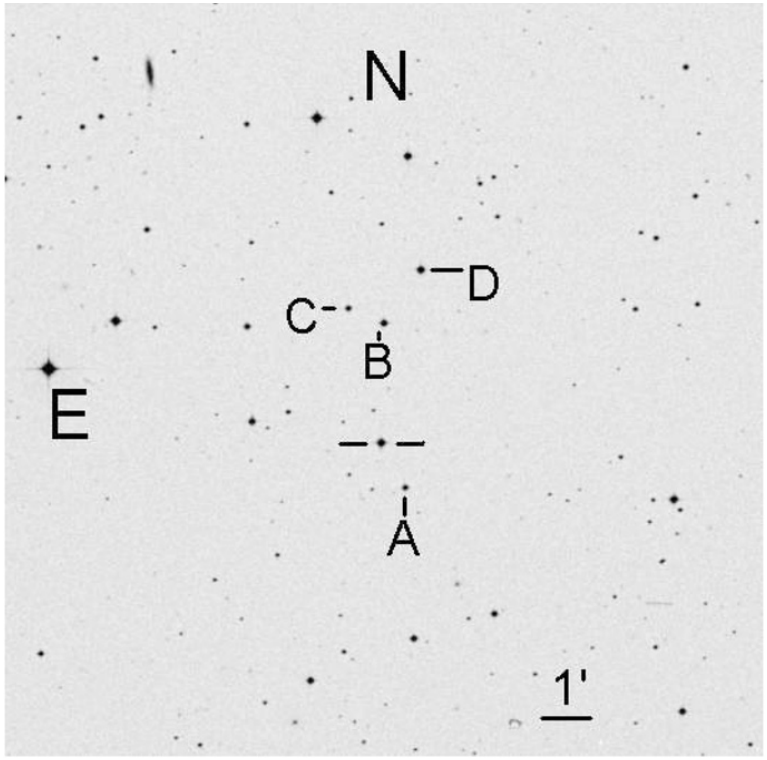


**Figure 47.** Field, 15′ on a side, of the sequence in the vicinity of the star PG0942−029.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| PG0942−029D | 09 45 08.637 | −03 05 54.45 | 13.683 | +0.576 | +0.064 | +0.341 | +0.329 | +0.668 |
| PG0942−029A | 09 45 09.90 | −03 10 14.2 | 14.738 | +0.888 | +0.552 | +0.563 | +0.474 | +1.035 |
| PG0942−029B | 09 45 11.574 | −03 06 58.11 | 14.105 | +0.573 | +0.014 | +0.353 | +0.341 | +0.693 |
| PG0942−029 | 09 45 11.85 | −03 09 21.0 | 14.012 | −0.298 | −1.177 | −0.132 | −0.165 | −0.296 |
| PG0942−029C | 09 45 14.386 | −03 06 40.28 | 14.950 | +0.803 | +0.338 | +0.488 | +0.395 | +0.884 |

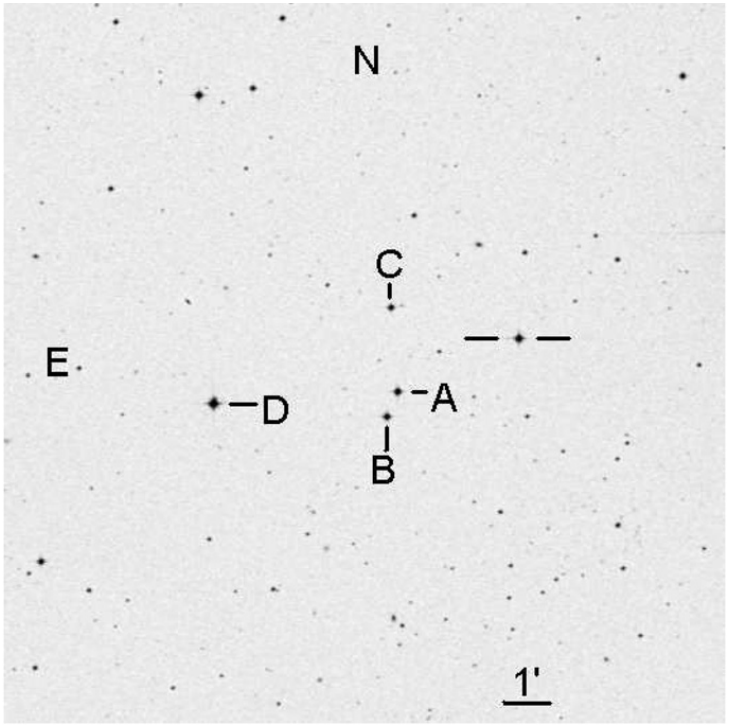


**Figure 75.** Field, 15′ on a side, of the sequence in the vicinity of the star PG1323−086.

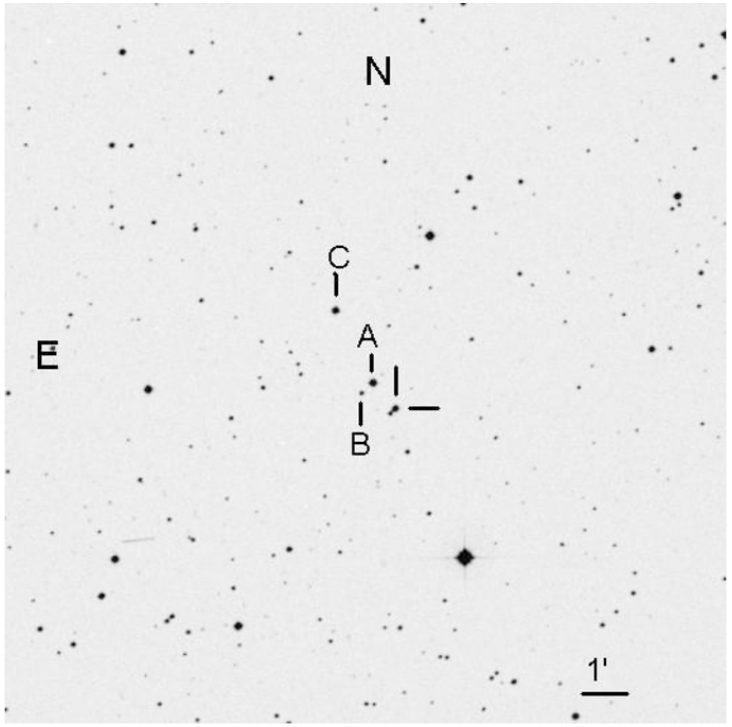


**Figure 77.** Field, 15′ on a side, of the sequence in the vicinity of the star PG1525−071.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| PG1323−086 | 13 25 39.468 | −08 49 19.12 | 13.481 | −0.140 | −0.681 | −0.048 | −0.078 | −0.127 |
| PG1323−086A | 13 25 49.722 | −08 50 23.53 | 13.591 | +0.393 | −0.019 | +0.252 | +0.252 | +0.506 |
| PG1323−086C | 13 25 50.222 | −08 48 38.94 | 14.003 | +0.707 | +0.245 | +0.395 | +0.363 | +0.759 |
| PG1323−086B | 13 25 50.651 | −08 50 55.10 | 13.406 | +0.761 | +0.265 | +0.426 | +0.407 | +0.833 |
| PG1323−086D | 13 26 05.252 | −08 50 36.19 | 12.080 | +0.587 | +0.005 | +0.346 | +0.335 | +0.684 |
| PG1525−071 | 15 28 11.57 | −07 16 32.7 | 15.046 | −0.211 | −1.177 | −0.068 | +0.012 | −0.151 |
| PG1525−071D | 15 28 12.00 | −07 16 39.1 | 16.300 | +0.393 | +0.224 | +0.405 | +0.343 | +0.756 |
| PG1525−071A | 15 28 13.416 | −07 16 01.03 | 13.506 | +0.773 | +0.282 | +0.437 | +0.421 | +0.862 |
| PG1525−071B | 15 28 14.39 | −07 16 13.2 | 16.392 | +0.729 | +0.141 | +0.450 | +0.387 | +0.906 |
| PG1525−071C | 15 28 16.502 | −07 14 30.36 | 13.519 | +1.116 | +1.073 | +0.593 | +0.509 | +1.096 |

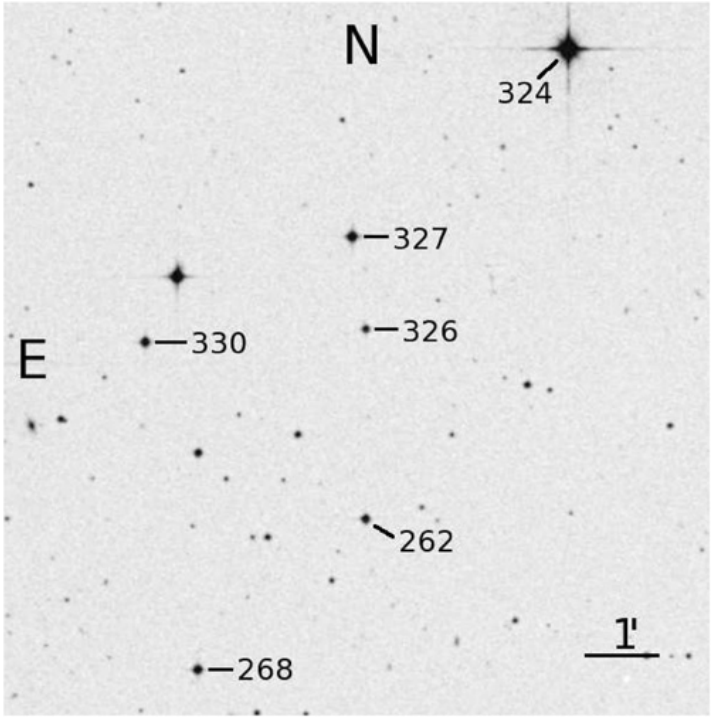


**Figure 52.** Field, 10′ on a side, of SA 101 SF2.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 101 324 | 09 55 56.650 | −00 23 15.10 | 9.737 | +1.161 | +1.145 | +0.591 | +0.519 | +1.109 |
| 101 408 | 09 56 08.001 | −00 12 41.28 | 14.785 | +1.200 | +1.347 | +0.718 | +0.603 | +1.321 |
| 101 262 | 09 56 08.096 | −00 29 50.50 | 14.295 | +0.784 | +0.297 | +0.440 | +0.387 | +0.827 |
| 101 326 | 09 56 08.101 | −00 27 10.94 | 14.923 | +0.729 | +0.227 | +0.406 | +0.375 | +0.780 |
| 101 327 | 09 56 08.86 | −00 25 53.5 | 13.441 | +1.155 | +1.139 | +0.717 | +0.574 | +1.290 |
| 101 410 | 09 56 09.136 | −00 14 02.23 | 13.646 | +0.546 | −0.063 | +0.298 | +0.326 | +0.623 |
| 101 413 | 09 56 14.009 | −00 11 54.86 | 12.583 | +0.983 | +0.716 | +0.529 | +0.497 | +1.025 |
| 101 268 | 09 56 17.377 | −00 31 57.05 | 14.380 | +1.531 | +1.381 | +1.040 | +1.200 | +2.237 |
| 101 330 | 09 56 20.587 | −00 27 22.12 | 13.723 | +0.577 | −0.026 | +0.346 | +0.338 | +0.684 |

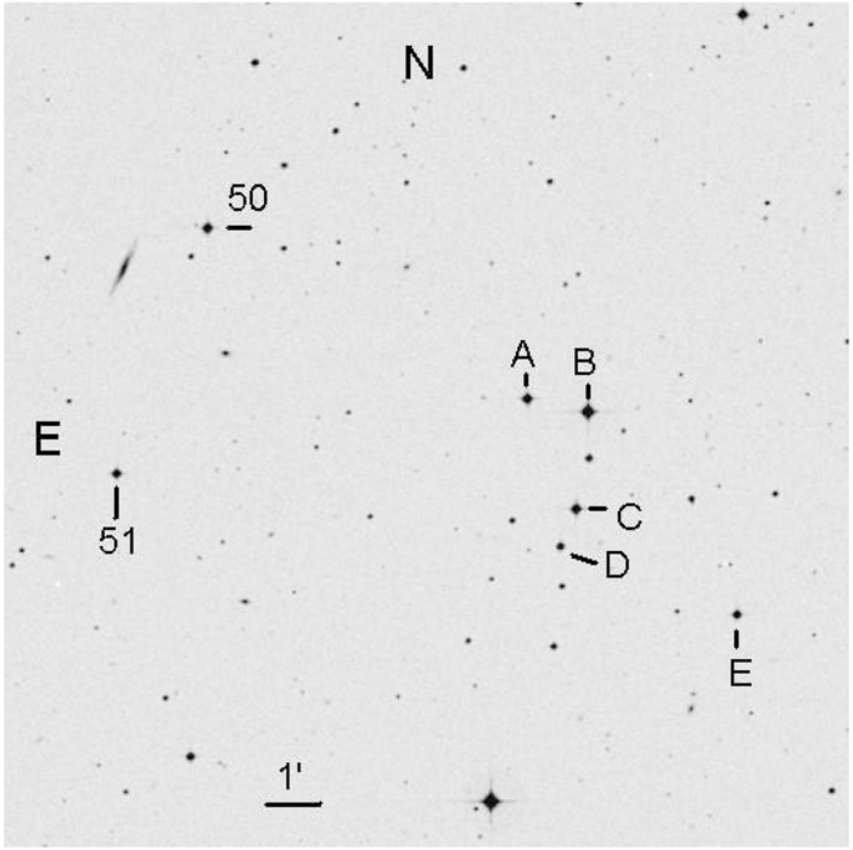


**Figure 61.** Field, 15′ on a side, of the sequence in the vicinity of the stars G 163-50 and G 163-51.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| G163 51E | 11 07 22.332 | −05 16 13.86 | 14.466 | +0.611 | +0.095 | +0.381 | +0.344 | +0.725 |
| G163 51B | 11 07 32.846 | −05 12 37.29 | 11.292 | +0.623 | +0.119 | +0.355 | +0.336 | +0.692 |
| G163 51C | 11 07 33.782 | −05 14 20.26 | 12.672 | +0.431 | −0.009 | +0.267 | +0.272 | +0.540 |
| G163 51D | 11 07 34.915 | −05 15 00.50 | 13.862 | +0.844 | +0.202 | +0.478 | +0.466 | +0.945 |
| G163 51A | 11 07 37.196 | −05 12 23.31 | 12.504 | +0.666 | +0.060 | +0.382 | +0.371 | +0.753 |
| G163 50 | 11 07 59.950 | −05 09 26.10 | 13.057 | +0.036 | −0.696 | −0.084 | −0.072 | −0.158 |
| G163 51 | 11 08 06.539 | −05 13 47.19 | 12.559 | +1.499 | +1.195 | +1.080 | +1.355 | +2.434 |

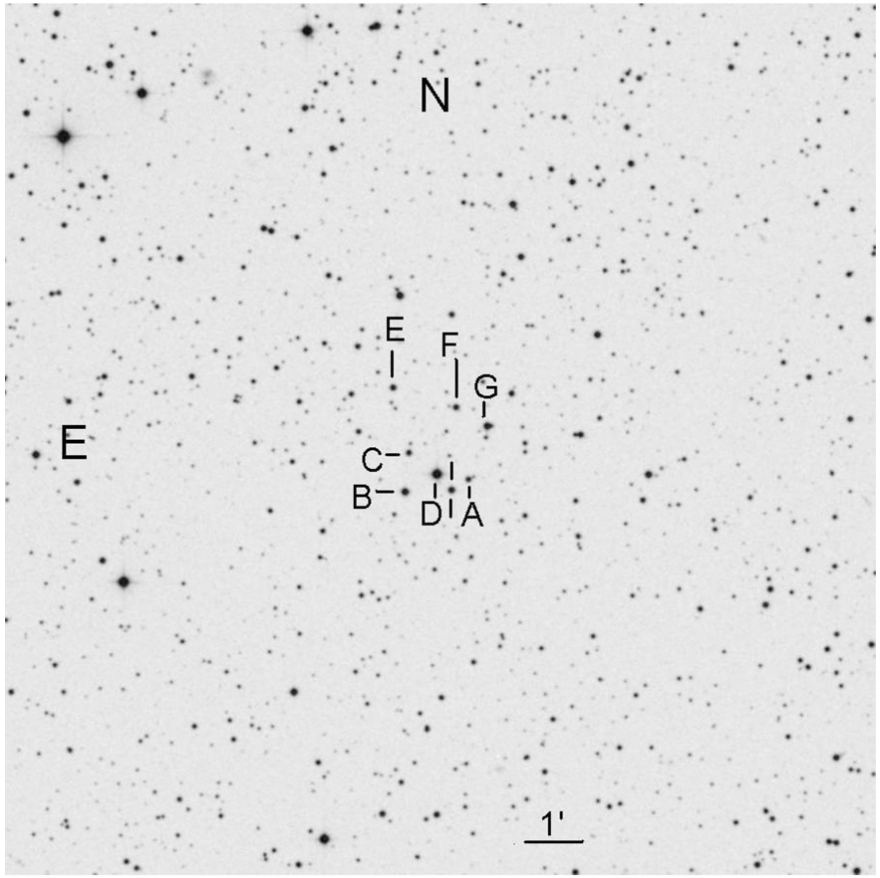


**Figure 39.** Field, 15′ on a side, of the sequence in the vicinity of the star Rubin 149.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Ru 149G | 07 24 11.928 | −00 31 58.11 | 12.829 | +0.541 | +0.033 | +0.322 | +0.322 | +0.645 |
| Ru 149A | 07 24 13.216 | −00 32 53.11 | 14.495 | +0.298 | +0.118 | +0.196 | +0.196 | +0.391 |
| Ru 149F | 07 24 14.077 | −00 31 38.69 | 13.471 | +1.115 | +1.025 | +0.594 | +0.538 | +1.132 |
| Ru 149 | 07 24 14.372 | −00 33 04.17 | 13.866 | −0.129 | −0.779 | −0.040 | −0.068 | −0.108 |
| Ru 149D | 07 24 15.378 | −00 32 47.84 | 11.480 | −0.037 | −0.287 | +0.021 | +0.008 | +0.029 |
| Ru 149C | 07 24 17.312 | −00 32 25.78 | 14.425 | +0.195 | +0.141 | +0.093 | +0.127 | +0.222 |
| Ru 149B | 07 24 17.572 | −00 33 06.18 | 12.642 | +0.662 | +0.151 | +0.374 | +0.354 | +0.728 |
| Ru 149E | 07 24 18.409 | −00 31 18.58 | 13.718 | +0.522 | −0.007 | +0.321 | +0.314 | +0.637 |

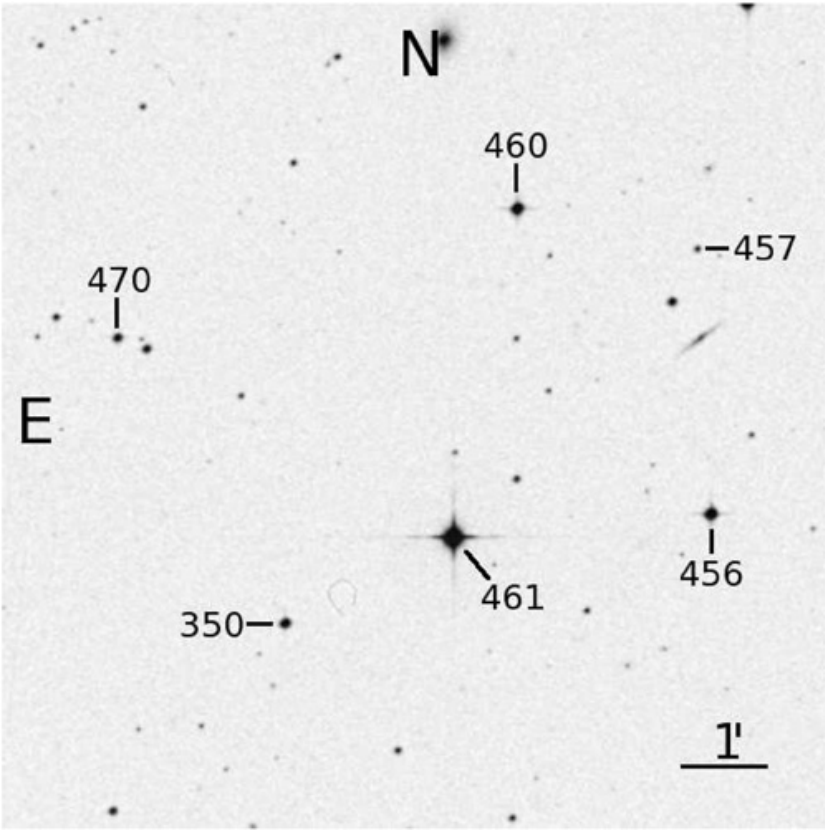


**Figure 73.** Field, 10′ on a side, of SA 104 SF1.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 104 456 | 12 42 53.505 | −00 32 00.91 | 12.362 | +0.622 | +0.135 | +0.357 | +0.337 | +0.694 |
| 104 457 | 12 42 54.195 | −00 28 48.68 | 16.048 | +0.753 | +0.522 | +0.484 | +0.490 | +0.974 |
| 104 460 | 12 43 02.86 | −00 28 19.0 | 12.895 | +1.281 | +1.246 | +0.813 | +0.695 | +1.511 |
| 104 461 | 12 43 06.031 | −00 32 18.01 | 9.705 | +0.476 | −0.035 | +0.288 | +0.289 | +0.579 |
| 104 350 | 12 43 14.204 | −00 33 20.54 | 13.634 | +0.673 | +0.165 | +0.383 | +0.353 | +0.736 |
| 104 470 | 12 43 22.314 | −00 29 52.83 | 14.310 | +0.732 | +0.101 | +0.295 | +0.356 | +0.649 |

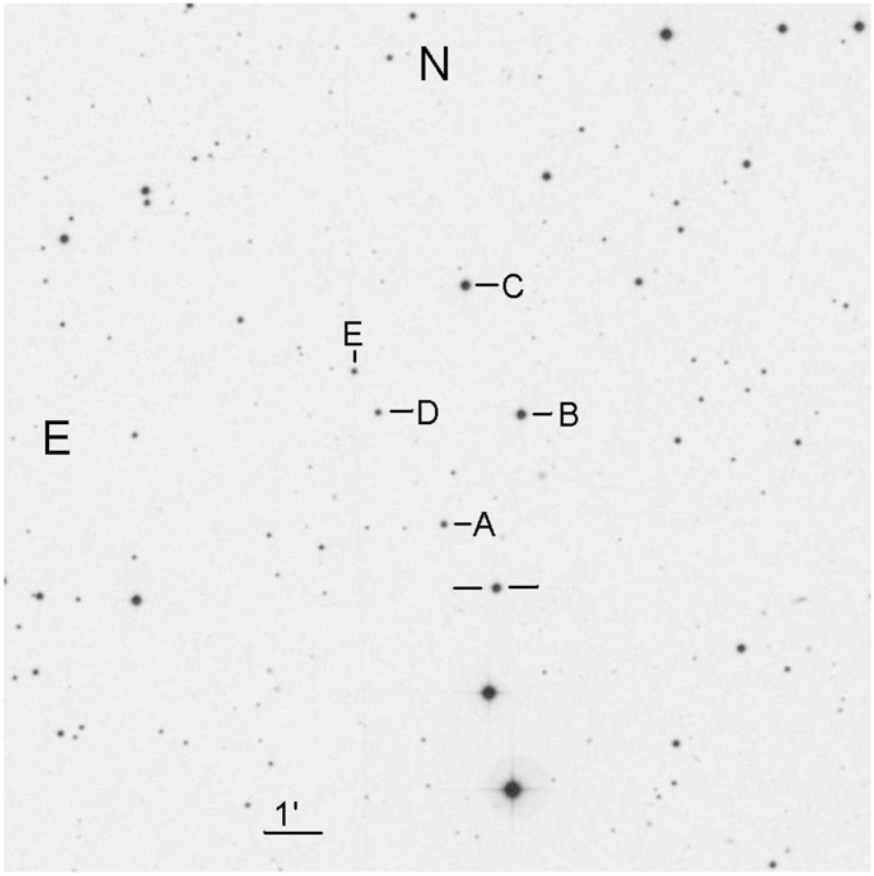


**Figure 76.** Field, 15′ on a side, of the sequence in the vicinity of the star PG1407−013.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| PG1407−013B | 14 10 24.181 | −01 27 16.52 | 12.471 | +0.970 | +0.665 | +0.537 | +0.505 | +1.037 |
| PG1407−013 | 14 10 25.915 | −01 30 16.61 | 13.758 | −0.259 | −1.133 | −0.119 | −0.151 | −0.272 |
| PG1407−013C | 14 10 28.013 | −01 25 03.05 | 12.462 | +0.805 | +0.298 | +0.464 | +0.448 | +0.914 |
| PG1407−013A | 14 10 29.547 | −01 29 10.18 | 14.661 | +1.151 | +1.049 | +0.617 | +0.569 | +1.178 |
| PG1407−013D | 14 10 34.083 | −01 27 14.00 | 14.872 | +0.891 | +0.420 | +0.496 | +0.472 | +0.967 |
| PG1407−013E | 14 10 35.721 | −01 26 31.42 | 15.182 | +0.883 | +0.600 | +0.496 | +0.417 | +0.915 |

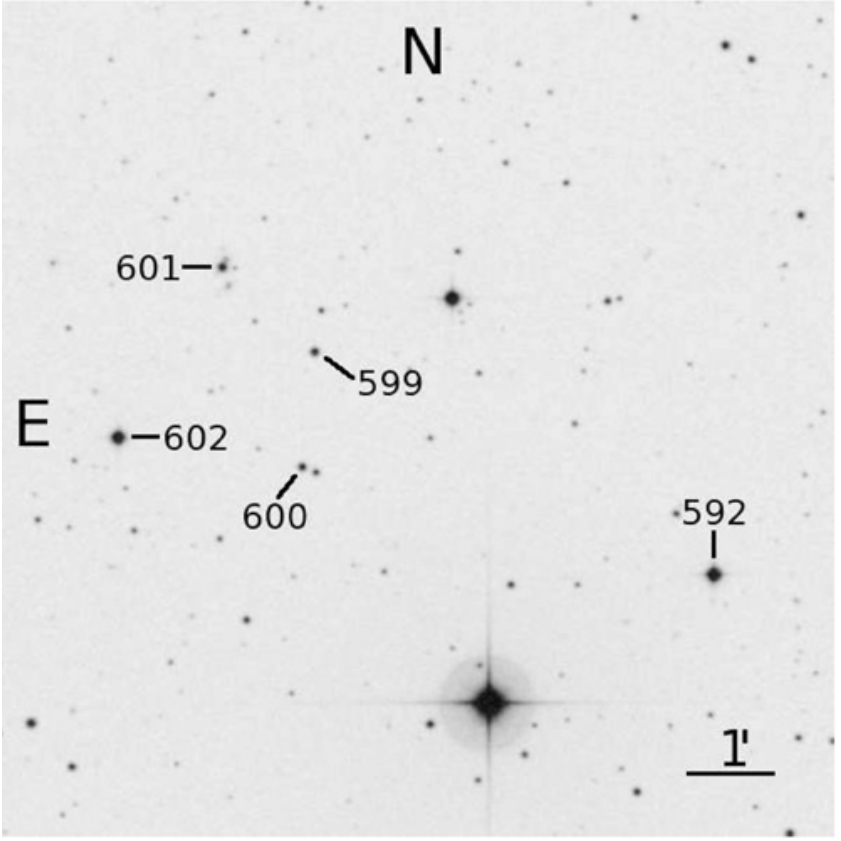


**Figure 86.** Field, 10′ on a side, of SA 107 SF2.

| Star | $\alpha$ (J2000.0) | $\delta$ (J2000.0) | $V$ | $B-V$ | $U-B$ | $V-R$ | $R-I$ | $V-I$ |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 107 599 | 15 39 09.457 | −00 14 28.74 | 14.675 | +0.698 | +0.243 | +0.433 | +0.438 | +0.869 |
| 107 600 | 15 39 10.065 | −00 15 51.15 | 14.884 | +0.503 | +0.049 | +0.339 | +0.361 | +0.700 |
| 107 601 | 15 39 13.88 | −00 13 28.0 | 14.646 | +1.412 | +1.265 | +0.923 | +0.835 | +1.761 |
| 107 602 | 15 39 18.878 | −00 15 29.94 | 12.116 | +0.991 | +0.585 | +0.545 | +0.531 | +1.074 |
| 107 592 | 15 38 50.382 | −00 17 09.17 | 11.847 | +1.318 | +1.380 | +0.709 | +0.647 | +1.357 |

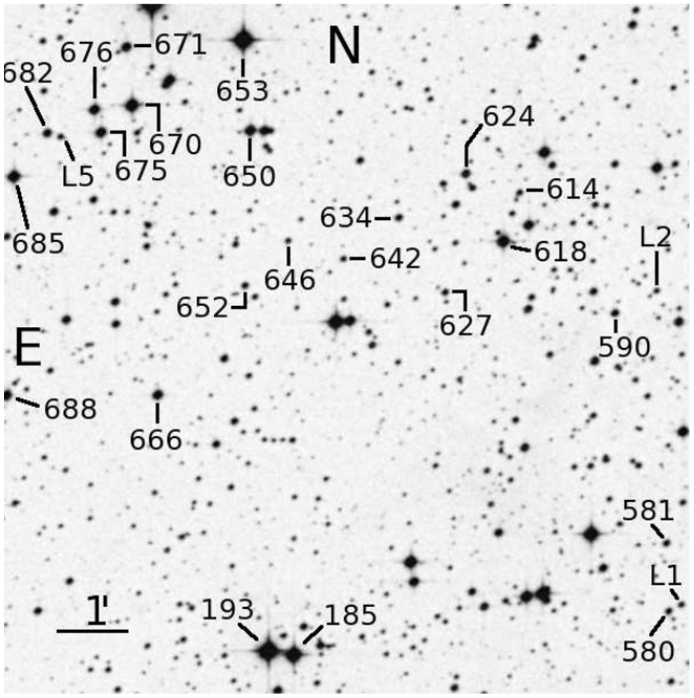


**Figure 37.** Field, 10′ on a side, of SA 98 SF1.

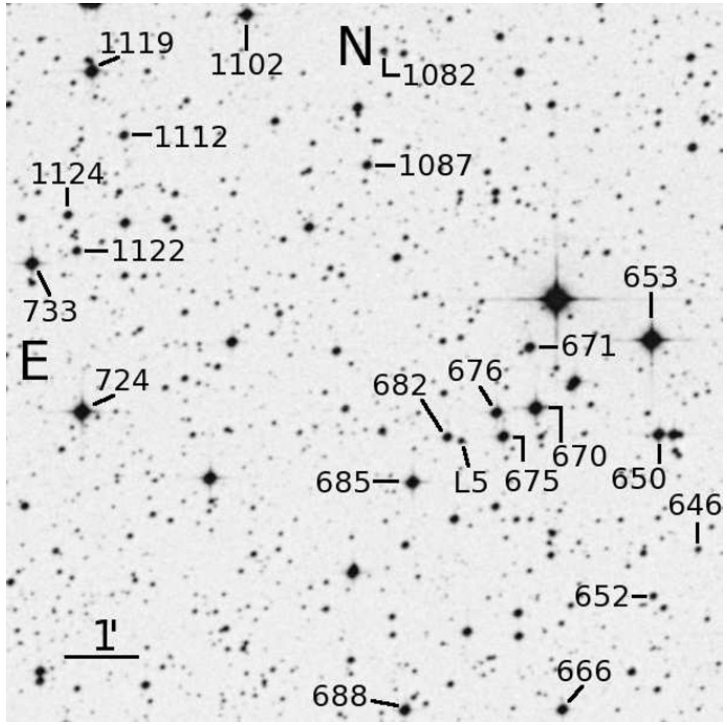


**Figure 38.** Field, 10′ on a side, of SA 98 SF2.

| Star | α (J2000.0) | δ (J2000.0) | V | B−V | U−B | V−R | R−I | V−I |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 98 961 | 06 51 26.994 | −00 15 36.06 | 13.089 | +1.283 | +1.003 | +0.701 | +0.662 | +1.362 |
| 98 966 | 06 51 28.304 | −00 16 25.44 | 14.001 | +0.469 | +0.357 | +0.283 | +0.331 | +0.613 |
| 98 557 | 06 51 29.506 | −00 25 06.29 | 14.780 | +1.397 | +1.072 | +0.755 | +0.741 | +1.494 |
| 98 556 | 06 51 29.537 | −00 24 50.78 | 14.137 | +0.338 | +0.126 | +0.196 | +0.243 | +0.437 |
| 98 562 | 06 51 30.674 | −00 18 58.70 | 12.185 | +0.522 | −0.002 | +0.305 | +0.303 | +0.607 |
| 98 563 | 06 51 31.543 | −00 26 25.60 | 14.162 | +0.416 | −0.190 | +0.294 | +0.317 | +0.610 |
| 98 978 | 06 51 33.730 | −00 11 31.53 | 10.574 | +0.609 | +0.094 | +0.348 | +0.321 | +0.669 |
| 98 L1 | 06 51 39.022 | −00 26 36.28 | 15.672 | +1.243 | +0.776 | +0.730 | +0.712 | +1.445 |
| 98 580 | 06 51 39.76 | −00 26 41.9 | 14.728 | +0.367 | +0.303 | +0.241 | +0.305 | +0.547 |
| 98 581 | 06 51 39.901 | −00 25 41.86 | 14.556 | +0.238 | +0.161 | +0.118 | +0.244 | +0.361 |
| 98 L2 | 06 51 40.52 | −00 21 59.0 | 15.859 | +1.340 | +1.497 | +0.754 | +0.572 | +1.327 |
| 98 L3 | 06 51 42.24 | −00 15 55.3 | 14.614 | +1.936 | +1.837 | +1.091 | +1.047 | +2.142 |
| 98 L4 | 06 51 42.25 | −00 16 21.3 | 16.332 | +1.344 | +1.086 | +0.936 | +0.785 | +1.726 |
| 98 590 | 06 51 42.973 | −00 22 18.91 | 14.642 | +1.352 | +0.853 | +0.753 | +0.747 | +1.500 |
| 98 1002 | 06 51 43.094 | −00 15 52.20 | 14.568 | +0.574 | −0.027 | +0.354 | +0.379 | +0.733 |
| 98 614 | 06 51 48.634 | −00 20 32.52 | 15.674 | +1.063 | +0.399 | +0.834 | +0.645 | +1.480 |
| 98 618 | 06 51 49.579 | −00 21 15.75 | 12.723 | +2.192 | +2.144 | +1.254 | +1.151 | +2.407 |
| 98 624 | 06 51 51.798 | −00 20 16.03 | 13.811 | +0.791 | +0.394 | +0.417 | +0.404 | +0.822 |
| 98 626 | 06 51 52.394 | −00 20 43.28 | 14.758 | +1.406 | +1.067 | +0.806 | +0.816 | +1.624 |
| 98 627 | 06 51 53.01 | −00 22 01.0 | 14.900 | +0.689 | +0.078 | +0.428 | +0.387 | +0.817 |
| 98 634 | 06 51 55.741 | −00 20 55.11 | 14.608 | +0.647 | +0.123 | +0.382 | +0.372 | +0.757 |

| Star | α (J2000.0) | δ (J2000.0) | V | B−V | U−B | V−R | R−I | V−I |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 98 642 | 06 51 59.018 | −00 21 31.71 | 15.290 | +0.571 | +0.318 | +0.302 | +0.393 | +0.697 |
| 98 185 | 06 52 01.886 | −00 27 21.57 | 10.537 | +0.202 | +0.114 | +0.110 | +0.122 | +0.231 |
| 98 646 | 06 52 02.281 | −00 21 15.97 | 15.839 | +1.060 | +1.426 | +0.583 | +0.504 | +1.090 |
| 98 193 | 06 52 03.381 | −00 27 18.41 | 10.026 | +1.176 | +1.152 | +0.614 | +0.536 | +1.151 |
| 98 650 | 06 52 04.528 | −00 19 38.29 | 12.271 | +0.157 | +0.110 | +0.080 | +0.086 | +0.166 |
| 98 652 | 06 52 04.815 | −00 21 55.63 | 14.817 | +0.611 | +0.126 | +0.276 | +0.339 | +0.618 |
| 98 653 | 06 52 04.954 | −00 18 18.26 | 9.538 | −0.003 | −0.102 | +0.010 | +0.009 | +0.017 |
| 98 666 | 06 52 09.945 | −00 23 32.01 | 12.732 | +0.164 | −0.004 | +0.091 | +0.108 | +0.200 |
| 98 670 | 06 52 11.514 | −00 19 16.37 | 11.930 | +1.357 | +1.325 | +0.727 | +0.654 | +1.381 |
| 98 671 | 06 52 11.830 | −00 18 25.30 | 13.385 | +0.968 | +0.719 | +0.575 | +0.494 | +1.071 |
| 98 675 | 06 52 13.341 | −00 19 40.36 | 13.398 | +1.909 | +1.936 | +1.082 | +1.002 | +2.085 |
| 98 676 | 06 52 13.728 | −00 19 20.15 | 13.068 | +1.146 | +0.666 | +0.683 | +0.673 | +1.352 |
| 98 L5 | 06 52 15.73 | −00 19 44.4 | 17.800 | +1.900 | −0.100 | +3.100 | +2.600 | +5.800 |
| 98 682 | 06 52 16.504 | −00 19 40.97 | 13.749 | +0.632 | +0.098 | +0.366 | +0.352 | +0.717 |
| 98 685 | 06 52 18.468 | −00 20 19.51 | 11.954 | +0.463 | +0.096 | +0.290 | +0.280 | +0.570 |
| 98 688 | 06 52 18.874 | −00 23 32.82 | 12.754 | +0.293 | +0.245 | +0.158 | +0.180 | +0.337 |
| 98 1082 | 06 52 20.184 | −00 14 13.63 | 15.010 | +0.835 | −0.001 | +0.485 | +0.619 | +1.102 |
| 98 1087 | 06 52 21.099 | −00 15 50.42 | 14.439 | +1.595 | +1.284 | +0.928 | +0.882 | +1.812 |
| 98 1102 | 06 52 27.949 | −00 13 43.08 | 12.113 | +0.314 | +0.089 | +0.193 | +0.195 | +0.388 |
| 98 1112 | 06 52 34.895 | −00 15 25.84 | 13.975 | +0.814 | +0.286 | +0.443 | +0.431 | +0.874 |
| 98 1119 | 06 52 36.710 | −00 14 31.61 | 11.878 | +0.551 | +0.069 | +0.312 | +0.299 | +0.611 |
| 98 724 | 06 52 37.225 | −00 19 20.39 | 11.118 | +1.104 | +0.904 | +0.575 | +0.527 | +1.103 |
| 98 1122 | 06 52 37.558 | −00 17 03.70 | 14.090 | +0.595 | −0.297 | +0.376 | +0.442 | +0.816 |
| 98 1124 | 06 52 38.050 | −00 16 33.43 | 13.707 | +0.315 | +0.258 | +0.173 | +0.201 | +0.373 |
| 98 733 | 06 52 40.073 | −00 17 14.67 | 12.238 | +1.285 | +1.087 | +0.698 | +0.650 | +1.347 |

# Formato do OPD

| Nome | AR | DEC | MAG | Movimento próprio AR | Movimento próprio DEC |
|---|---|---|---|---|---|
| HR9077 | 00 00 19.2 | -44 17 26 | 6.29 | 0.08 | -0.111 |
| HR9078 | 00 00 23.9 | +26 55 06 | 6.46 | 0.044 | -0.052 |
| HR9079 | 00 00 30.9 | +59 33 35 | 6.19 | -0.077 | -0.024 |
| HR9080 | 00 00 43.[illegible] | [illegible]5 15 12 | 6.38 | 0.027 | 0.005 |
| HR9081 | 00 01 04.5 | -48 48 36 | 5.71 | -0.022 | -0.009 |
| HR9083 | 00 01 19.3 | +49 58 54 | 6.22 | 0.018 | -0.006 |

TAB

Espaço

**Atenção:** todos os catálogos carregados deverão possuir coordenadas J2000.

**HR 9079** -- Star

| | |
|---|---|
| Other object types: | * (HR,AG,BD,CSI,FK5,GC,GCRV, (IRAS,IRCO,2MASS) |
| **ICRS** coord. (ep=J2000) : | 00 00 30.88833 +59 33 34.849 2007A&A...474..653V |
| **FK5** coord. (ep=J2000 eq=2000) : | 00 00 30.888 +59 33 34.85 ( |
| **FK4** coord. (ep=B1950 eq=1950) : | 23 57 58.02 +59 16 54.0 ( Op |
| **Gal** coord. (ep=J2000) : | 116.5145 -02.6761 ( Optical |
| Proper motions *mas/yr* [error ellipse]: | -80.81 -23.64 [0.37 0.28 0] |

-0.081 -0.02364

OPD: proper motion em "/ano:
Dividir por 1000 o valor do SIMBAD!

# Lista de projetos

Andre – Pleiades
Antonia – ER Cha (variavel tipo delta Scuti)
Breno – NGC 4755 (Jewel Box)
Elielson – WASP-43 (exoplanet transit)
Elvis – omega Cen
Fabricio – Saturno
Lucas – Qatar-2 (exoplanet transit)
Paulo – KQ Mon (nova)
Ricardo – SMC (PNM)
Roberto – Sombrero Galaxy ou DT Pyx (nova)
Rodrigo – M42 (Orion Nebula) / M11 (open cluster)