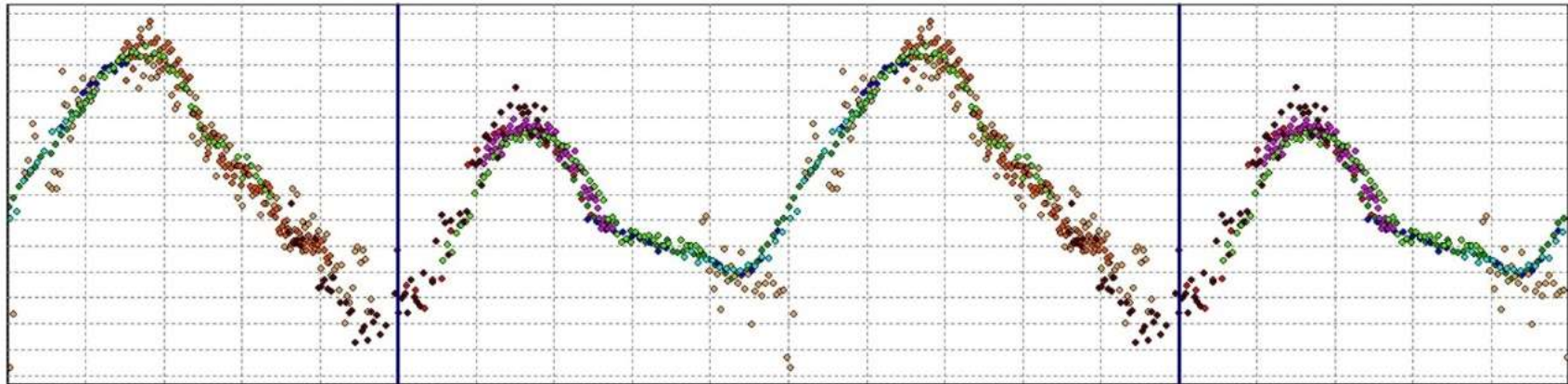# III WORKSHOP GRUPO G.O.R.A

Tanti - Córdoba

14 y 15 de Marzo 2020

3er Encuentro del Grupo de Observadores de Rotaciones de Asteroides (GORA)

Tanti (Provincia de Córdoba) – 13, 14 y 15 de marzo de 2020

Cupo limitado: 20 personas.

Inscripciones por correo electrónico: cacolazo@hotmail.com

Programa:

Viernes 13 - 15:00 a 21:00 - Para aspirantes a incorporarse al GORA.

Equipos necesarios - Técnicas de observación - Rotación en asteroides - Fotometría diferencial - Funcionamiento del GORA.

Sábado 14 - 09:00 a 13:00 – 15:00 a 20:00 - Para todos los inscriptos.

Domingo 15 – 09:00 a 13:00 - Para todos los inscriptos.

Trabajos para publicar – Vinculación de sesiones consecutivas – Reducción de la dispersión – Calibración de imágenes – Periodogramas – Selección de objetivos para 2020 – Nuevas metodologías y recursos a utilizar – Vinculación del GORA con otros grupos.

# III WORKSHOP GORA - Tanti13,14y15/marzo/2020Inscriptos

- Cesar Fornari, (Oro Verde)
Erica Hasenauer, (Oro Verde)
Jonás Alonso, (Oro Verde)
Emanuel Devoto, (Paraná)
Néstor Suarez, (Pilar-Bs.As.)
Ricardo Llanos, (Santiago del Estero)
Nicolás Vasconi, (Villa María)
Carlos Colazo, (Tanti)
Raúl Melia, (Carlos Paz)
Nicolas Melia, (Carlos Paz)
José García, (Cosquín)
Guillermo Amilibia, (Córdob

- Guillermo Ferrero, (Córdoba)
Marcos Anzola, (Córdoba)
Elisa Rodríguez, (Córdoba)
Milagros Colazo, (Córdoba)
Marcos Santucho, (Córdoba)
Matías Martini, (Córdoba)
Luis Rearte, (Córdoba)
Eduardo Pulver, (Rosario) VC
Ariel Stechina, (Reconquista) VC
Andrés Chapman, (BAires) VC
Damián Scotta, (San Carlos Centro) VC
Sergio Babino, (Montevideo) VC

Estrellas Variables

AAVSO

- American Association of Variable Star Observers
- https://www.aavso.org/
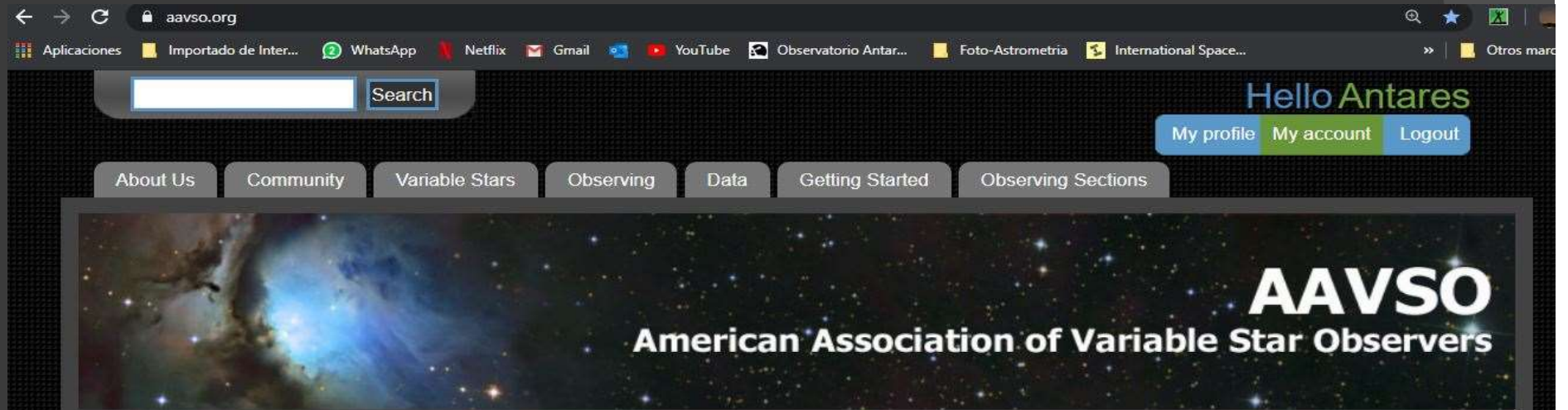
Manual AAVSO Castellano

Alert Notice

Recent Activity

Variable Star Observations in Database:

`4` `0` , `6` `3` `8` , `5` `8` `7` *and Counting ...*

Last Observation Received:

1 min 47 sec ago by PKT - John Pickett (US)

RV HYA   Feb 16.2931   8.846TB

Plot RV HYA light curve

» Alert Notice 701: Nova in Serpens: Nova Ser 2020 = N Ser 2020 = TCP J18104219-1534184   Feb 24

» Alert Notice 700: EE Cep observing campaign 2020-2021   Feb 24

» Alert Notice 699: V386 Ser HST observing schedule revised   Feb 14

» Solar Bulletin - Volume 76, Number 01   Feb 14

» Alert Notice 698: V386 Ser to be observed with HST   Feb 7

▷ **News Archives**

LesvePhotometry

Quick links

Description

LesvePhotometry is based on differential photometry, the more common photometry method used by amateurs. In differential photometry, we compare the amounts of light from the target star (variable star) and comparison stars.

The different steps to measure the magnitude of star from a CCD image are :
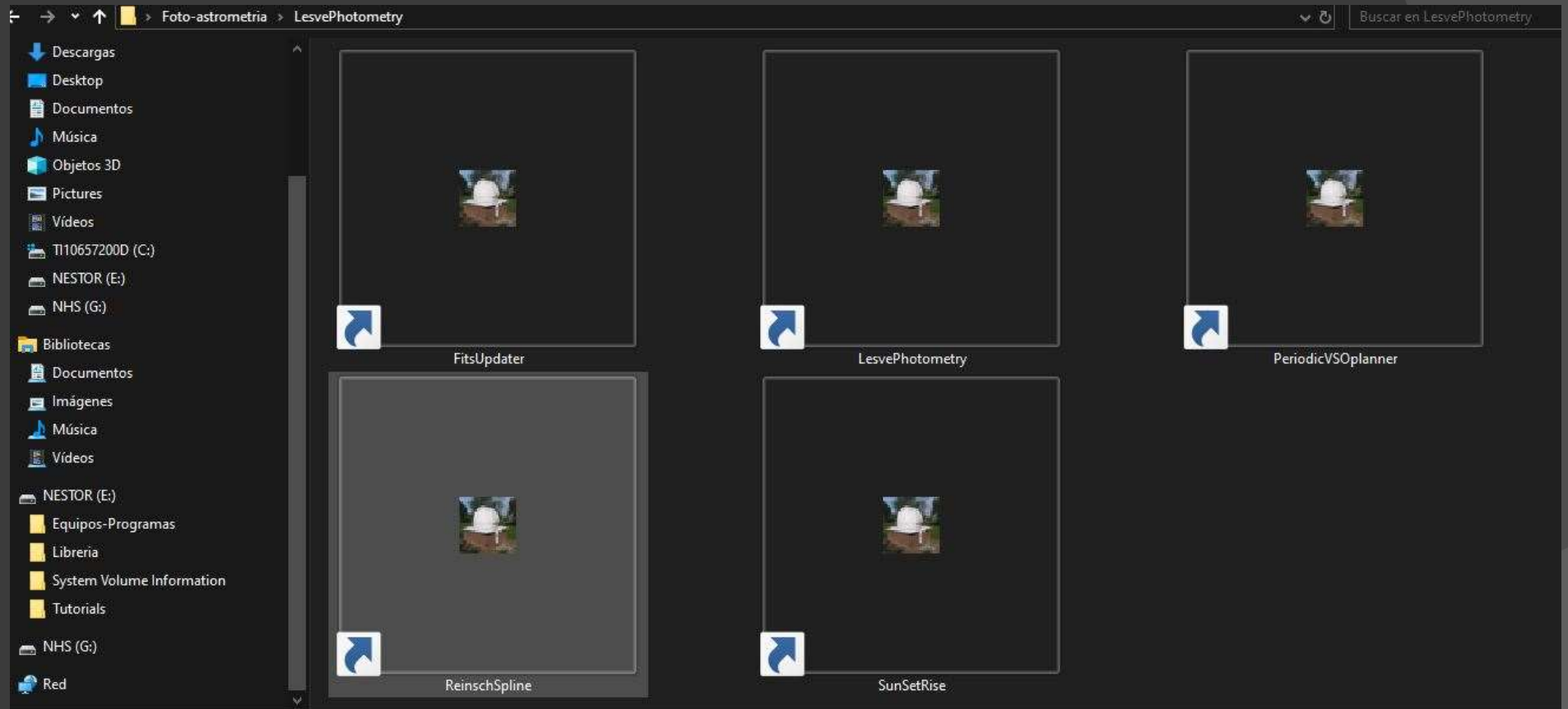
- detection of target and comparison stars on the CCD image

- calculation of the average pixel values in a circular apertures around the star and in annulus (to measure the sky background)

- calculate the magnitude of the target star from
  - the aperture measurements
  - catalog magnitudes of comparison stars

With common photometry programs, the user has to select manually the target and comparison stars (on the first image of a series) enter the catalog magnitudes of comparison stars. He has to repeat these operations each time a new photometry is launched. In LesvePhotometry, following data are provided once by the user and stored in a database:

target star

Programas-Software

- Software Programs for Variable Star Observers
- DPP Observatory
- http://www.dppobservatory.net/AstroPrograms/Software4VSObservers.php
- LesvePhotometry - Download page
- http://www.dppobservatory.net/AstroPrograms/LesvePhotometryDownloadPage.php

Periodic VSO Planner

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	Star	UT Night of ...	ToM JD	ToM Date(UT)	ToM Time(UT)	Star Altitude	Star Azimuth	Star rise UT	Star transit UT	Star set UT	Sun Altitude	Moon Altitude	Moon Dist	Moon Phase	Obs start JD	Obs stop JD	Sta
73	V0406 Vel	Wednesday	2458829,82600	2019-12-12	07:49	70,8	184,4	03:11	07:41	12:11	-9,0	10,7	89,8	1,0	2458829,78433	2458829,86767	6
74	PT Vel	Wednesday	2458829,83085	2019-12-12	07:56	79,3	192,7	03:26	07:45	12:03	-7,9	9,6	84,7	1,0	2458829,78919	2458829,87252	7
75	V0428 Vel	Wednesday	2458829,83160	2019-12-12	07:57	70,2	149,3	04:32	09:02	13:32	-7,7	9,4	98,8	1,0	2458829,78993	2458829,87327	6
76	ET Psc	Thursday	2458830,49776	2019-12-12	23:56	44,4	349,5	23:04	23:26	NaN:NaN	-10,3	3,1	73,6	1,0	2458830,45609	2458830,53943	4
77	KW Eri	Thursday	2458830,52522	2019-12-13	00:36	73,0	152,4	21:05	01:24	05:54	-16,5	9,5	83,5	1,0	2458830,48356	2458830,56689	6
78	CW Scl	Thursday	2458830,53270	2019-12-13	00:47	55,2	258,3	17:50	21:57	02:05	-18,1	11,2	110,1	1,0	2458830,49103	2458830,57437	6
79	V0362 Pup	Thursday	2458830,55721	2019-12-13	01:22	40,2	119,9	01:21	05:40	09:59	-22,7	16,4	67,3	1,0	2458830,51554	2458830,59888	2
80	CT Scl	Thursday	2458830,55918	2019-12-13	01:25	67,0	283,9	19:55	23:45	03:36	-23,1	16,8	86,0	1,0	2458830,51751	2458830,60084	
81	RT CMa	Thursday	2458830,58624	2019-12-13	02:04	51,0	74,9	01:09	04:43	08:17	-27,3	21,8	40,8	1,0	2458830,54457	2458830,62791	
82	CE Scl	Thursday	2458830,59301	2019-12-13	02:13	51,2	250,6	18:54	23:01	03:09	-28,2	23,0	99,9	1,0	2458830,55135	2458830,63468	
83	BD Dor	Thursday	2458830,61189	2019-12-13	02:41	65,2	171,9	22:38	03:08	07:38	-30,3	25,9	84,2	1,0	2458830,57023	2458830,65356	6
84	AU For	Thursday	2458830,62864	2019-12-13	03:05	61,0	260,3	20:43	00:45	04:52	-31,6	28,0	80,4	1,0	2458830,58697	2458830,67031	7
85	TW Cet	Thursday	2458830,63162	2019-12-13	03:09	50,1	278,3	20:45	00:19	04:04	-31,7	28,4	77,8	1,0	2458830,58995	2458830,67328	6
86	YZ Vol	Thursday	2458830,65593	2019-12-13	03:44	50,7	166,2	01:05	05:35	10:05	-32,5	30,7	94,5	1,0	2458830,61426	2458830,69760	4
87	V0605 Pup	Thursday	2458830,65700	2019-12-13	03:46	63,0	124,0	01:38	05:56	10:15	-32,5	30,8	70,7	1,0	2458830,61533	2458830,69867	5
88	R CMa	Thursday	2458830,66821	2019-12-13	04:02	60,1	59,7	02:27	05:49	09:23	-32,4	31,5	42,7	1,0	2458830,62655	2458830,70988	4
89	V0592 Car	Thursday	2458830,67080	2019-12-13	04:05	43,0	153,9	03:33	08:03	12:33	-32,4	31,6	98,3	1,0	2458830,62913	2458830,71247	
90	V0675 Pup	Thursday	2458830,67097	2019-12-13	04:06	62,0	93,8	02:24	06:20	10:28	-32,4	31,6	59,5	1,0	2458830,62930	2458830,71264	
91	V1249 Tau	Thursday	2458830,68187	2019-12-13	04:21	44,9	332,8	01:59	03:06	05:10	-32,0	32,0	28,9	1,0	2458830,64020	2458830,72353	
92	V0397 CMa	Thursday	2458830,68289	2019-12-13	04:23	65,5	52,4	02:11	05:45	09:19	-31,9	32,0	43,6	1,0	2458830,64122	2458830,72456	5
93	V0340 Vel	Thursday	2458830,70267	2019-12-13	04:51	45,1	130,6	04:18	08:48	13:18	-30,6	32,2	91,4	1,0	2458830,66100	2458830,74434	3
94	V0452 Vel	Thursday	2458830,70691	2019-12-13	04:57	64,0	112,2	03:00	07:07	11:26	-30,2	32,1	71,4	1,0	2458830,66525	2458830,74858	5
95	KS Eri	Thursday	2458830,70749	2019-12-13	04:58	58,0	319,9	01:01	03:39	06:50	-30,2	32,1	35,8	1,0	2458830,66582	2458830,74916	
96	V0907 Mon	Thursday	2458830,72566	2019-12-13	05:24	48,2	353,7	04:01	05:09	07:01	-28,2	31,5	17,0	1,0	2458830,68399	2458830,76733	4
97	V0440 Vel	Thursday	2458830,74529	2019-12-13	05:53	49,0	123,4	05:06	09:24	13:54	-25,4	30,1	93,5	1,0	2458830,70363	2458830,78696	3
98	V0833 Car	Thursday	2458830,75389	2019-12-13	06:05	46,8	140,6	05:17	09:47	14:17	-24,0	29,3	102,0	1,0	2458830,71222	2458830,79556	3
99	AE Vol	Thursday	2458830,75906	2019-12-13	06:13	58,0	167,8	02:45	07:15	11:45	-23,1	28,7	92,9	1,0	2458830,71739	2458830,80073	5
100	V0625 Pup	Thursday	2458830,76131	2019-12-13	06:16	82,3	159,5	02:13	06:32	10:50	-22,7	28,5	69,2	1,0	2458830,71965	2458830,80298	7
101	DQ Pyx	Thursday	2458830,76748	2019-12-13	06:25	78,1	103,3	03:16	07:24	11:31	-21,6	27,7	70,0	1,0	2458830,72581	2458830,80915	

Pick a star
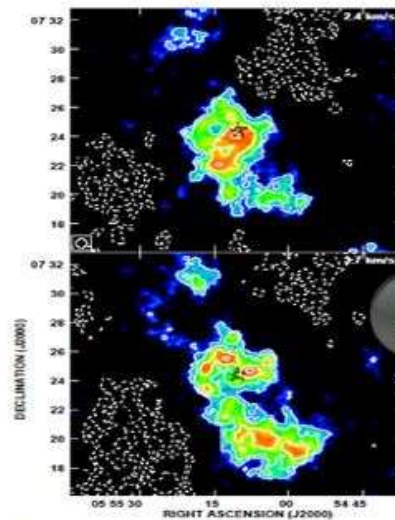
Variable Star Plotter

Field Photometry

Field photometry **for PNV J11261220-6531086** from the AAVSO Variable Star Database

Data includes all comparison stars within 0.5° of RA: **11:26:15.16 [171.56316667°]**& Dec: **-65:31:23.3 [-65.52313889°]**

Report this sequence as **X22665W** in the chart field of your observation report.

AUID	RA	Dec	Label	V	B-V	Comments
000-BMN-395	11:23:39.14 [170.91308594°]	-65:50:03.7 [-65.83435822°]	81	8.149 (0.040) 37	0.114 (0.079)	BINO_COMP
000-BMN-400	11:27:51.09 [171.96287537°]	-65:40:31.6 [-65.67544556°]	100	10.006 (0.032) 37	0.490 (0.074)	
000-BMN-708	11:26:55.51 [171.73129272°]	-65:17:35.1 [-65.29308319°]	107	10.747 (0.019) 29	1.061 (0.078)	
000-BJK-553	11:31:05.74 [172.77391052°]	-65:09:14.8 [-65.15411377°]	110	11.030 (—)[19]	0.680 (—)	VSP_VOLUME_07.TXT NOMAD ID:0248-0232350 11.682T 11.005T 10.560B 0.25
000-BMN-709	11:26:18.73 [171.57804871°]	-65:30:42.4 [-65.51177979°]	113	11.264 (0.019) 29	0.752 (0.043)	
000-BKB-381	11:30:32.19 [172.63412476°]	-65:35:01.3 [-65.58369446°]	113	11.340 (0.006) 29	0.636 (0.012)	

Proceso de SeqPlot

- Cuando no tenemos un ploteo de la zona a capturar podemos usar SeqPlot
- Provisto por AAVSO, nos permite consultar diversos catálogos al mismo tiempo
- Luego presenta una carta (chart) con información de fotometría de las estrellas en ese campo

SeqPlot
Pantalla inicial

SeqPlot:
Búsqueda del objetivo

TT Cet RA: 26.73542 DEC: -9.75272 (15 arcminutes)
Data from the Calibration Database - limiting magnitude 17.0

REFERENCIA COLOR B-V

Amarillo: estrella seleccionada

Verde: B-V entre 0.5mag y 1.1mag

Rojo: B-V mayor a 1.1mag

Azul: B-V <=0.5mag

Usar solo las verdes

Manual: https://www.aavso.org/seqplot

El tamaño del punto es propocional a la magnitud de la estrella.
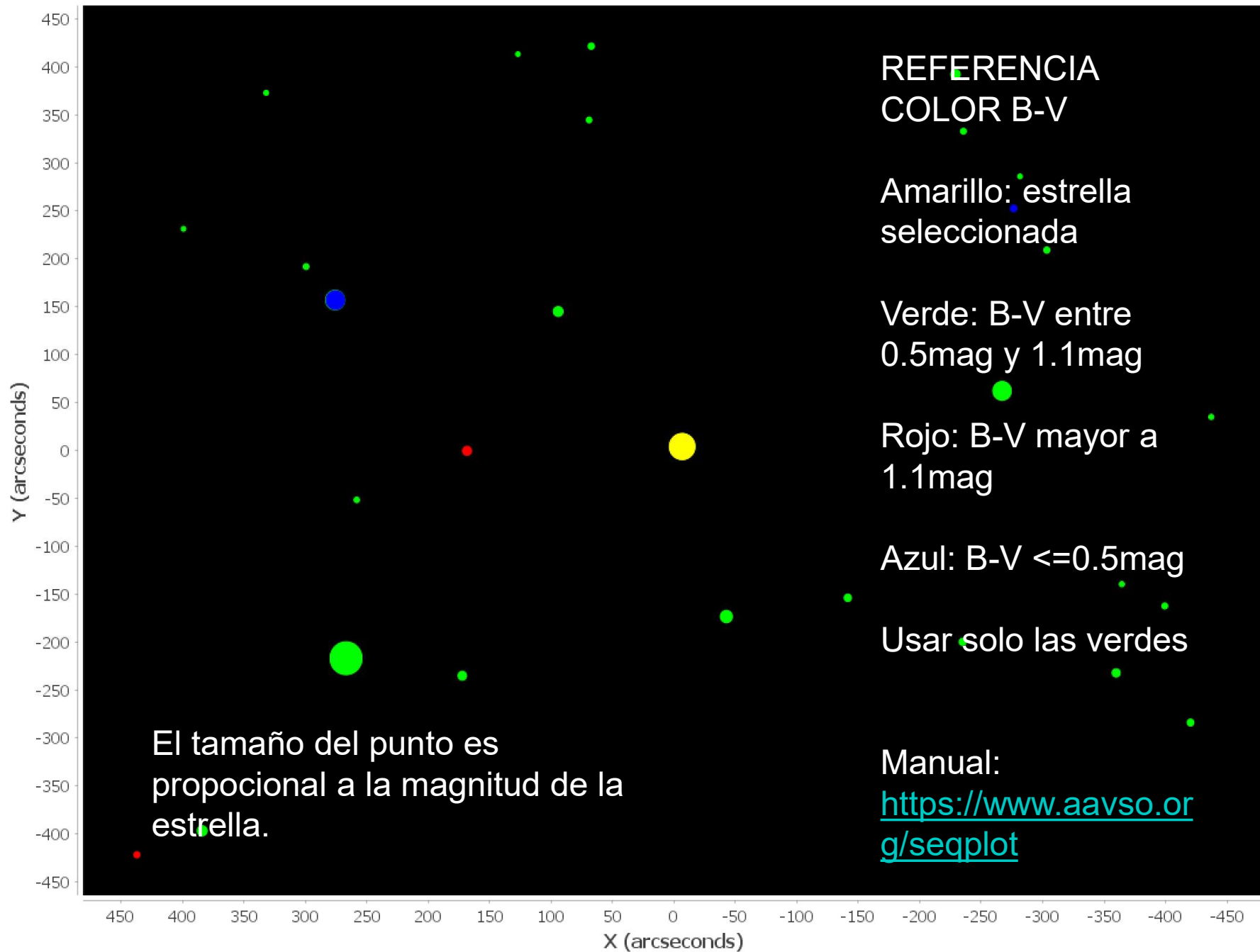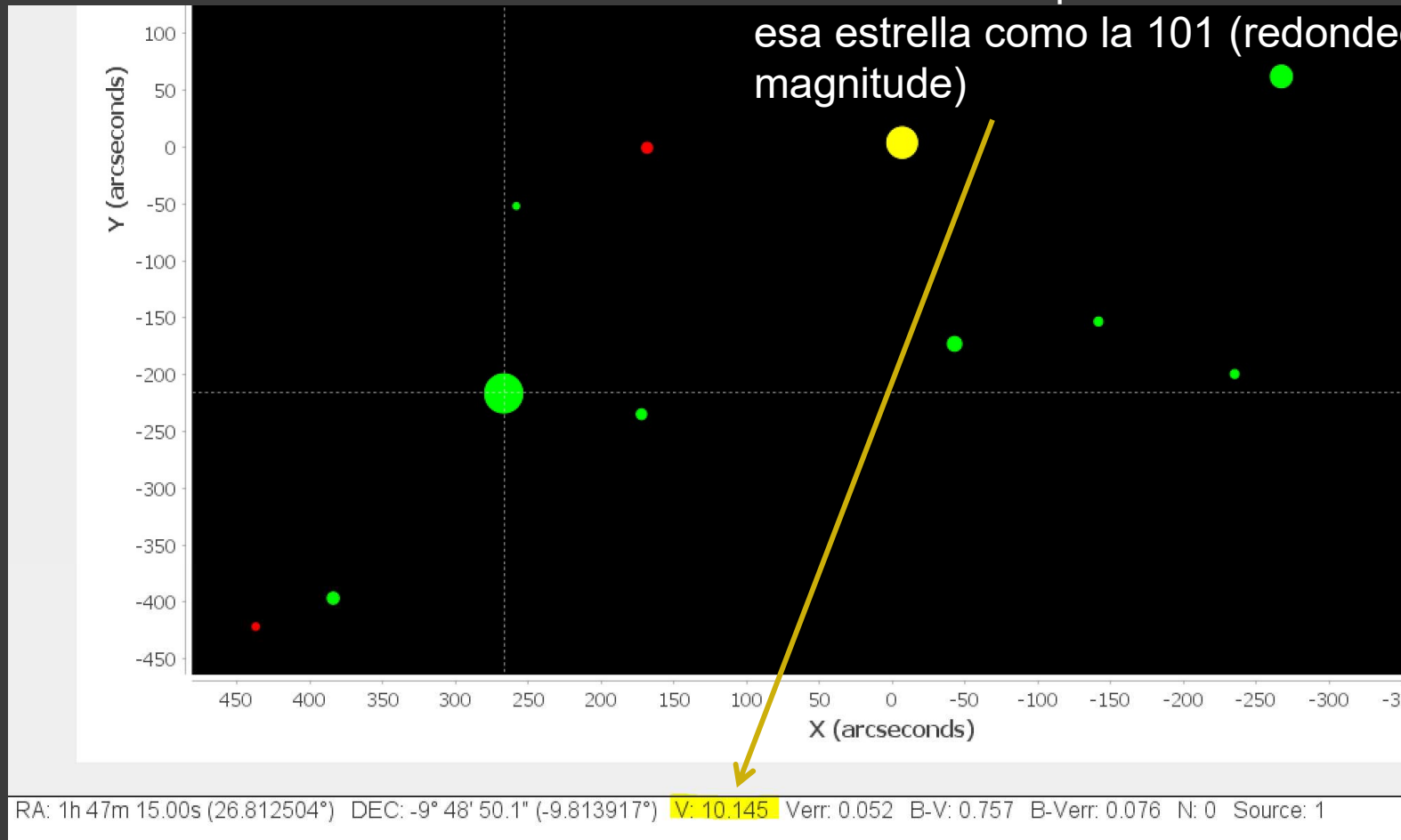
Referencia Estrella variable

Cuando se selecciona la Estrella variable (amarilla) la información al pie indica valores máximos y mínimos de magntidud y el tipo de variable. En este caso una eclipsante binaria.
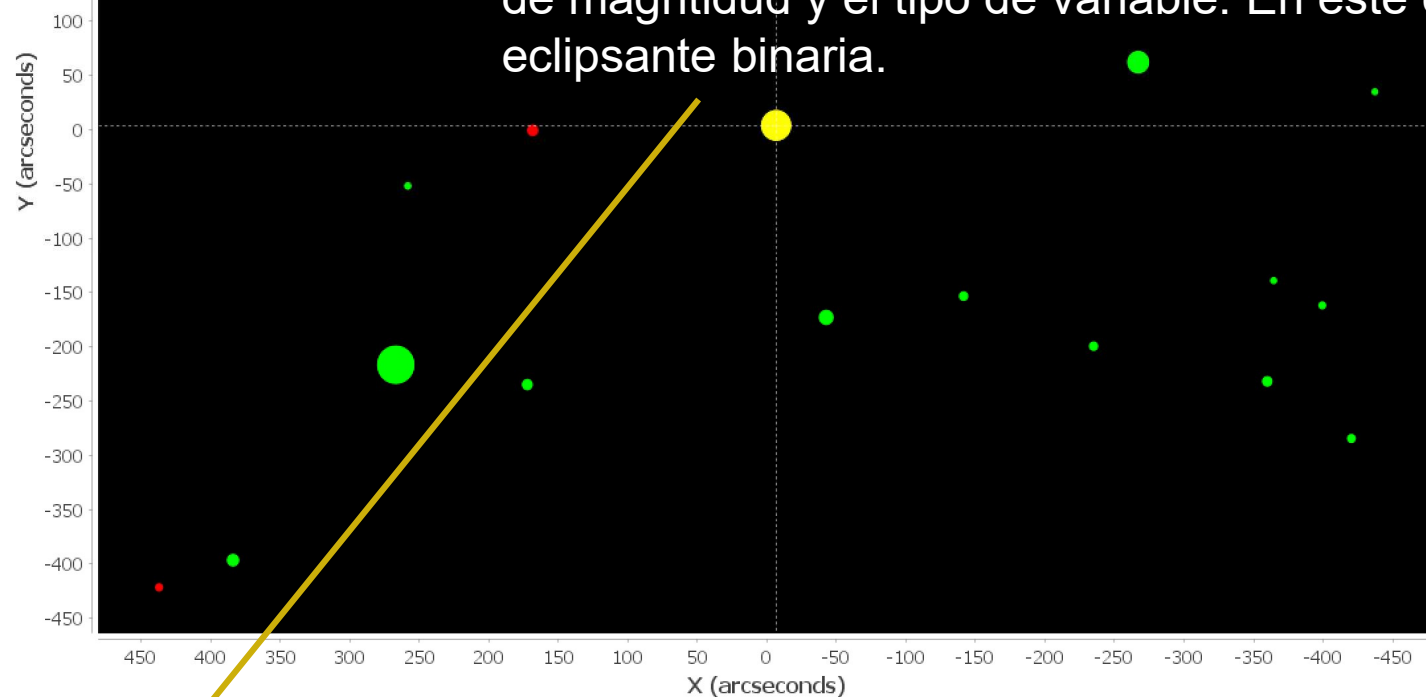
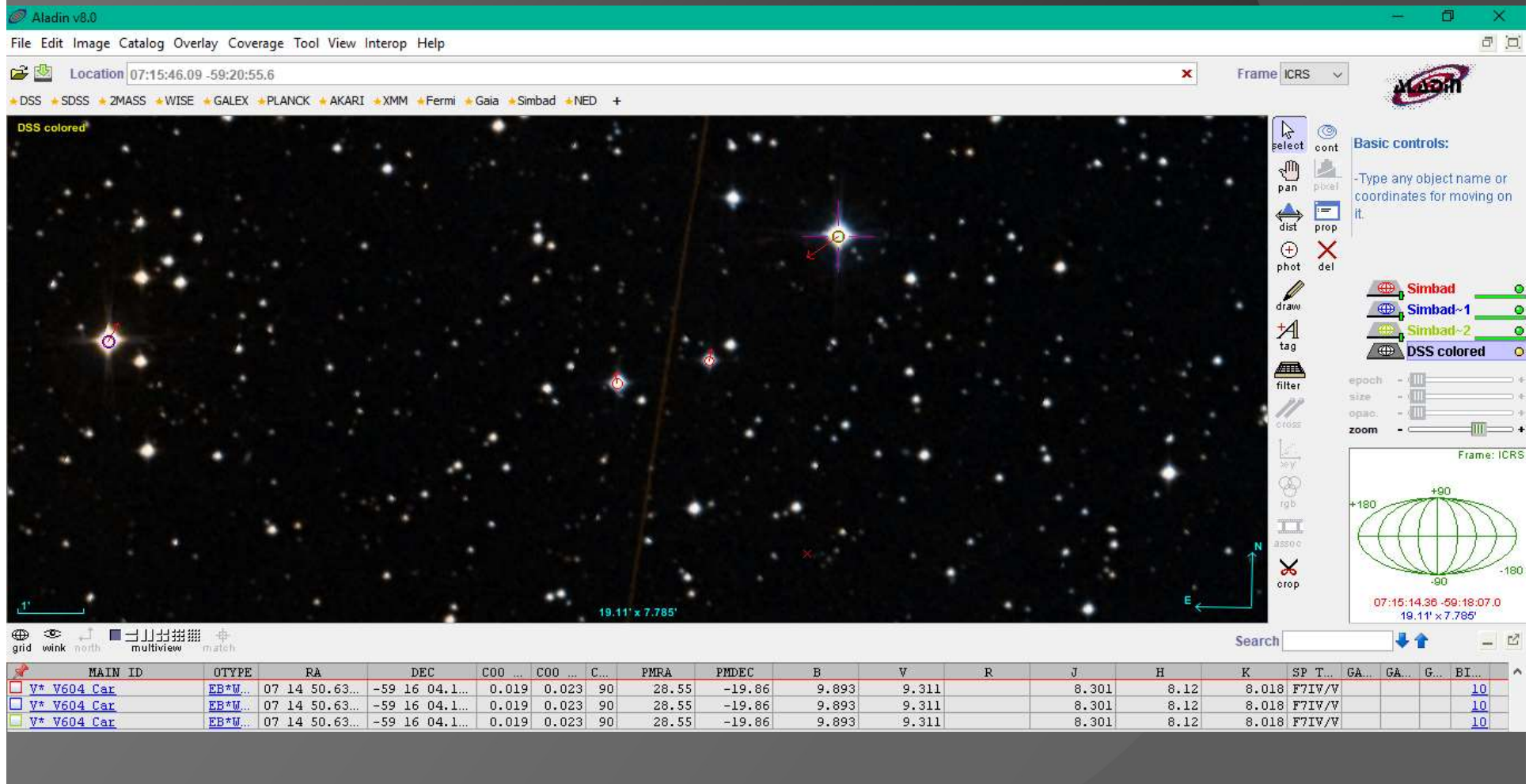Variable: TT Cet Type: EW/KE: Max: 10.8 V Min: 11.32 V RA: 1h 46m 56.50s (26.735437°) DEC: -9° 45' 9.8" (-9.752715°) V: 10.907 B-V: 0.451 Source: 1

Información

Al hacer click sobre una Estrella verde se informan al pie los distintos valores para cada filtro. En este caso tomamos el V en 10.145. En el reporte nos referimemos a esa estrella como la 101 (redondeo de su magnitude)

RA: 1h 47m 15.00s (26.812504°)   DEC: -9° 48' 50.1" (-9.813917°)   V: 10.145   Verr: 0.052   B-V: 0.757   B-Verr: 0.076   N: 0   Source: 1

Aladin-Simbad

Filtros Johnson-Cousins

Banda central efectiva en nm

- U: 365.6nm ("ultravioleta")
- B: 435.3nm ("azul")
- V: 547.7nm ("visual")
- R: 634.9nm ("rojo")
- I: 879.7nm ("infrarojo")

Filtros Sloan
Banda central efectiva en nm

- u': 358.0nm (ultravioleta)
- g': 475.4nm (verde)
- r': 620.4nm (rojo)
- i': 769.8nm (infrarojo)
- z': 966.5nm (infrarojo)

https://en.wikipedia.org/wiki/Photometric_system

Filter Letter	Effective Wavelength Midpoint λ_{eff} for Standard Filter[2]	Full Width Half Maximum[2] (Bandwidth Δλ)	Variant(s)	Description
Ultraviolet				
U	365 nm	66 nm	u, u', u*	"U" stands for ultraviolet.
Visible				
B	445 nm	94 nm	b	"B" stands for blue.
V	551 nm	88 nm	v, v'	"V" stands for visual.
G[3]	464 nm	128 nm	g'	"G" stands for green.
R	658 nm	138 nm	r, r', R', R_c, R_e, R_j	"R" stands for red.
Near-Infrared				
I	806 nm	149 nm	i, i', I_c, I_e, I_j	"I" stands for infrared.
Z	900 nm[4]		z, z'	
Y	1020 nm	120 nm	y	
J	1220 nm	213 nm	J', J_s	
H	1630 nm	307 nm		
K	2190 nm	390 nm	K Continuum, K', K_s, K_{long}, K^8, nbK	
L	3450 nm	472 nm	L', nbL'	
Mid-Infrared				
M	4750 nm	460 nm	M', nbM	
N	10500 nm	2500 nm		
Q	21000 nm[5]	5800 nm[5]	Q'	

Fotometría diferencial

Una vez obtenidos los datos necesarios (nombre de la estrella y selección de Estrella de referencia y de control) se debe utilizar un software de fotometría diferencial tales como:

- Maxim DL ($600)
- Iris (gratis)
- Lesve Photometry (gratis)
- FotoDif (gratis)

Estos programas generan reportes fotométricos respetando algún standard, en nuestro caso el de AAVSO:

https://www.aavso.org/aavso-extended-file-format

AAVSO Extended File Format

Version: 1.2
Release Date: July 27, 2011 (latest update: June 13, 2017)

This is one of two plain text (ASCII) formats that the AAVSO accepts for uploading a file of variable star observations. Please use the WebObs File Upload page to upload your file in the AAVSO Extended Format. The other format, which is intended for visual observers, is called the AAVSO Visual File Format.

Visit the Software that exports to AAVSO format page to help format your observations.

The extended format has two components: parameters and data. Each component is discussed in detail below.

The format is not case sensitive.

Parameters

The Parameters are specified at the top of the file and are used to describe the data that follows. Parameters must begin with a pound sign (#) at the start of the line. There are six specific parameters that we require to exist at the top of the file. Personal comments may also be added as long as they follow a pound sign (#). These comments will be ignored by the software and not loaded into the database. However, they will be retained when the

AAVSO Light Curve: **VZ Ret** 2019/12/03 *to* 2019/12/03

WebObs Search Results

Showing *142* observations for *VZ Ret* from *1* observer

■ Plot a Chart   ■ Generate a Light Curve   ■ Search VSX

		Star	JD	Calendar Date	Magnitude	Error	Filter	Observer	Collapse All Expand All
☐	Edit Delete	VZ RET	2458820.629473	2019 Dec. 03.12947	-0.771	0.008	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.628906	2019 Dec. 03.12891	-0.779	0.008	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.628328	2019 Dec. 03.12833	-0.763	0.008	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.62776	2019 Dec. 03.12776	-0.758	0.009	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.627193	2019 Dec. 03.12719	-0.747	0.008	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.626615	2019 Dec. 03.12661	-0.753	0.009	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.626047	2019 Dec. 03.12605	-0.757	0.009	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.625469	2019 Dec. 03.12547	-0.748	0.009	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.624902	2019 Dec. 03.12490	-0.751	0.009	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.624323	2019 Dec. 03.12432	-0.743	0.009	V	SNEA	Details...
☐	Edit Delete	VZ RET	2458820.623756	2019 Dec. 03.12376	-0.747	0.009	V	SNEA	Details...

VZ RET — CONTROL

Fotometría relativa
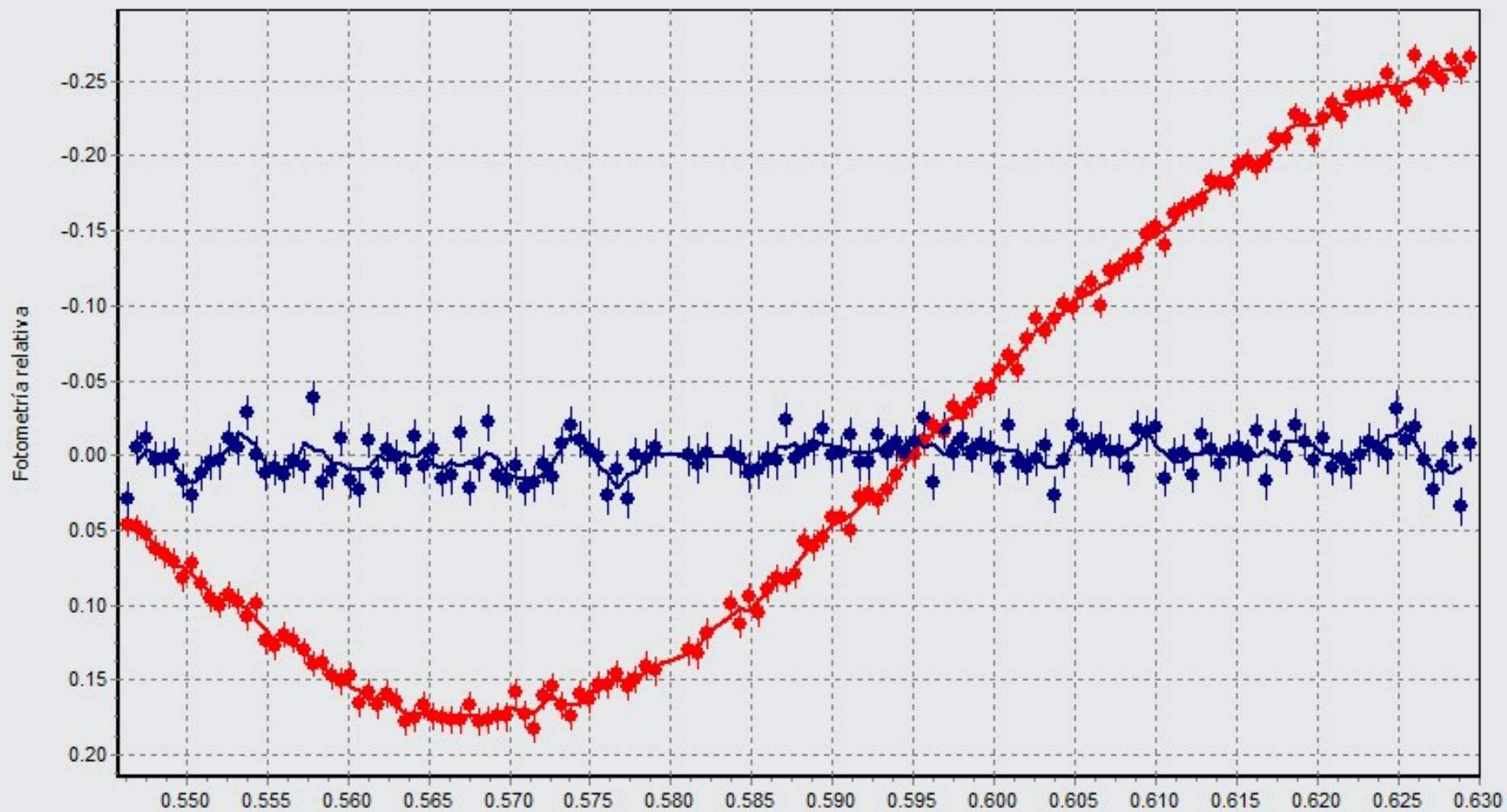
Fecha Juliana Geocéntrica: 2458820 +
Observador: Nestor Suarez-Observatorio Antares

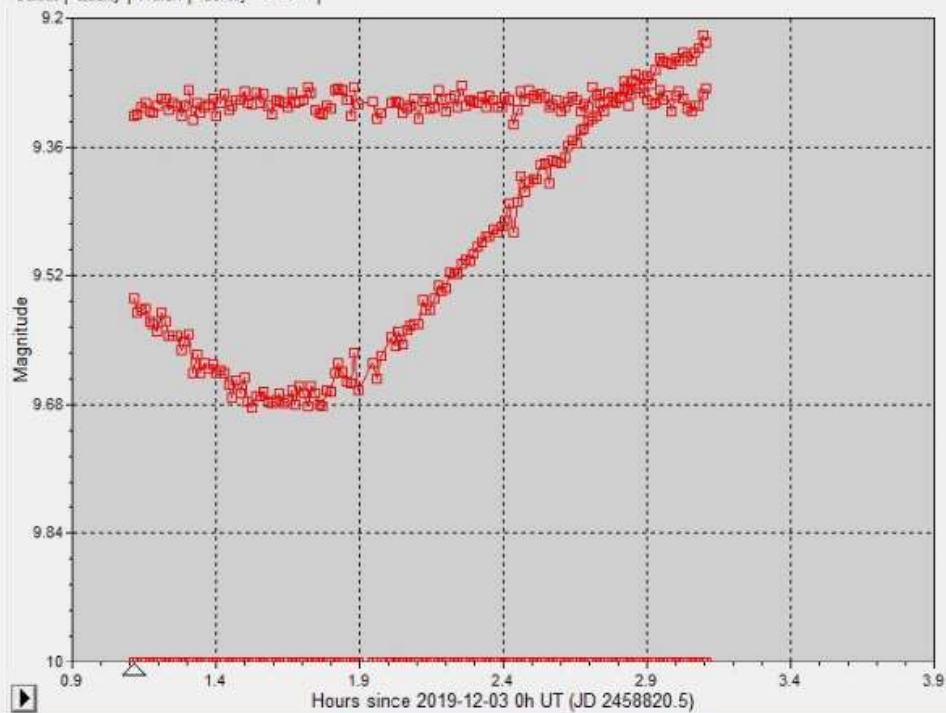FotoDif 3.93