



The new CHARA - AAVSO Collaboration

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Outline

- About the AAVSO
- Photometric capabilities and sample data
- Spectroscopic capabilities and sample data
- Describe the new CHARA-AAVSO collaboration
- Discuss how you can request data from AAVSO
- Explain data usage guidelines
- Show a few other things things that may interest you



The American Association of Variable Star Observers (AAVSO)



The mission of the AAVSO is “to enable anyone, anywhere, to participate in scientific discovery through variable star astronomy”

We achieve this mission through pro-am collaboration, strategic partnerships, educational activities, and data stewardship.



AAVSO by the numbers

Key Numbers

- Founded in 1911
- **1,200 members**
- **800 active observers**
- **200 volunteers**
- 6 staff + 2 contractors
- **\$1M/year budget**

Education and Public Outreach

- **Webinars reached 5,500 people**
- 10 CHOICE courses with an average of 125 participants annually
- **7 Observing Manuals in 13 languages**
- Mentoring Program

Contributions to Science

- Data or products used in **380 publications/year**
- Photometry database (**55M observations**)
- Curated variable star metadata (**2.2M**)
- Spectra (**10k observations**)
- Exoplanet Transits (**1.5k**)
- Peer-reviewed Journal - JAAVSO

Other Activities

- Annual variable star meeting
- Proceedings
- Workshops



Characteristics of AAVSO participants

Come from different backgrounds

- High school to retired career professionals
- All interested in astronomy
- All want to contribute to science

Have a range of capabilities:

- Need education, training, and guidance (10%)
- Work with professional astronomers (80%)
- Conduct independent research (2-10%)

Utilize vastly different instruments

- Detectors: Eyes, DSLR, CCD/CMOS
- Optics: None to meter class telescopes.
- Tools: Robotic telescopes, photometers, spectrographs, speckle cameras, software.



2022 Annual Meeting - Credit Bob Stephens



Visual Observing
Roger Kalh



0.8 m telescope
Mario Motta



Home built solar scope
Santanu Basu



Amateur astronomers are *extremely* capable

SAS 2022 Proceedings

- Speckle interferometry
- Astrometry
- Exoplanet transit depth analysis
- Photometry
- Jovian ammonia monitoring
- Custom build spectrometers and analysis software
- Seeing measurements
- Light pollution monitoring and modeling
- Time series spectroscopy

JAAVSO 50.2 (peer reviewed)

- Eclipsing binary characterization
- Overcontact binary modeling
- Newly discovered variable stars
- HADS photometry and modeling
- Times of minimum for eclipsing binaries
- High throughput photometry and short periods in novae

BAV Magazine Spectroscopy

- Spectropolarimetry with a home-built, 3D-printed instrument

Research from today's amateur astronomers is comparable to that of professionals from 1990-2010.
Low cost hardware and open-source software facilitates their research.

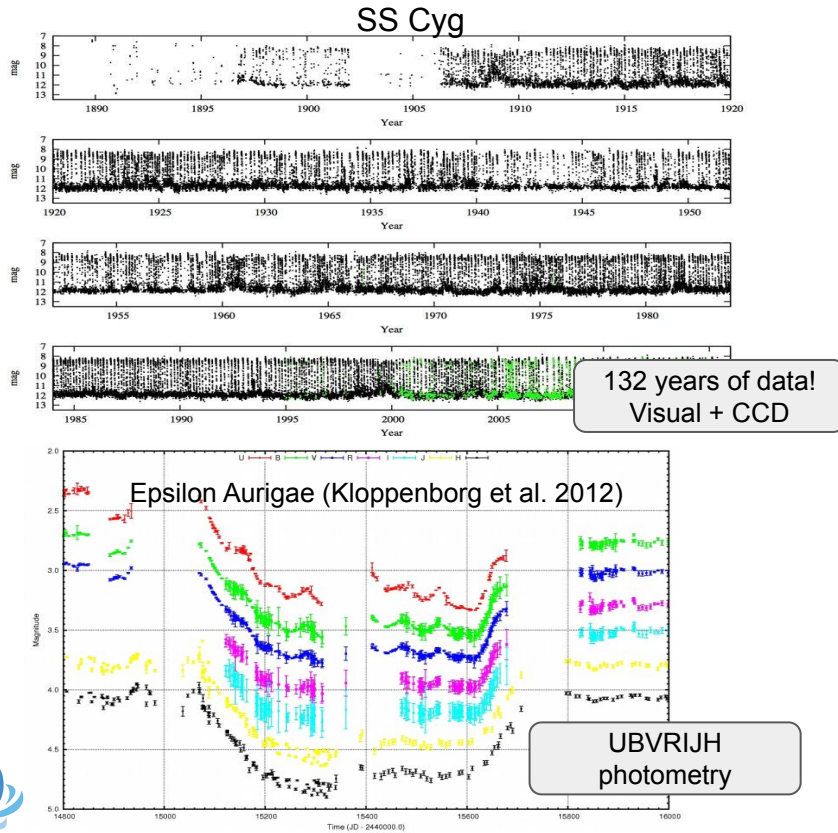


Photometric Capabilities

Instrument	Filters	Range [magnitudes]	Precision [magnitude]	Commonality of resource	Principal Geographic Coverage	Notes
Visual	Eye	0-16+	0.1-0.2	Abundant	Worldwide	
CCD/CMOS	Johnson Cousins UBVRI	2 - 19+	0.01-0.05	Abundant	Worldwide	U filter very uncommon
CCD/CMOS	Sloan UGRIZ	2 - 19+	0.01-0.05	Rare	Worldwide	Mostly on AAVSONet
PEP	Johnson Cousins UBVRI	U: -1 - 7 BVRI: -1 - 8	0.005-0.010	Rare	North America, Europe	
PEP	Optec JH	-4 - 4	0.010-0.020	Very Rare	North America, Australia	Fewer than 20 exist

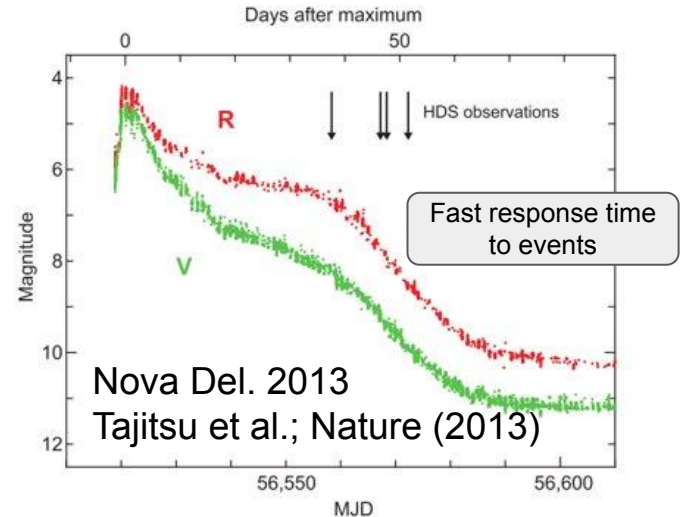


Photometry database: AID



The largest source of amateur photometry

- 54 M observations
- 34,000 stars monitored
- Most data are visual, Johnson-Cousins, and Sloan filtered. Some narrow-band observations.



Spectroscopic Capabilities

Instrument	Type	Mag Limit	Resolution	Wavelengths [Angstroms]	Spectral Range [Angstroms]	Commonality of Resource	Principle Geographic Coverage	Notes
SA100/200	Widefield Slitless	V = 10-14	100-200	3600-10,000	Full	Common	Worldwide	Includes zero order. Stars can overlap.
Alpy 600	Slit	V = 10-14	600-1000	3700-7500	Full	Common	North America, Europe	
LISA, LOWSPEC	Slit	V = 10-14	1000-4000	4000-7000	2000-3000	Common	North America, Europe	
eShel	Echelle	V = 6-8	10,000	4500-7000	Full	Very Rare	North America, Europe	
LHIRES III	Slit	V = 6-8	10,000 - 20,000	4000-7000	251-155	Common	North America, Europe	
Shelyak Whoppshel	Echelle	V= 9	30,000	3920-7500	Full	Very Rare	North America, Europe	Fewer than 10 exist

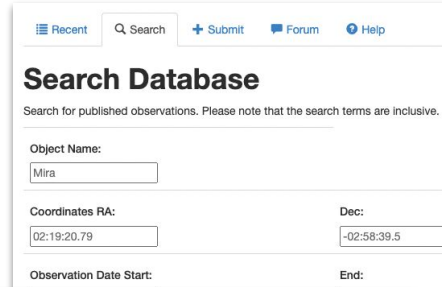


Spectroscopy database: AVSpec

New effort at AAVSO to encourage spectroscopic monitoring of variable stars.

All amateur spectroscopic databases:

- AVSpec (10,329 spectra)
 - Variable stars only
- ARAS (12,220 spectra)
 - Symbiotic, Novae, Dwarf Novae
- BAA SpecDB (12,110 spectra)
 - Everything
- BeSS (266,772 spectra)
 - Be, Herbig Ae/Be/, B[e]



Recent Search Submit Forum Help

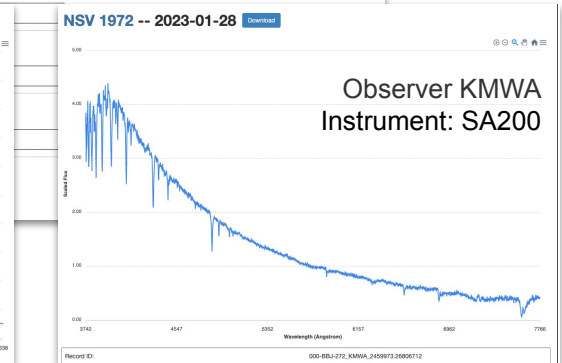
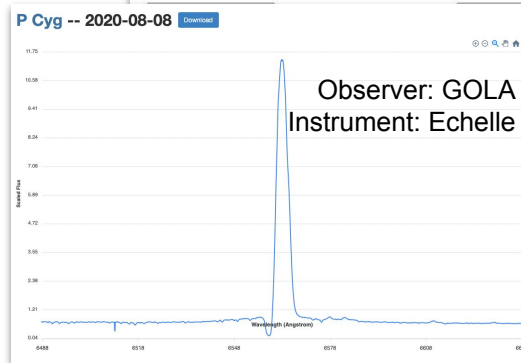
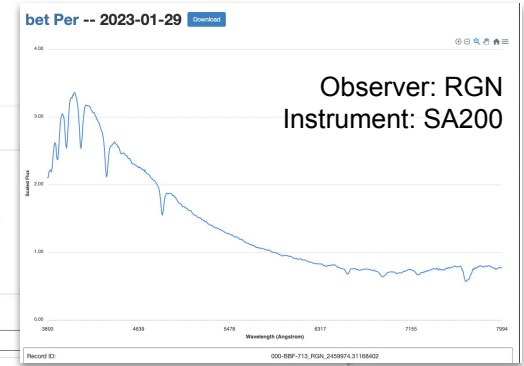
Search Database

Search for published observations. Please note that the search terms are inclusive.

Object Name:

Coordinates RA: Dec:

Observation Date Start: End:



AVSpec: <https://app.aavso.org/avspec>

ARAS: <https://aras-database.github.io/database/index.html>

BAA SpecDB: <https://britastro.org/specdb/>

BeSS: <http://basebe.obspm.fr/basebe/>

About the CHARA-AAVSO collaboration

AAVSO is learning how to serve the professional community better. This is our first major experiment.

During 2023B:

- You can request AAVSO observations using the CHARA proposal form.
- If you choose “yes”, you will get a copy of AAVSO’s Observing Campaign Form to fill out and return to AAVSO.
- AAVSO will encourage our members to observe your targets.
- Our members will observe, reduce, and submit data to our databases (all open access and non-proprietary)
- You can take the data and use it in your papers.
 - Please comply with our Data Usage Guidelines
- We *request* you also communicate with the observers on AAVSO’s forum.

Observing Campaign Manager
Elizabeth Waagen
eowaagen@aavso.org

Request for Observing Time at the CHARA Array
For the Period
August 1 – December 21, 2023
Type only within boxed areas immediately after hyphens

P.I. Name/e-mail -	PhD Research? – yes/no (circle choice)
Co-P.I. Names -	
Observing Participants -	AAVSO data? – yes/no (circle choice)
Proposal Title –	
	Is this a new or continuing project? – new / continuing (circle choice)
Abstract -	

Summary of Requested Observing Run(s)

Run	No. of Nights	Optimal Dates	Acceptable Dates	Beam Combiner	Filter / Spectral Mode	Telescopes
1						
2						
3						

Unacceptable Observing Dates (for non-astronomical reasons) -



AAVSO Data Usage Guidelines

1. Include the following in your acknowledgements:

"We acknowledge the use of data from the AAVSO International Database in this research. We express our gratitude to the worldwide network of observers who made these data possible."

2. In AAS journals, use "AAVSO" as a facility keyword

3. AAVSO encourages you to acknowledge observers within your paper and consider adding them as co-authors if they add significant value.

- a. Drop Elizabeth Waagen an email to get observer contact information: eowaagen@aavso.org

Data Usage Guidelines:

<https://www.aavso.org/data-usage-guidelines>



Stellar metadata: Variable Star Index (VSX)

Search VSX ?

Special searches

Select a Special search above, or enter information in the fields below, then click Search.

Name
Examples: SS Cyg, V456 Sgr, NSV 1009
%And, ASAS %+%, Mis V%
Search by AUJD also available

Capture coordinates for object to Position field

Const.

Filters search results by boundaries of selected constellation

Position
Examples: 21 42 42.8 +43 35 10
07:04:04 -03:50:51
118.77187 +22.00139

Size Radius Box size

Mag. at maximum between and

Mag. at minimum between and

Period between d and d

Epoch between HJD and HJD

Rise dur. between % and %

Nova year between and

Variability type

Examples: M, DCEP, EA%

Spectral type

Examples: K, Mfs, pec(%)

Stellar Association

Campaign or Program Observations in the AAVSO International Database

Catalog Color between and

Include Variables Suspects Non-variables Not checked

Order by Descending

Click [Less](#) to hide extended search options.

The International Variable Star Index

Current Time: 20 Jan 2023 22:17:33 UTC Welcome, Guest. You are not logged in.

Latest Details ?

Log in to retrieve additional aliases from SIMBAD.

Name **eps Aur**

AAVSO UID 000-BCT-905 (33572 observations)

Constellation Auriga > Sequence

J2000.0 05 01 58.13 +43 49 23.9 (75.49221+43.82331) > Search nearby

B1950.0 04 58 22.53 +43 45 05.4

Proper motion: RA: -0.86 +/- 1.38 mas/yr Dec: -2.66 +/- 0.75 mas/yr Source: F. Van Leeuwen, 2007

Galactic coord. 162.788 +1.179

Other names (Internal only) Please note that aliases shown in grey link to obsolete records.

7 Aur	AKSD 0454443	ADS 3605 A
ASASSN-V J050159.29+43345.9	ASASSN-V J050200.51+433101.9	ASASSN-V J050202.42+434720.2
BD+43 1166	HD 31964	HP 23416
HR 1605	IRC +40709	RAFGL 6705
SAO 39955		

(Not logged in) > Add name

Variability type EA/GS ?

Spectral type A8:V-F2:ep+BV ?

Mag. range 2.92 - 3.83 V ?

Discoverer --

Epoch 04 Jun 1956 (HJD 2435629) > Ephemeris

Outburst --

Period 3892 d (27.08 y)

Rise/clipse dur. 8% (113 weeks)

Remarks ?

Some references may be clicked to view in new window. Roll over index number to view submission details.

1 GCVS V8 A/B 14.0m, 21", 2249eg, d = 0.0377 Survey of the physical properties of the system **ID. Struve, PASP 68, 27, 1956, K.O. Weig, AAS Conf 48, 221, 1955, H.A. Abt, ApJ 126, 138, 1957, I.M. Kopylov, P.N.Kumaragopalan, in: Kosmich. Astron., Obs. 29, 251, 1963, M.Hack, Mem. SAI 32, FA, 1961=Milano-Merate Contr. N185, 1962, Kh. Abto, Tartu Publ. 45, 294, 1977.** The spectrum probably varies even outside eclipses. The eclipses are probably due to a disk of gas and dust surrounding the hot companion. The brightness has physical fluctuations with the amplitude up to 0.25m and the cycle about 110d (C.M.Huffer, ApJ 76, 1, 1932) which hinder revealing the possible Mm II. Similar cycle was discovered also in the fluctuations of V1.

(Not logged in) > Add remark

References ?

Click reference title/citation to view in new window. Roll over index number to view submission details.

1 T. Jayasinghe, K. Z. Stanek, C. Kochanek, et al., 2019 (in preparation) --

2 Kh. Abto, Tartu Publ. 39, 82, 1971. --

External Links ?

Links open in a new window. Not all links may be valid for this particular target.

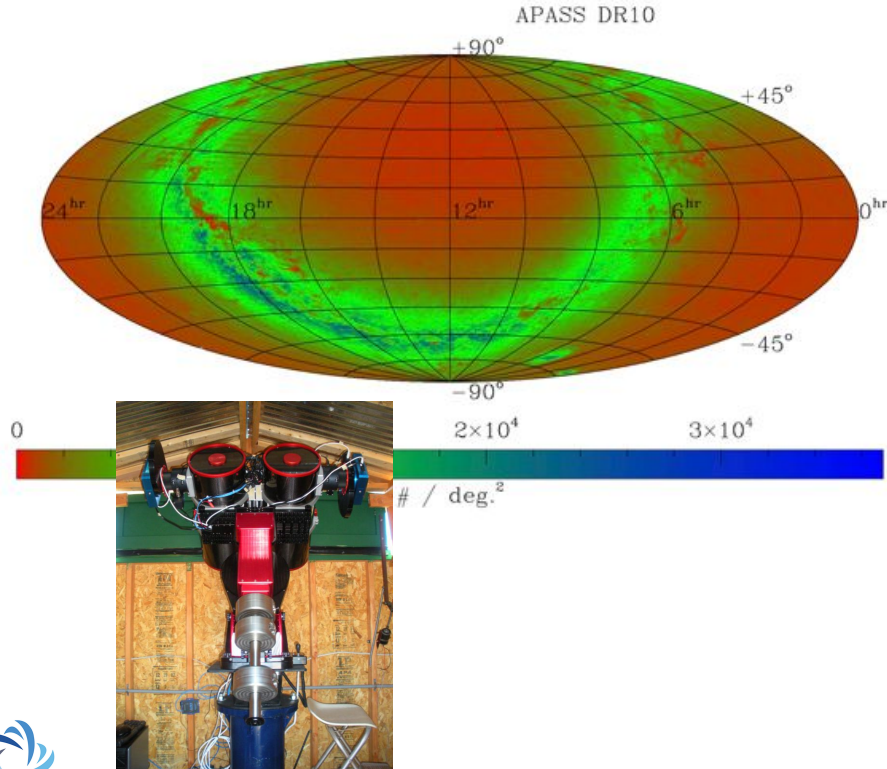
Location Select a Location for more details.

Think of VSX as ADS for variable stars.

- 2.2 M entries (all known variables of > 1 milli-mag or more)
- Query by name, coordinates, min/max magnitude, period, variability type, spectral type, stellar associations, campaigns
- External Links point to 30 separate databases, including survey programs.

Visit aavso.org/vsx/

AAVSO Photometric All-Sky Survey (APASS)



About the survey:

- Bridges the gap between Tyco2 and SDSS
- Valid from 7 - 17th magnitudes
- Eight filters:
 - Johnson B, V
 - Sloan u', g', r', i', z', and Z
- Photometry on 128 million objects.
- 510,000 images taken as of DR10

Where can you get it?

- DR10 on AAVSO.org
- DR9 on VizieR and Virtual Observatory

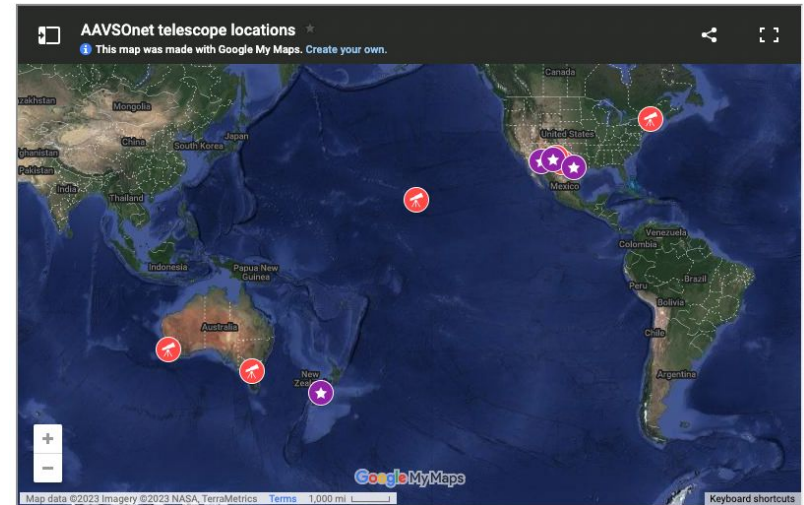
Funded by Robert Martin Ayers Sciences Fund,
NSF AST 1412587, and AAVSO endowment



Use our telescopes



- 8 robotic telescopes worldwide
 - 5 – Bright star monitors (7" apertures)
 - 3 - Faint star monitors (24" apertures)
 - Johnson-Cousins, Sloan, H-alpha filters
 - Spectrograph coming soon
- Time requested by proposal
- All proposals reviewed by TAC
- Data can be downloaded or sent to VPhot for processing.
- **Member-only benefit**



We are always open to adding additional telescopes to the network and have partnered with universities to do so. Contact us if you are interested!



Two announcements:

Small Ground and Space Telescopes in the New Era of Big Telescope Surveys

Hybrid workshop at AAS 242

Albuquerque, New Mexico, June 3/4, 2023

- Session 1: Modern All-Sky surveys
- Session 2: Complementary small telescopes
- Session 3: Photons to papers
- Session 4: Bringing it All Together

AAVSO is hiring a web developer!

- A flexible, 35 hour work week
- 100 % employer paid healthcare plan
- Paid holidays, sick time, and vacation
- 401(k) Plan - Employees receive a total company-paid benefit of 5% of their salary after three months of employment.
- Flexible Spending Account
- Educational assistance program

Applications close on March 31

<https://www.aavso.org/software-developer-job>





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