



MAST
Users
Group
Meeting

Nov 26
2012

Virtual Astronomical Observatory (VAO)

Gretchen Greene



MAST Users Group Meeting

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2012

www.usvao.org

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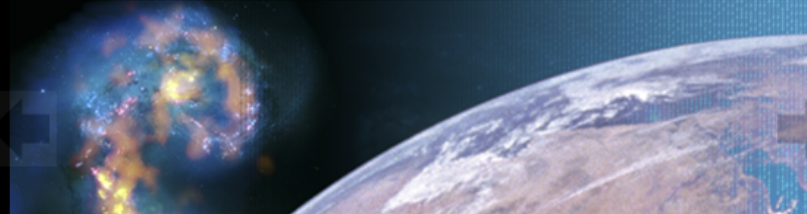


US Virtual Astronomical Observatory



- Home
- Science Tools & Services
- About the VAO
- VO News
- Support & Community
- Contact & Connect

VO NEWS FROM AROUND THE WORLD



VO News

A summary of Virtual Observatory news for the US astronomical research community. Supported and compiled by the US Virtual Astronomical Observatory.

VAO Tools & Services

- **Data Discovery Tool** – Retrieve astronomical data about a given position or object in the sky.
- **Iris: SED Analysis Tool** - Find, plot, and fit spectral energy distributions (SEDs) with this desktop application.
- **Time Series Search Tool** – Discover time-series data from three major archives & analyze them with the NASA Exoplanet Archive periodogram application.
- **Cross-Comparison Tool** – Perform fast positional cross-matches between an input table of up to 1 million sources and common astronomical source catalogs.

▶ Science Service Monitor

More News from the VO

- ▶ VO Community Day in Baltimore, MD
- ▶ *se/este*: Software for Astronomical Database Queries
- ▶ Latest IRAF Version with Enhanced VO Capabilities
- ▶ VO Community Days in Ann Arbor & Baltimore
- ▶ IVOA Newsletter 009 – October 2012
- ▶ VAO Software Release: Data Discovery Tool (version 1.4)
- ▶ VOSpec Release 6.5
- ▶ The VAO at the NExScI Sagan Workshop

NOV 19
2012

VO Community Day in Baltimore, MD

Tools for Data-Intensive Astronomy

– a VO Community Day in Baltimore, MD

Thursday, November 29, 2012
10AM-2PM

Location: Bahcall Auditorium, Space Telescope Science Institute

Experts from the VAO will demonstrate tools and services for data-intensive astronomy in the context of a range of science use cases and tutorials including:

- Data discovery and access
- Catalog cross comparison
- Constructing and modeling spectral energy distributions
- Time series analysis tools
- Distributed database queries
- ...and more

In the morning we will be showing a number of demonstrations of VO science applications and tools. Lunch will be provided for all participants and there will be informal discussions and Q&A over lunch. Afterwards, from ~12:45 to 2:00pm, there will be some hands-on time with some typical science use cases. You are welcome to bring your laptop and try things out for yourself.

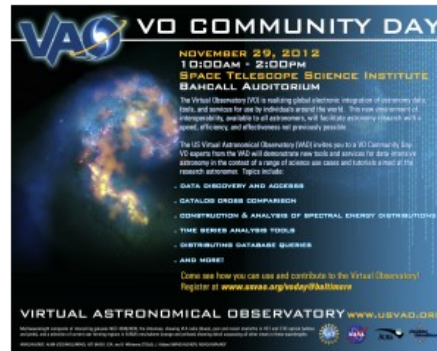
Register now at usvao.org/voday@baltimore

This event will also be webcast live:

For video see: <https://webcast.stsci.edu/webcast/>

For audio: 1 877-951-4490 Passcode is 4015008

Tags: voday



Member of the
International Virtual Observatory Alliance

VO impact and penetration

- At least 100 scientific papers based on use of VO tools and VO-accessible data collections

A universal ultraviolet-optical colour-colour-magnitude relation of galaxies Chilingarian, I., Zolotukhin, I., 2012, MNRAS, 419, 1727

Astroinformatics of galaxies and quasars: a new general method for photometric redshifts estimation Laurino, O., D'Abrusco, R., Longo, G., Riccio, G., 2011, MNRAS, 418, 2165

SearchCal: a Virtual Observatory tool for searching calibrators in optical long-baseline interferometry. II. The faint-object case Bonneau, D., Delfosse, X., Mourard, D., Lafrasse, S., Mella, G., Cetre, S., Clausse, J.-M., Zins, G., A&A, 2011, 535, A53

TESELA: a new Virtual Observatory tool to determine blank fields for astronomical observations Cardiel, N., Jimenez-Esteban, F. M., Alacid, J. M., Solano, E., Aberasturi, M., 2011, MNRAS, 417, 3061

WISE/2MASS-SDSS brown dwarfs candidates using Virtual Observatory tools Aberasturi, M., Solano, E., Martin, E. L., A&A, 2011, 534, L7

...

- ADS search on term “virtual observatory” (AND) yields over 2300 papers
- Astronomers make excellent use of VO tools
 - But not all astronomers, and not often enough



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VO impact and penetration

- Astronomers use VO every day *without realizing it*
- A few examples
 - Hubble Legacy Archive, HEASARC “Xamin” interface, are built with “*VO Inside*”
 - Major archives and data centers are VO compliant
 - JWST has VO standards included in Level 4 Requirements
 - Dark Energy Survey pipeline and archive
 - WIYN One-Degree Imager pipeline and archive
 - PanSTARRS
 - LSST development
- ~1M VO-compliant service requests every 2 weeks from data providers in the US VAO collaboration



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The Virtual Observatory

*The VO is a global framework for universal discovery, access, and **interoperability** of astronomical data*

- Image, spectrum, time series data
- Catalogs, databases
- Transient event notices
- Software and services
- Distributed computing (authentication, authorization, process management)
- Application inter-communication



International coordination and collaboration is essential!

<http://ivoa.net>



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Focus of VAO Project efforts

- Science applications
 - Data Discovery Tool
 - Catalog Cross-Comparison Service
 - Spectral Energy Distributions
 - Time Series Analysis
- Operations
- User support
- Standards and infrastructure



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STScI VAO

- STScI is 1 of 9 partner organizations in the VAO (CFA, NCSA, HEASARC, Caltech, IPAC, NOAO, NRAO, JHU, STScI)
- VAO Director (Bob Hanisch)
- Work Areas:
 - VAO Data Provider Services (Randy Thompson)
 - Technical Leadership with Science Applications
 - Data Discovery Portal (Tom Donaldson)
 - IRIS SpecView (Ivo Busko)
 - Standards and Infrastructure technical leads
 - VAO Registry (Theresa Dower)
 - IVOA Registry Chair (Gretchen Greene)

Behind the Scenes Registry



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VAO Directory

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Find Astronomical Data Resources

Enter terms in the text box that describe the type of data you are looking for. Results will show catalogs and data collections that have these terms as part of their descriptions.

[Advanced](#)

Examples: [quasar](#), [AGN](#), [binary stars](#), [Chandra](#), [GALEX](#), [far ultraviolet](#)

Use [DataScope](#) to search and view data for a particular object or position.

Use the [Inventory](#) to find catalogs having entries for a given position or list of positions.



not logged in to registry publishing

[Help](#)

VAO Registry Publishing Interface - Login

Using the VAO registry publishing interface, you can publish new and modify existing VO resources, representing data services, catalogs, archive institutions, and many other astronomical data concepts. This system manages resources hosted at the VAO registry at Space Telescope Science Institute. Resources in this VAO registry are accessible by search tools and VO client software throughout the IVOA. For more information, check the [publishing help page](#) or the main [VAO web page](#).

To register as a new user and start creating new resources, use the 'Register New User' button below to create an account. If during account creation your associated institution is not in the predefined list, or if you have previously published resources through the NVO or the VAO which you now wish to edit, please contact [US VAO Help](#).

Please Login to the US VAO Registry Publishing System

Username:

Password:

How to Publish Data
to the VO?

* Beginning work on the
Publishers View



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Specview

specview

Input Cursor Window Help

X axis: WAVELENGTH, Y axis: FLUX

4790.283 0.0067253965 Hardcopy

Fixed Reset Back In Out Grid on DQ Units

NGC3516

FLUX (photon/s/cm²/Angstrom)

WAVELENGTH (Angstrom)

AWTapp

Emission Gaussian

[OIII] 5007

Center: 5049.725 0.118848 Fit

Flux: 0.05117421 9.6370466E-4 Fit

FWHM: 723.32776 14.651007 Fit

Skew: 1.0 INDEF Fit

Fit /data/obi-wan3/busko/specviewdata/c

Levenberg-Marquardt Stopped

rms chisq

Convergency: -0.0031108309182741323

Current chisq: 182.01779305111944

Current iteration: 6

Start Stop Step Continue Dismiss

frame

X axis: WAVELENGTH, Y axis: Residuals

Fixed Reset Back In Out Grid off DQ Units

NGC3516

Residuals (photon/s/cm²/Ang)

WAVELENGTH (Angstrom)

File: /data/obi-wan3/busko/specviewdata/o4st09020_sx1.fits[1][1]

Component

- 1 Continuum: Polynomial degree = 1 a0 = 0.00361
- 2 [OIII] 5007: Gaussian (em) @ 5049.72489
- 3 2 [OIII] 4959: Gaussian (em) @ 5001.24753
- 4 Hbeta (narrow): Gaussian (em) @ 4900.49013
- 5 4 Hbeta (broad): Gaussian (em) @ 4910.29111
- 6 Continuum: Gaussian (ab) @ 5140

Add Edit Adjust Recenter Copy Delete Re-insert

Define range Reset ranges Constrain Un-constrain

Fit Reset model Fix all Default fit Save Quit



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Specview features

- Reads spectral data from any VO-compliant spectral service, plus FITS and ASCII
- Flexible plotting options
 - Unit conversions, scaling, zoom and pan
- Line fitting and line identification from spectral line catalogs
 - Including VAMDC (Virtual Atomic and Molecular Data Center)
- Runs either as Java applet in your web browser or application on your desktop

User forum: astrobabel.com

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astrobabel: Q/A for astronomical computing

Discussions Sign In

Welcome to astrobabel.com -- a gathering place for the collective community intelligence about astronomical computing. Astrobabel is sponsored and supported by the US Virtual Astronomical Observatory.

Popular All Posts Unanswered 3

Getting started on astrobabel [README!] Announcement Started by virtualastronomer June 18 Pages	Votes 0	Follows 0	Views 51	Comments 0
Saving and restoring arbitrary objects in Python Question Most recent by ChrisBeaumont June 20 Questions	Votes 1	Follows 0	Views 42	Comments 1
Use of Astronomical Catalogs Answered Most recent by RaffaeleDAbrusco June 18 Questions	Votes 0	Follows 0	Views 52	Comments 2
PCA based image sequence filtering Answered Most recent by Tamas Budavari June 18 Questions	Votes 1	Follows 0	Views 73	Comments 1
Automated coalignment tools Answered Most recent by ebessert June 18 Questions	Votes 1	Follows 0	Views 108	Comments 5
What should an undergraduate astronomy lab course consist of? Answered Most recent by adamginsburg June 18 Questions	Votes 2	Follows 1	Views 94	Comments 2
What are some online courses or workshops for scientific computing? Most recent by Christoph June 17 Open Discussions	Votes 1	Follows 1	Views 95	Comments 4
Photometry package in Python Answered ✓ Most recent by ebessert June 17 Questions	Votes 1	Follows 0	Views 182	Comments 5
How do you analyze extended emission? Answered Most recent by ebessert June 17 Questions	Votes 2	Follows 1	Views 81	Comments 1
Huge Query for Data Discovery Tool Answered Most recent by Sarah June 15 Questions	Votes 1	Follows 0	Views 75	Comments 2
How to overplot position data from Topcat to Aladin Most recent by virtualastronomer June 11 Open Discussions	Votes 0	Follows 0	Views 39	Comments 1
Data types for numerical data in RDF Most recent by virtualastronomer June 11 Open Discussions	Votes 0	Follows 0	Views 17	Comments 1
Best Observing Target Selection workflow Answered Most recent by AugustMuench April 8 Questions	Votes 0	Follows 0	Views 106	Comments 2

Welcome to Astrobabel!

If you want to take part in the discussions, sign in or apply for membership below!



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open 2 categories 2

offtopic 2 help 2 samp 2

aladin 2 numeric 1

support 1 alignment 1

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Email (My Preferences)



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Education and public outreach

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VAO

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[Use the VAO Now: Data Discovery Tool](#)

[For Educators](#)

[FAQ](#)

The Education Site of the Virtual Astronomical Observatory

Connecting the public to the world's observatories

What is the VAO?

The Virtual Astronomical Observatory (VAO) is a U.S.-funded effort to put efficient astronomical tools in the hands of U.S. astronomers, students, educators, and public outreach leaders. [READ MORE...](#)

Use the VAO now

Find tools for sharing, mining, and displaying images and data from observatories and databases the world over. [READ MORE...](#)

For educators

The VAO formal education program provides educators and students access to hands-on learning using real astronomical data from the world's most powerful telescopes. [READ MORE...](#)

FAQ

What is the VAO? Why do astronomers need the VAO? What new discoveries will come from the VAO? And more... [READ MORE...](#)

virtualobservatory.org

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Education and public outreach

- VAO education effort focused on World Wide Telescope (WWT) as exploration environment
www.worldwidetelescope.org
- WWT is VO-enabled
 - SAMP protocol
 - Embedded cone-search and SIAP searches
- >2 million downloads → has immense impact
- Microsoft Research is ongoing VO collaborator
- VAO EPO program no longer supported, but websites and tutorials remain available

Figures
 Boundaries
 Focused Only

Equatorial Grid
 Ecliptic
 Reticle/Crosshairs
 Field of View Indicator

Show Stars
 Milky Way
 Cosmos
 Orbits

Name: Microsoft Research Building 99
 Lat: 47:37:59 Alt: 0m
 Lng: 122:08:00

View From This Location [Setup](#)

2012/10/16 16:48:05

Real Time UTC



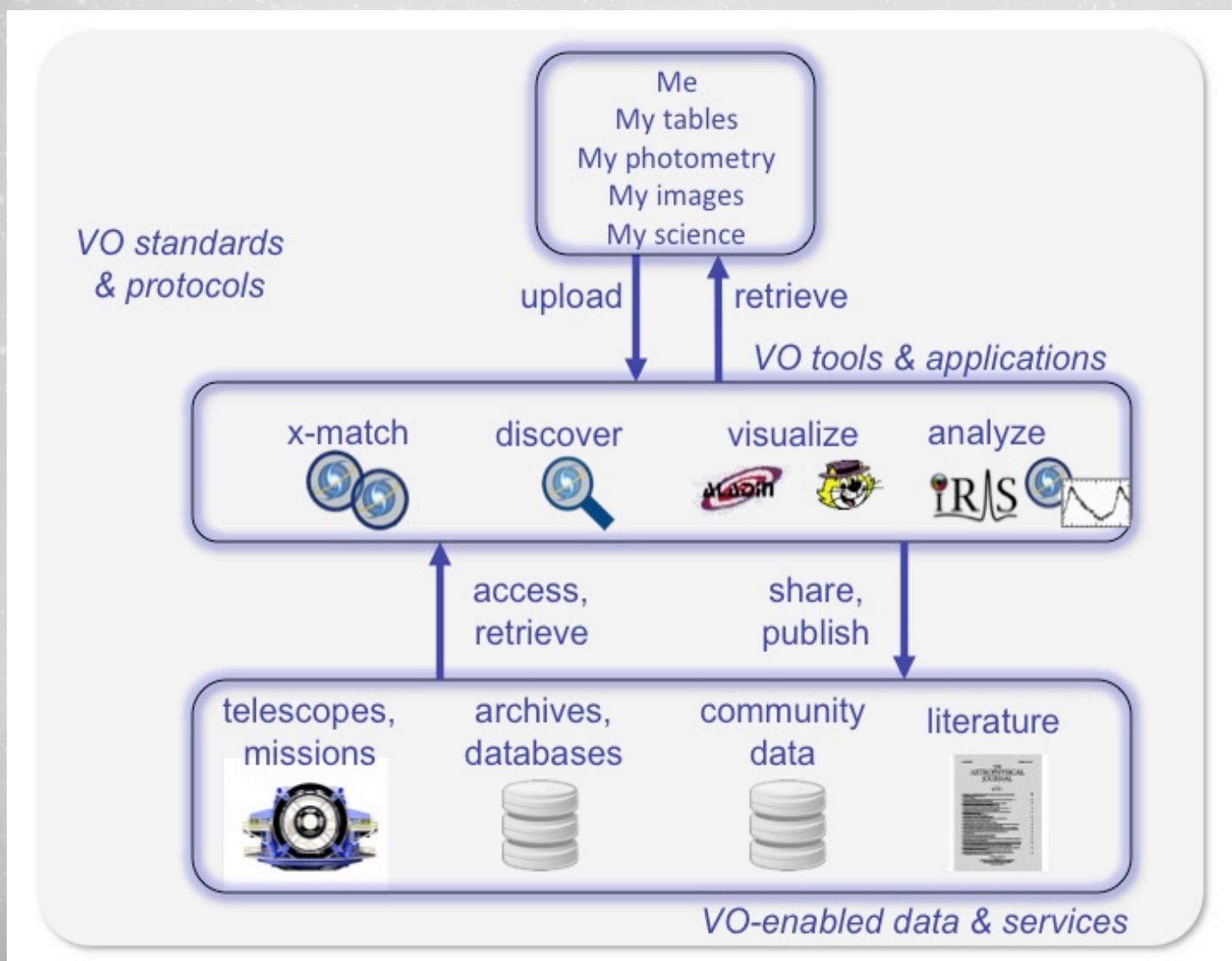
Look At: Sky
 Imagery: SDSS: Sloan Digital Sky Survey

Info:

1 of 4

Ursa Major 01:52:30
 RA : 09h53m32s
 Dec : 69:16:34

VAO Ecosystem



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VAO Future Planning

- NSF/NASA joint review completed FY12
 - Announced Project closure end of FY14
- VAO Project is developing restructure plan (Feb '13)
 - As a result of funding reduced and prioritization for sustaining the infrastructure
- Anticipate Archive Data Centers with community and partners will play more critical role, opportunity for leadership



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Role in Big Data and Opportunity for Leadership

- VO efforts over the past decade have led to a rich and versatile infrastructure
- We cannot afford to lose this!

“VAO and its NVO predecessor have provided an essential foundation on which a future virtual observatory can be maintained. We are examining models that will maximize the use of NSF and NASA resources to achieve the ultimate goal of maintaining a virtual observatory, including the successful protocols and standards, that will be an important research resource for our scientific community. We anticipate that existing VAO project members will be strong contributors to that future.”

-- J. Ulvestad (NSF), P. Hertz (NASA)

Letter dated 9/26/2012, sent 10/10/2012