German Astrophysical Virtual Observatory

Virtual Observatory

VO Day Leibniz-Institut für Astrophysik Potsdam
November 7 2012

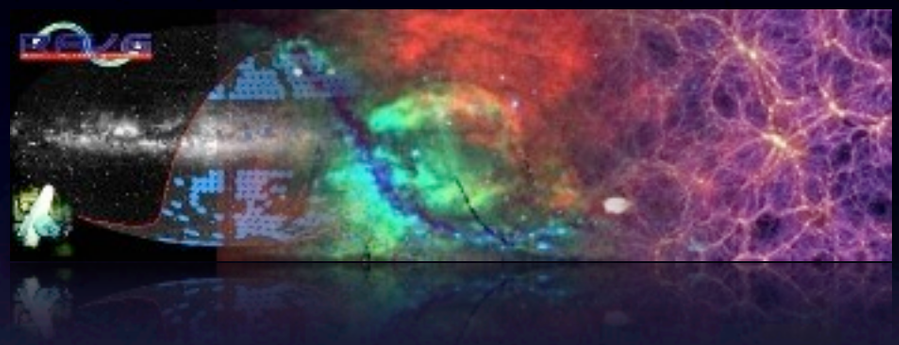
Janine Fohlmeister, Kristin Riebe & Florian Rothmaier
AIP, ZAH

Workshop Program

9:15 - 9:45 Introduction, Overview VO Tools
9:45 - 10:00 Topcat - analysis and manipulation of catalogues and tables
10:00 - 10:30 Exercise Session I: crossmatches, spectral access with Topcat & SPLAT
10:30 - 11:00 Coffee Break
11:00 - 12:30 Exercise Session II: cone search, calibration & visualization with Aladin
12:30 - 13:30 Lunch
13:30 - 14:00 The CDS portal: working with Simbad, VizieR and Aladin
14:00 - 15:00 Simulation Databases
15:00 - 15:30 Coffee Break
15:30 - 16:30 Accessing data archives via TAP and ADQL
16:30 - 17:00 Summary & Discussion

Outline

- Organisation
- Why VO?
- VO services & tools
- Science with the VO
- Tutorials & use cases



VO - Why?

The Virtual Observatory (VO) is opening up new ways of exploiting the huge amount of data provided by the ever-growing number of ground-based and space facilities, as well as by computer simulations.

The goals of the Virtual Observatory are to:

- allow or improve access to astronomical **data of all kinds** (astrometry, photometry, spectroscopy, time series,...), **from everywhere**, in well-defined protocols

- let astronomers **easily discover, access** and use data relevant to them

- **ensure that data does not simply disappear**, that it is properly described and can be accessed and understood in the future

- **provide software to help astronomers to use all this**

Astronomical data explosion

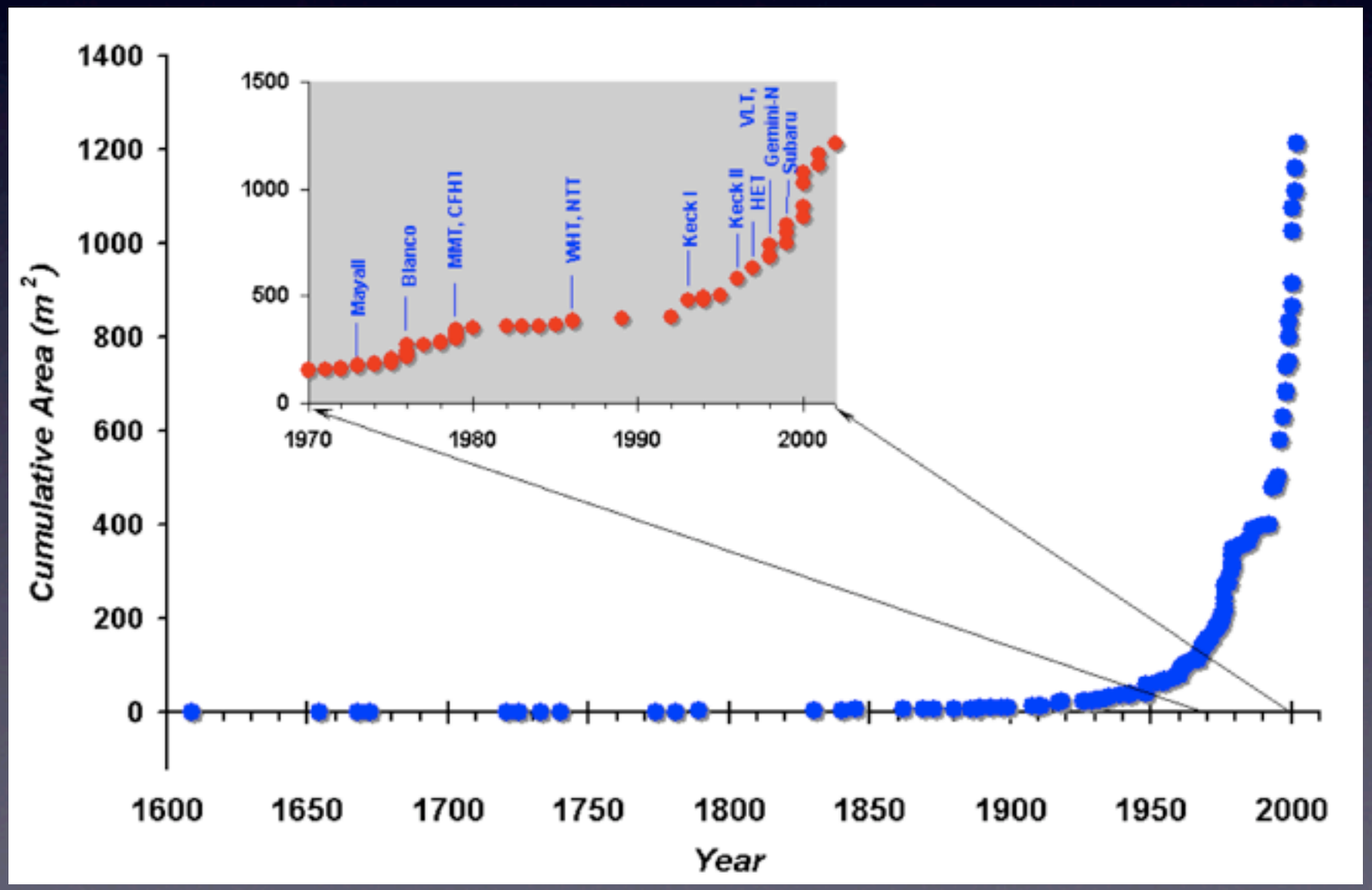
- huge surveys (SDSS, 2dF, WMAP) produce large and more complex datasets
- digital libraries: ADS, astro-ph, NED, CDS
- observatory archives: HST, ESO
- Future: LSST, GAIA, SKA ...

- will produce TERABYTES of data

Why VO?

Telescope collective area increase

E-ELT 39.3m



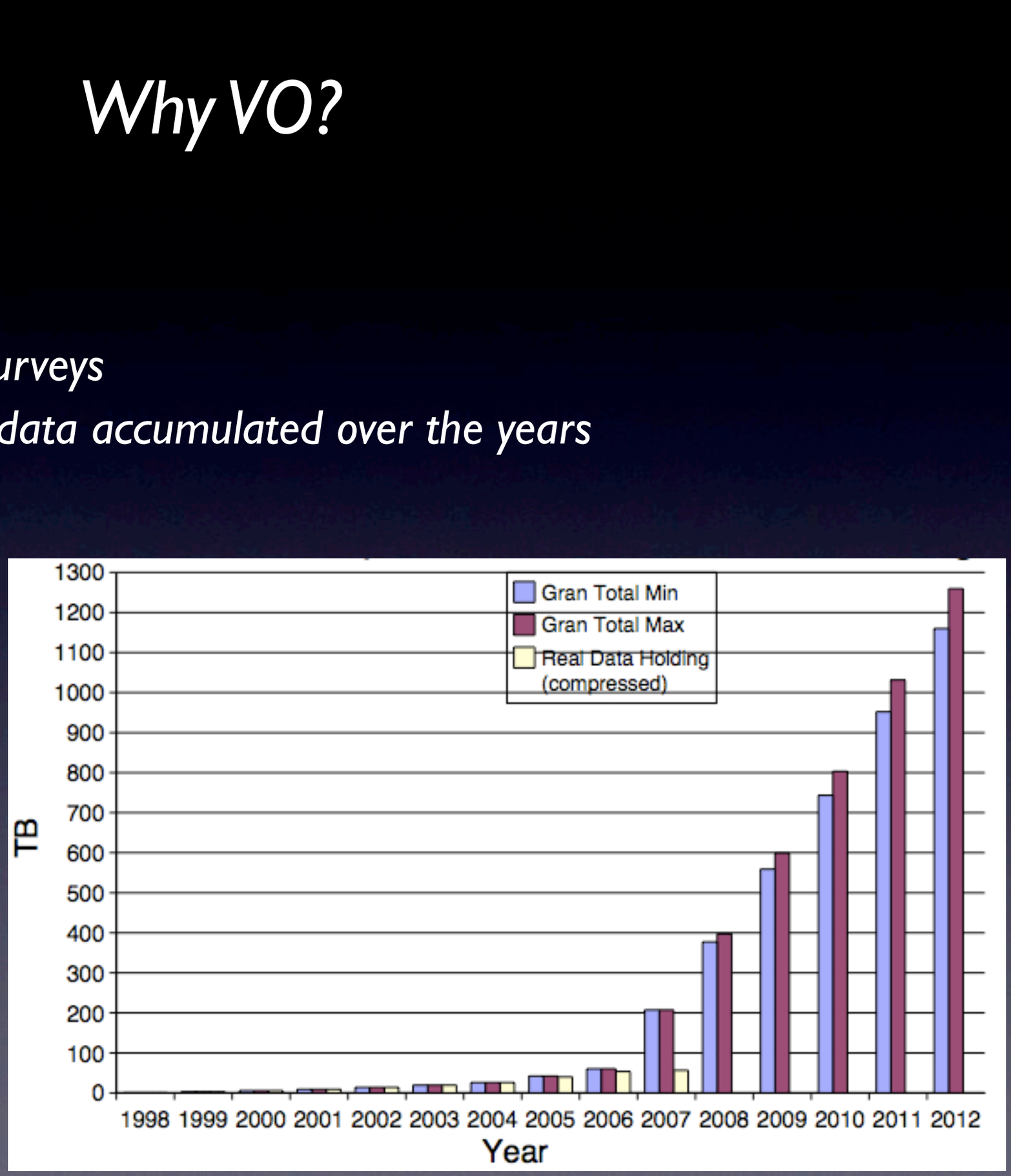
LSST 8m

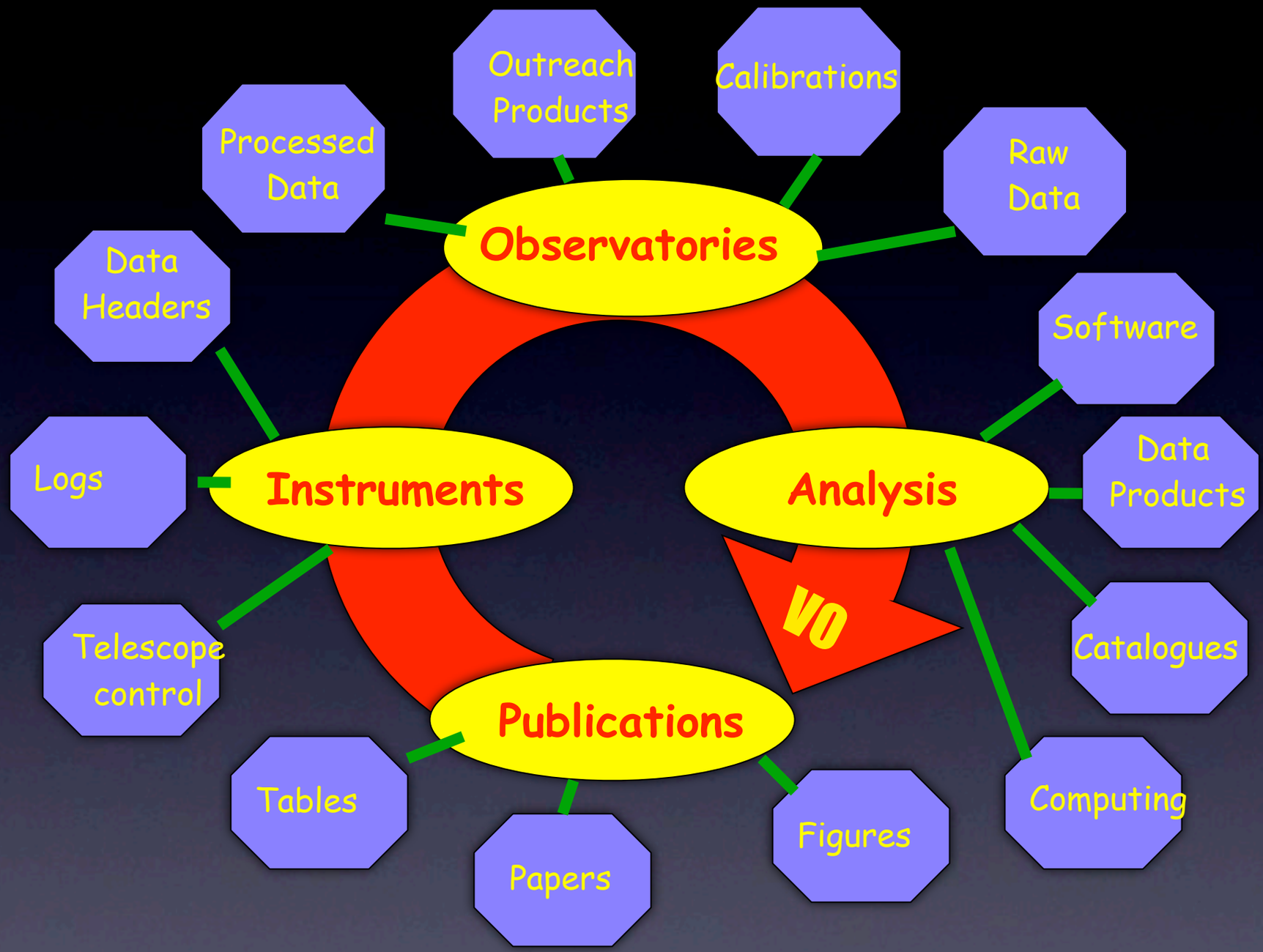
Why VO?

Modern astronomy:

- *dominated by wide/deep surveys*
- *a huge amount of multi-λ data accumulated over the years*
  - *by different people*
  - *in different places*
  - *and different formats*
- *exploding data rates*

ESO archive growth

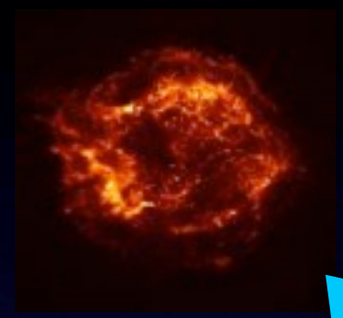




Courtesy of P. Quinn

The VO Concept

- ***VO:*** *all astronomical data on your computer*



- *The VO framework*
  - *Agreed* ***standards***
  - ***Inter-operable*** *data collections, tools and applications*

- *The usual misconceptions*
  - *no data in - no data out*
  - *not the "data police"*

All of the above requires the various players to "speak the same language": VO standards and protocols need be defined and adopted within the IVOA (International Virtual Observatory Alliance), which includes 19 projects world-wide

www.ivoa.net

German Astrophysical Virtual Observatory

Home Page

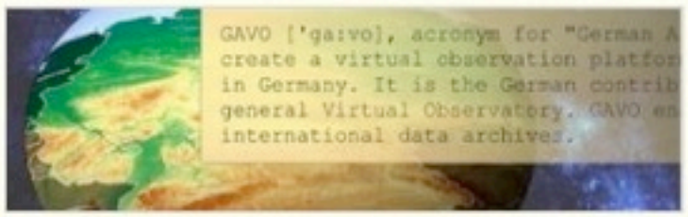
Home
About GAVO
Getting Started
GAVO Services
Documents
Contact

Search

Internal
Edit Sidebar History

About GAVO

Get background information on GAVO and the Virtual Observatory, participating institutes and GAVO members as well as contact details for further information.



GAVO Services & Data Center

Looking for a special service? Visit this page and browse GAVO's products and services or visit the GAVO Data Center for a growing collection of services, tools & archives.

Getting Started

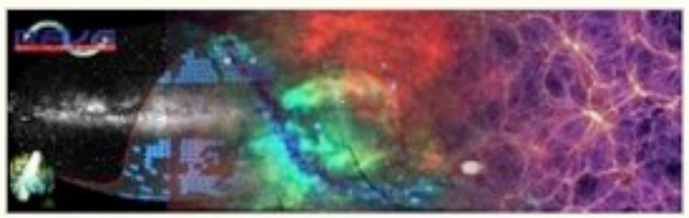
This is the starting point for information on:

- Publishing your data in the VO
- Tutorials & Use cases
- VO Tools & Services
- Acknowledging GAVO

Highlights

Links to some of GAVO's main services:

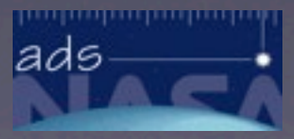
- ROSAT Services
- RAVE
- Millennium Databases
- MultiDark Database
- TheoSSA



VO - Services and Tools

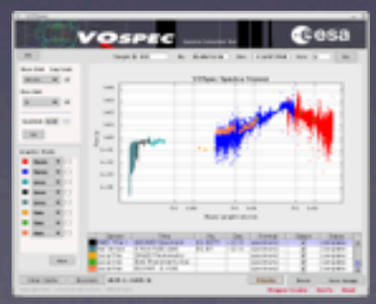
Behind the scene

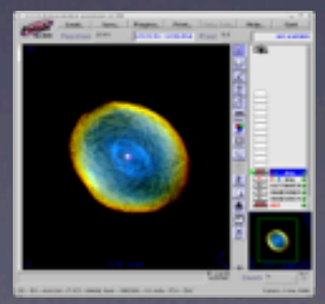
- *Global standards*
  - ➡ *Transparent inter-operability for the end users*
- *VO aware data services*
- *VO aware client tools and portals*
  - ➡ *Data Access*

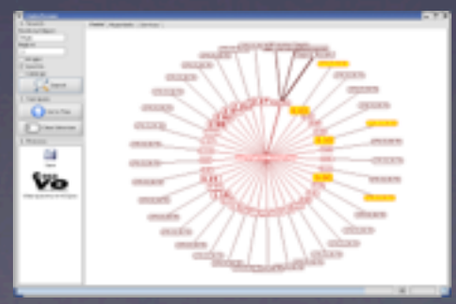


On stage

- *Registry*
  - ➡ *what, where, who, when, how*
- *VO tools, applications and services*







Dictionary

- ***Registry***: the yellow pages of the VO
- ***SAMP***: Simple Application Messaging Protocol
- ***VOTable***: data stored in XML format
- ***SIA(P)***: Simple Image Access Protocol
- ***SSA(P)***: Simple Spectral Access Protocol

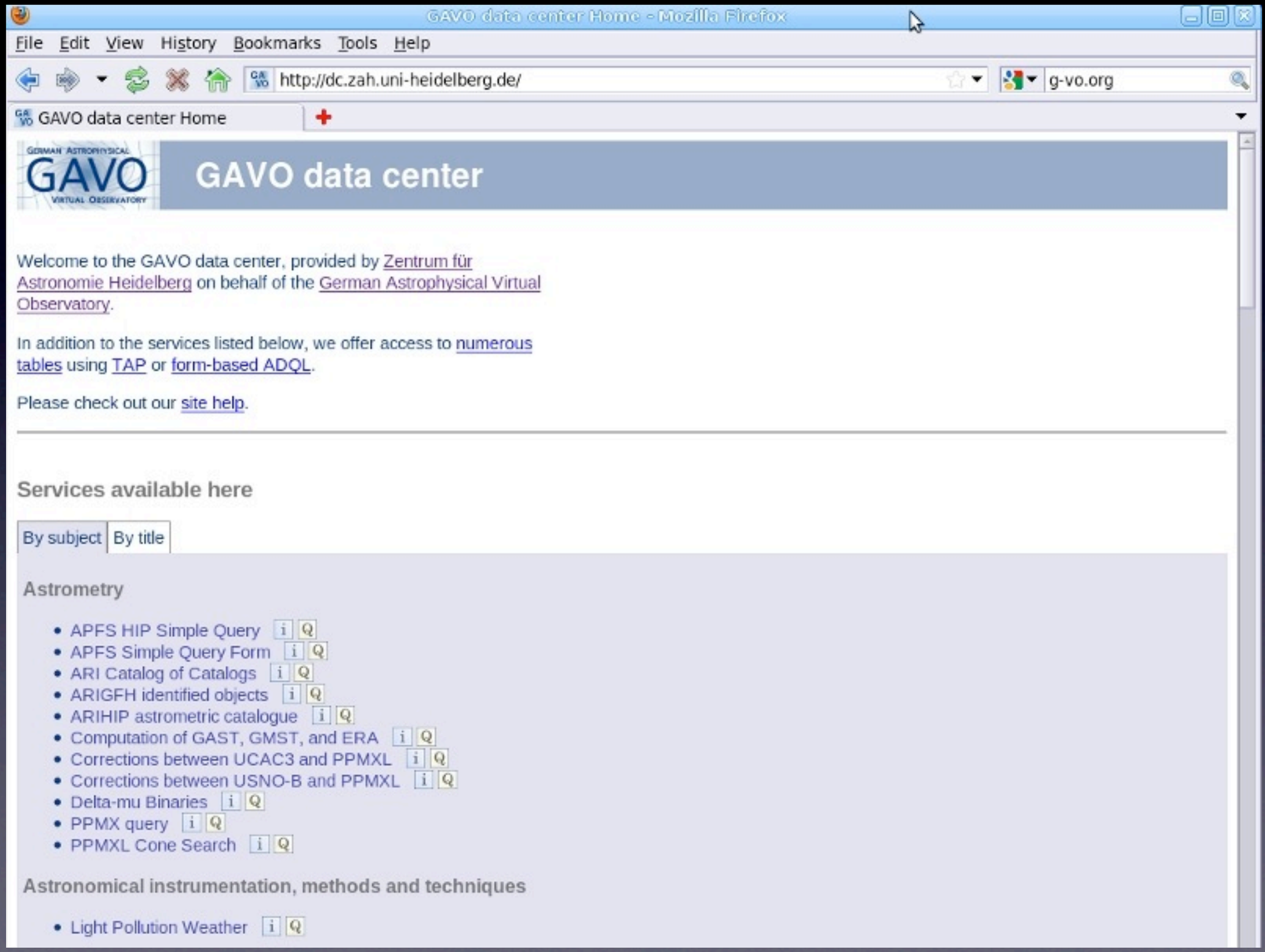
the registry

"yellow pages" of the VO
information about the service
metadata
data

Registries:

GAVO registry: http://vo.uni-hd.de
EURO-VO registry: http://registry.euro-vo.org/
AstroGrid registry: http://www.astrogrid.org/maven/docs/
NVO registry: http://nvo.stsci.edu/voregistry/index.aspx

http://dc.zah.uni-heidelberg.de/



a quick tour of some VO tools and services

VO tools offer a variety of functionalities:

- data discovery / data mining
- cross correlation
- spectra visualisation
- catalogue/table manipulation
- image handling
- plotting

SAMP: a messaging protocol allowing various tools to communicate with each other

Data Discovery	Spectral Analysis	Data visualisation and handling	SED building and fitting	Cross-correlation	Footprints
Aladin	SPLAT	TOPCAT	VOSED	TOPCAT/STILTS	*NVO Footprint*
VO Desktop	VOSpec	Aladin	VOSA	Aladin	Aladin
Datascope	Specview	VOPlot	easy-z*	*Open SkyQuery*	VirGO*
Octet	*NVO Spectrum*	*VisIVO*	GOSSIP*	VODesktop	
NED	[EURO-3D]	VOCat	*NVO Filter*		
VoEventNet		*Montage*	VOSpec		
ASPID		*VOStat*			
VirGO*		DS9*			
SkyView		Mirage*			

*existing tool, adapted to "speak" SAMP

Check/uncheck the servers concerned by the ALL VO discovery mode

Select all | Unselect all | Filter: | Go

Image servers

1)	The Aladin image server (CDS/Strasbourg) - DSS/MAM...	Ok	?
2)	SDSS DR7 images	Ok	?
3)	Multimission Archive at STScI (MAST)	Ok	?
4)	Canadian Astronomical Data Center (CADC)	Ok	?
5)	Hubble press release images	No result	?
6)	MAMA ESO R Atlas - VO-Paris (Fr)	Ok	?
7)	Chandra X-Ray Observatory Data Archive	Ok	?
8)	NOAO Science Archive	No result	?
9)	SAI Supernova light curve catalogue	Ok	?
10)	Observations of neutron stars	Ok	?
11)	IA2 Italian Center for Astronomical Archive: TNG	Querying.....	?
12)	VO-Paris MAMA ESO R Atlas	No result	?
	...andra Deep Field South (CD...	No result	?
		Querying.....	?
	...Library Simple Image Access	Error	?
		No result	?
	... - NOAO ELAIS N1 -- R	No result	?
	... - NOAO Extragalactic -- R	No result	?
		No result	?
	...Extragalactic Survey	No result	?
	...ST	No result	?
		No result	?
	...cope preview images	Querying.....	?
	... - Ancillary VLA Data	No result	?
	...e Service	Ok	?
	...atabase Image Data Atlas	Ok	?
		Ok	?
28)	2MASS Large Galaxy Atlas	Ok	?

SUBMIT | Close

Server selector

Others | File | all VO | FC

VO discovery tool

Image servers

Aladin images | SkyView | Sloan | MAST | CADC | DSS... | VLA... | Others...

Target..... NGC1068

Radius..... 3'

Servers | Images | Catalogs | Spectra

Server status report

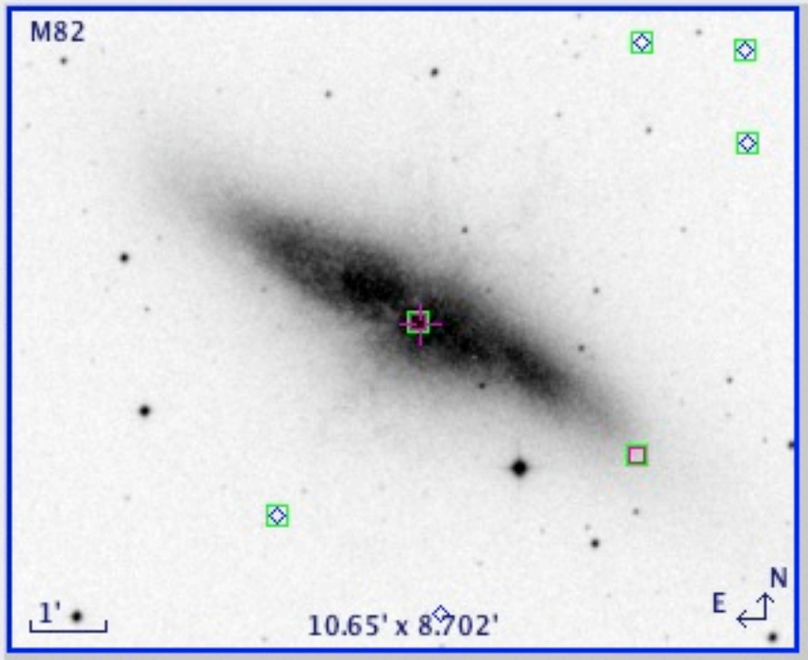
CADC

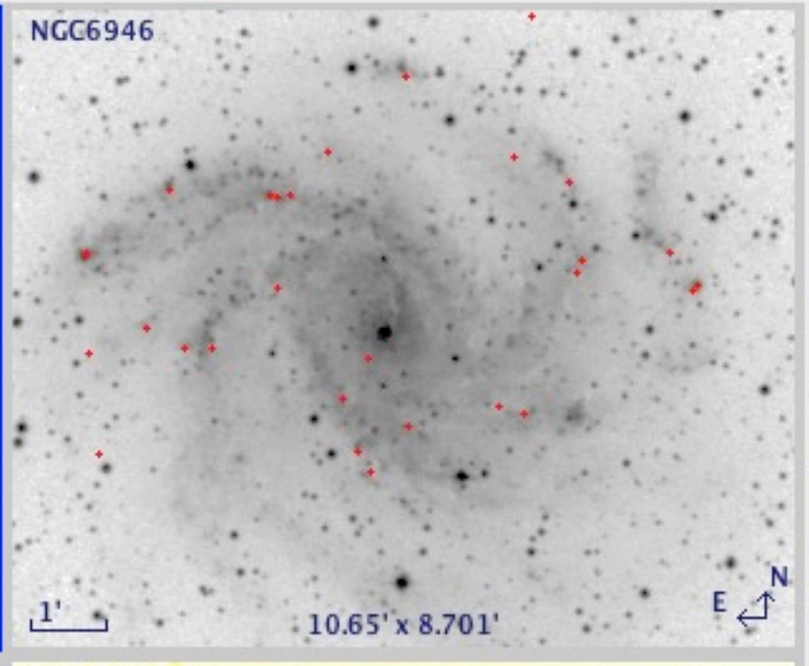
```
Description    : Canadian Astronomical Data Center (CADC)
Type           : Image
More info      : http://www.cadc.hia.nrc.gc.ca/cadc/
Last query     : http://www.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/ivoa/CADC/siapQuery?POS=4
Status         : Ok
Identifier     : CADC

The Canadian Virtual Observatory (CVO) provides this SIA server access for some CADC
archives (decompose mosaic images into single extension FITS files , cutout of the
region-of-interest when it is smaller than the image, WCS correction of returned
FITS files.
```

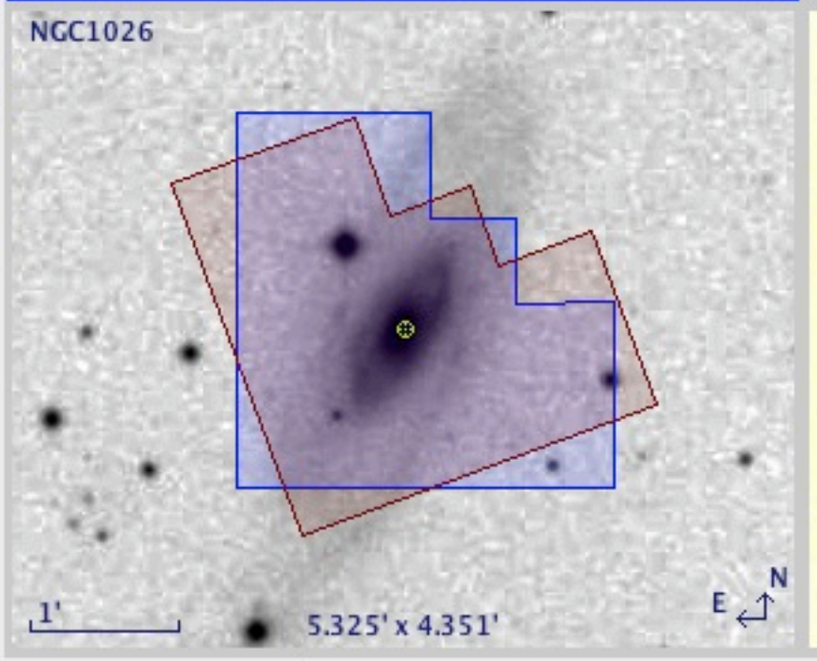
More info... | Close

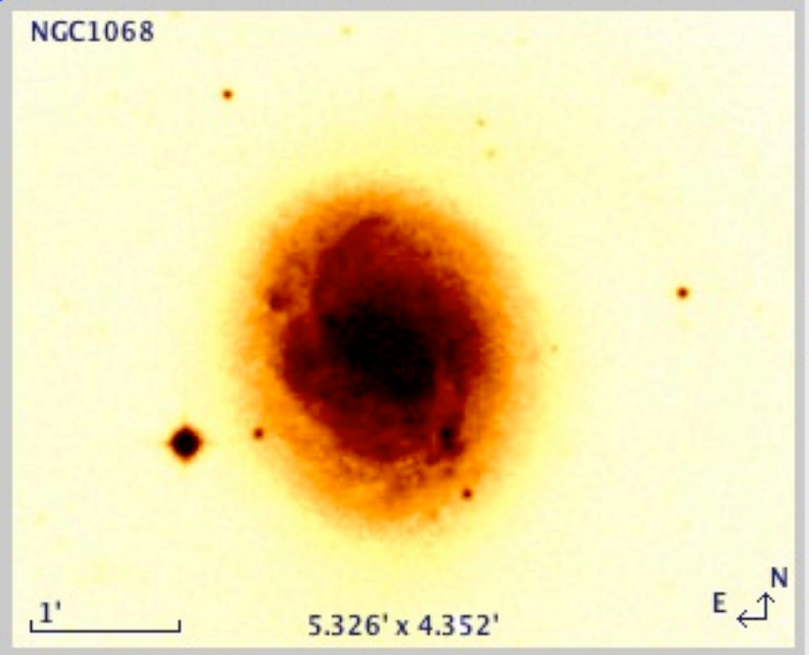
Aladin v6.0

Location | ICRS | Pixel unknown | full







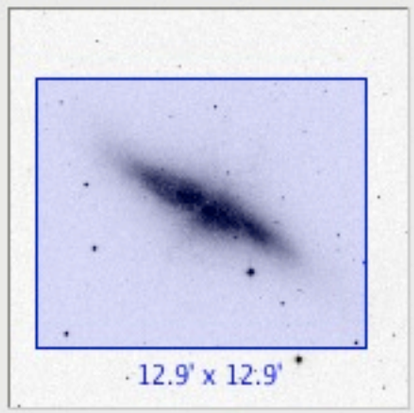


select | pan | zoom | dist | draw | tag | text | filter | cross | rgb | assoc | cont | mgiss | pixel | prop | del

M82

- Chandra
- LEDA
- WFPC2~1
- WFPC2
- HII (Simbad)
- M82
- NGC6946
- NGC1026
- NGC1068

Zoom 1/2x



grid | multiview | match

[View A1] – M82

Search GO

name	ra	dec	err elli...	err elli...	err elli...	conf flag	extent f...	sat src ...	flux ape...	flux ap
CXO J095...	149.0484...	69.6344044	0.61873	0.61874	90.0	F	F	F	1.44124E...	1.73213
2MASXJ09551726+6939...	148.82192	69.65367	-	-	-	-	6.00	6.00 45		
CXO J095...	148.7656...	69.72482...	0.47224	0.47224	90.0	F	F	F	2.54349E...	3.06043
CXO J095...	148.7718...	69.74516...	0.51303	0.51303	179.9998	F	F	F	3.892E-14	4.453E
CXO J095...	148.8370...	69.7452862	0.51413	0.51412	0.0	F	F	F	5.804E-14	6.627E

6 sel / 748 src 56Mb

TOPCAT

TOPCAT

Table List

1: Lockman_old_sample.dat

2: lh-swire_sdp090.fits

Current Table Properties

Label: test.txt

Load New Table

TOPCAT(1): Table Browser

Table Browser for 1: Lockman_old_sample.dat

	ObjID	RA	Dec	zspec
1	11014.	164.27254	58.07709	0.1
2	9802.			
3	10089.			
4	4483.			
5	12259.			
6	20416.			
7	5549.			
8	23266.			
9	29454.			
10	17415.			
11	7801.			
12	20645.			
13	17499.			
14	27261.			
15	38866.			
16	37569.			
17	28959.			
18	39703.			

TOPCAT(1): Tabl

Table Columns for 1: Lockman_old_sam

	Visible	Name	$ID
0	☐	Index	$0
1	☑	ObjID	$1
2	☑	RA	$2
3	☑	Dec	$3
4	☑	zspec	$4
5	☑	flux_fuv	$5
6	☑	flux_nuv	$6
7	☑	flux_u	$7
8	☑	flux_g	$8
9	☑	flux_r	$9
10	☑	flux_i	$10
11	☑	flux_z	$11
12	☑	flux_j	$12
13	☑	flux_h	$13
14	☑	flux_k	$14
15	☑	flux_irac1	$15
16	☑	flux_irac2	$16
17	☑	flux_irac3	$17

TOPCAT(1): Table Parameters

Table Parameters for 1: Lockman_old_sample.dat

Name	Value	Description
Name	/Users/ehatzimi/Desktop/Lockman_old_sample.dat	Table name
URL	file:/Users/ehatzimi/Desktop/Lockman_old_sample.dat	URL of original table
Column Count	44	Number of columns
Row Count	165	Number of rows

Name:

Class:

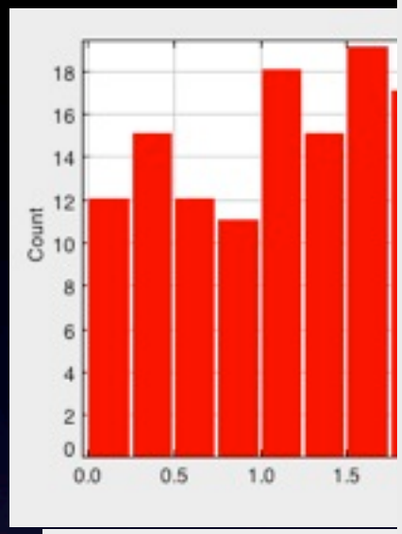
Shape:

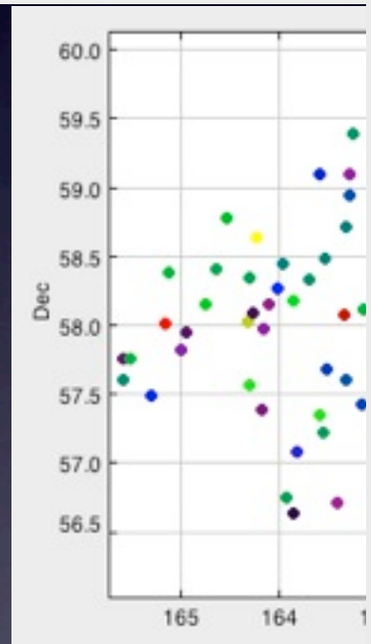
Units:

Description:

UCD:

Value:





Match

Match Criteria

Algorithm: Sky

Max Error:

- ✓ Sky
- Sky with Errors
- Sky 3D
- Exact Value
- 1-d Cartesian
- 2-d Cartesian
- 2-d Cartesian
- 3-d Cartesian

Table 1

Table: 1: Lockman_old_s

RA column: RA

Dec column: Dec

Table 2

Table: 2: lh-swire_sdp09

RA column: RA

Dec column: DEC

Output Rows

Match Se

Join Type:

- 1 and 2
- 1 or 2
- ✓ All from 1
- All from 2
- 1 not 2
- 2 not 1
- 1 xor 2

Locating inte
Eliminating m
Elapsed time
Match succeeded

Go

Multiple Cone Search

Available Cone Search Services

Registry: http://registry.astrogrid.org/astrogrid-registry/services/RegistryQueryv1_0

Keywords: SDSS quasars

And

Cancel Query

Submit Query

ame	title
TAR	ROSAT All-Sky Survey and SDSS Sample of X-Ray Emitting Stars
))	Sloan Digital Sky Survey Quasar Catalog (5th Data Release)
QS2	Sloan Digital Sky Survey Broad Absorption Line Quasars Catalog: 5th Data Release
QSO	Sloan Digital Sky Survey Broad Absorption Line Quasars Catalog (3rd Data Release
QSO	Sloan Digital Sky Survey Quasars Detected by Chandra
KDE	SDSS NBCKDE Catalog of Photometrically Selected Quasar Candidates

AccessURL	Description	Version
http://heasarc.gsfc.nasa.gov/...		

Multiple Cone Search Parameters

Cone Search URL: http://heasarc.gsfc.nasa.gov/cgi-bin/vo/cone/coneGet.pl?table=sdssc

Input Table: 1: Lockman_old_sample.dat

RA column: RA degrees (J2000)

Dec column: Dec degrees (J2000)

Search Radius column: 1.0 arcsec

Output Mode: New joined table with best matches

Parallelism: 5 Error Handling: ignore

Go Stop

Science with the VO

A&A 534, L7 (2011)
DOI: 10.1051/0004-6361/201117822

Astronomy & Astrophysics

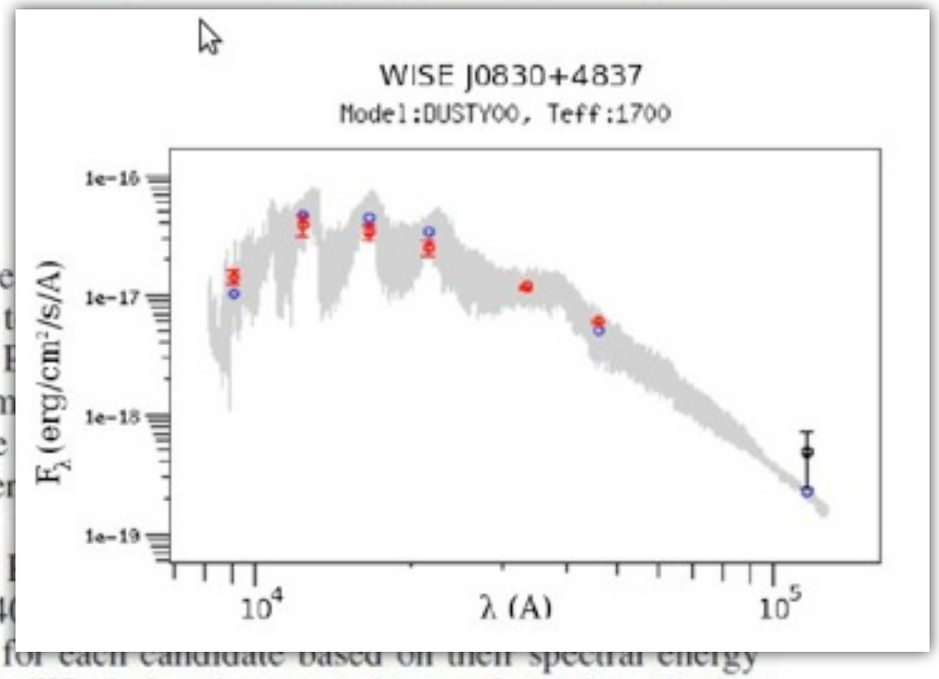
LETTER TO THE EDITOR

WISE/2MASS-SDSS brown dwarfs candidates using Virtual Observatory tools*

M. Aberasturi[1,2], E. Solano[1,2], and E. L. Martín[1]

[1] Centro de Astrobiología (INTA-CSIC), Departamento de Astrofísica, PO Box 78, 28691 Villanueva de la Cañada, Madrid, Spain
e-mail: [miriam;esm;ege]@cab.inta-csic.es
[2] Spanish Virtual Observatory, Spain

Received 4 August 2011 / Accepted 22 September 2011



ABSTRACT

Context. Massive far-red and infrared imaging surveys in different bandpasses are
dwarfs (BDs). The Virtual Observatory (VO) represents an adequate framework t
them out according to specific requirements. A statistically significant number of
properties better for identifing peculiar objects. WISE, an all-sky survey in the m
increase the number of BDs significantly, in particular those at the lower end of the
Aims. We aim to demonstrate that VO tools are efficient in identifing and character
released by large surveys.
Methods. Using VO tools we performed a cross-match of the WISE Preliminary
Data Release 7 catalogues over the whole area of sky that they have in common (~4
were used to obtain a list of BD candidates. A temperature estimate is provided for each candidate based on their spectral energy distribution using VOSA, a VO tool for spectral energy distribution (SED) fitting. We derive the spectral types from the effective temperatures. Distances, calculated from the absolute magnitude- spectral type relation, place our candidates at 14–80 pc from the Sun, assuming that they are single.
Results. We have identified 31 BD candidates, 25 of which have already been reported in the literature. The remaining six candidates have been classified as L- (four) and T-type (two) objects. The high rate of recovery of known BDs (~90% of the T dwarfs catalogued in 2MASS) demonstrates the validity of our strategy to identify them with VO tools. An application of this method for a deeper search that covers the whole sky in common to WISE and UKIDSS will be presented in a forthcoming work.

Key words. brown dwarfs – surveys – proper motions – virtual observatory tools – astronomical databases: miscellaneous

A&A 536, A50 (2011)
DOI: 10.1051/0004-6361/201117663

Astronomy & Astrophysics

Prediction of astrometric microlensing events during the *Gaia* mission

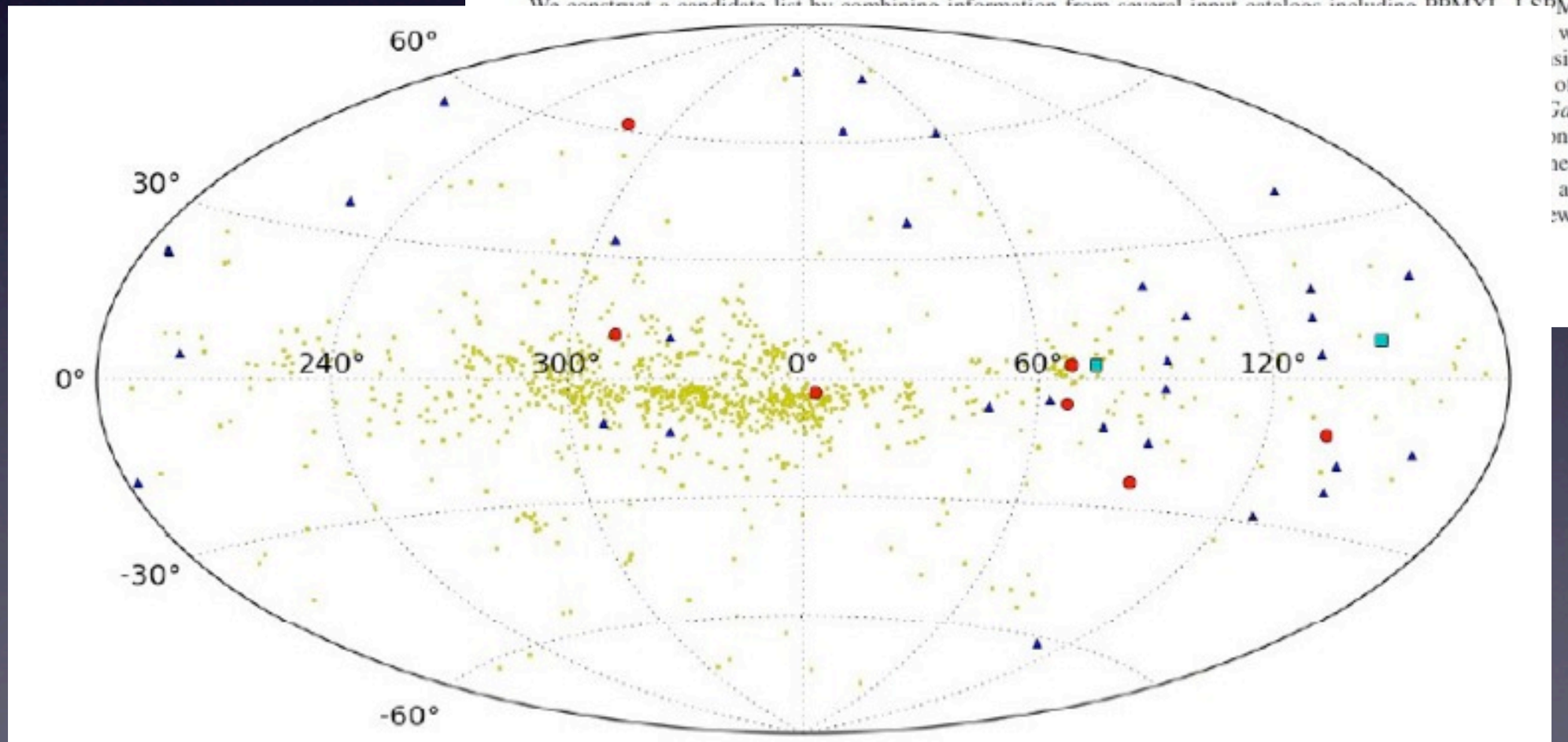
S. Proft, M. Demleitner, and J. Wambsganss

Astronomisches Rechen-Institut, Zentrum fuer Astronomie der Universitaet Heidelberg, Moenchofstraße 12–14, 69120 Heidelberg, Germany
e-mail: sproft@ari.uni-heidelberg.de

Received 8 July 2011 / Accepted 30 September 2011

ABSTRACT

We identify stars with large proper motions that are potential candidates for the astrometric microlensing effect during the *Gaia* mission i.e. between 2012 and 2019. The effect allows a precise measurement of the mass of a single star that is acting as a lens. We construct a candidate list by combining information from several input catalogs including PPMXL, LSPM, PPMX, OGLEBG, well as the calculation sing catalog comprises of these candidates are *Gaia* mission. For most nsiderably reduced by ne candidates that have a strong centroid shift ew years with the *Gaia*

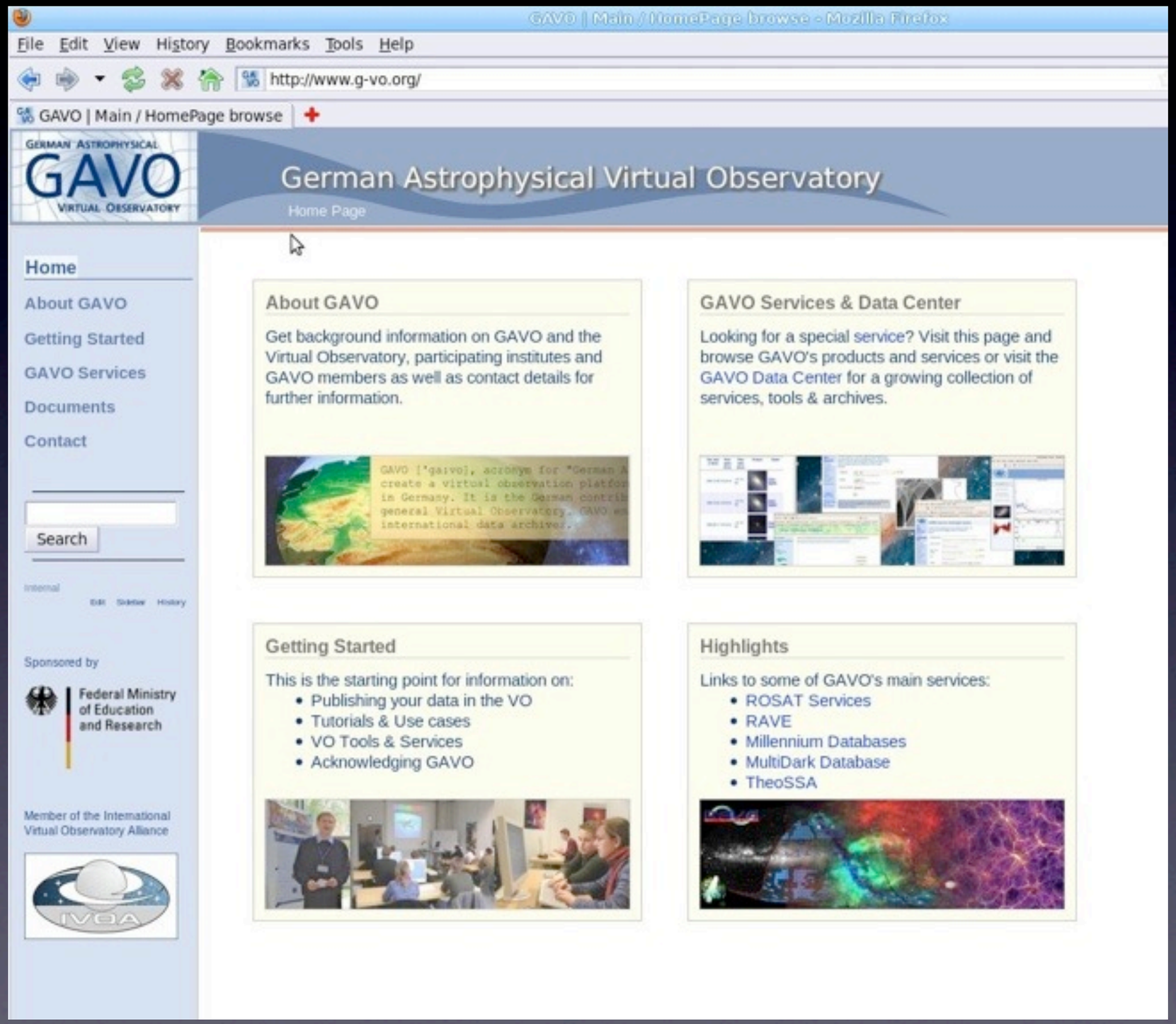


IVOA Newsletter

http://ivoa.net/newsletter/

- VO applications and instrumentation highlights
- recent papers on VO-enabled science
- VO calendar conferences and events

Keep in touch:



http://www.g-vo.org/

Email:
gavo@ari.uni-heidelberg.de