

AstroGrid and the Virtual Observatory @ iScience

Nicholas Walton

AstroGrid and Euro-VO Technology Centre Project Scientist

Institute of Astronomy
The University of Cambridge



Talk Aims

- Introduce you to the Virtual Observatory and AstroGrid's part in this
- Give an introduction to the use of the AstroGrid user software
 - VODesktop
 - Python scripting
 - TopCat
- Provide some real examples
 - such that you have an idea of how AstroGrid can be of use to you
- Close with questions and feedback
 - and after the meeting via helpdesk@astrogrid.org

After the Workshop

- Use AstroGrid
 - <http://www.astrogrid.org>
 - sign in to the astrogrid-announce mailing list
 - if you get stuck using the VO: helpdesk@astrogrid.org
- If you are interested in 'publishing' data to the VO
 - <http://deployer.astrogrid.org>
- and (for teccies!) if you are interested in the 'code'
 - <http://developer.astrogrid.org>
- Find out more about science with the VO
 - Euro-VO conference @ ESAC, Madrid
 -

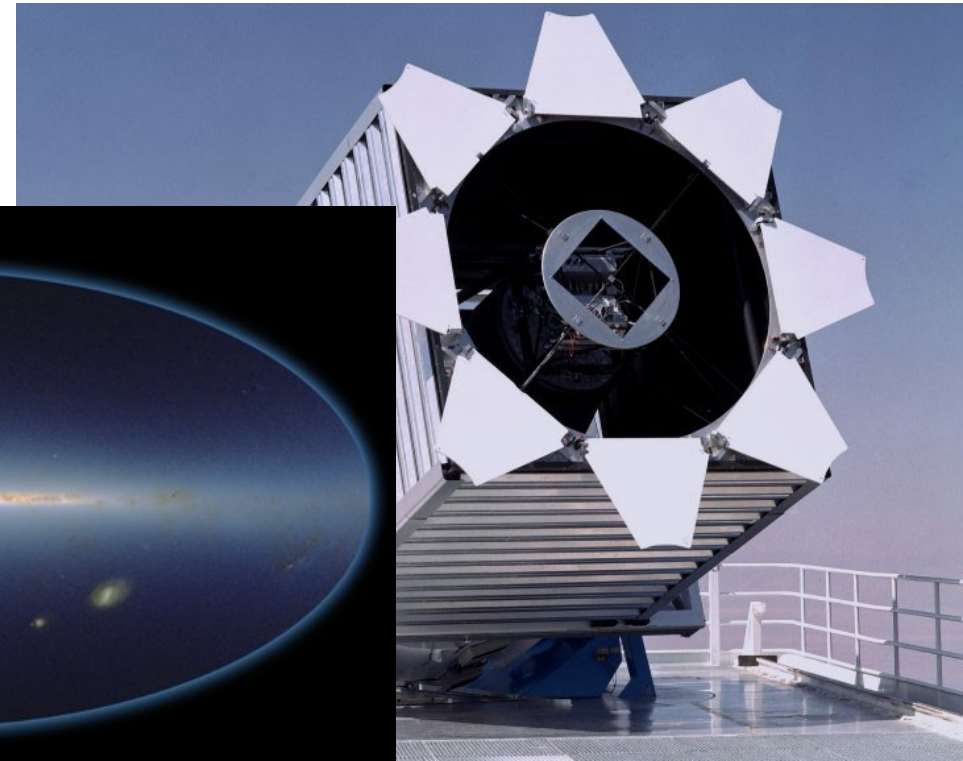
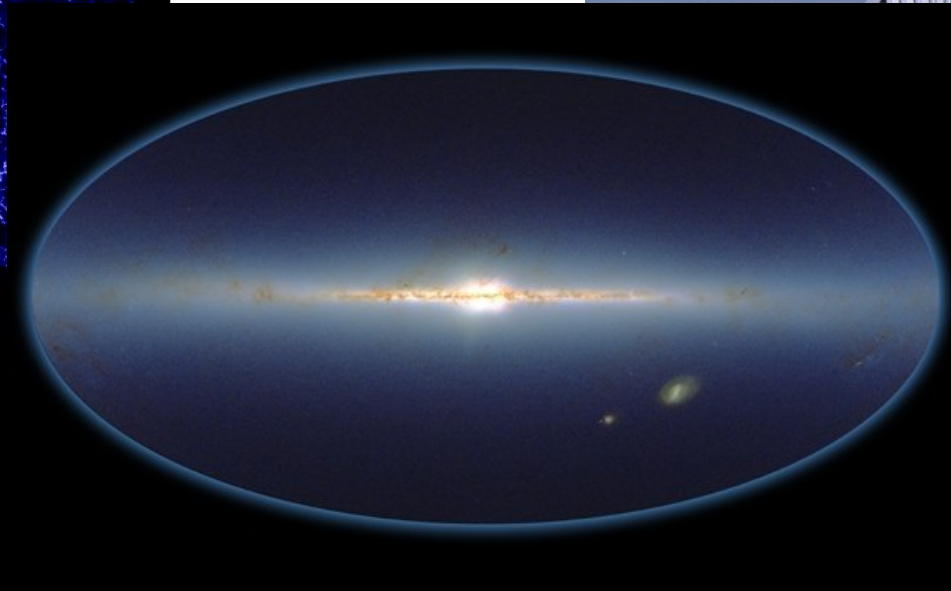
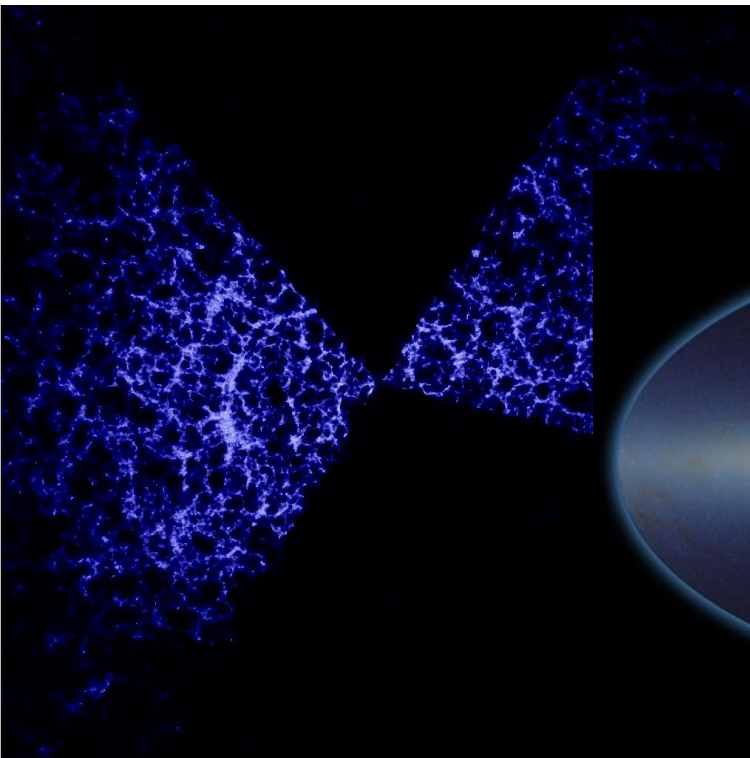
AstroGrid: a brief introduction

The Challenge of Data: Access and Analysis

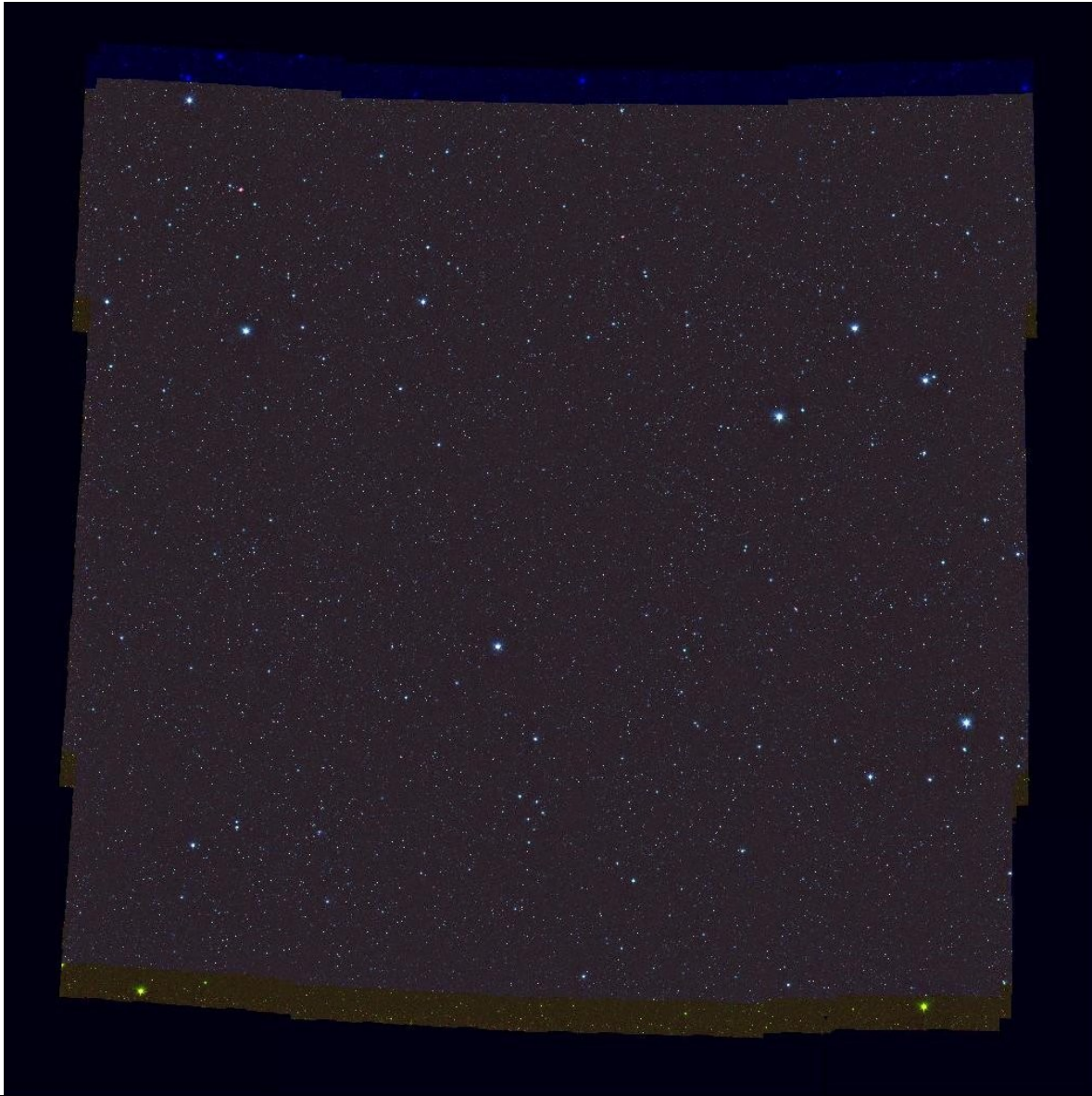
- Astronomy is an observational science
- Progress is made via understanding gained from the study of the cosmos
- Powerful observatories exist producing observational data across the wavelength domain
 - data comes in many formats/ complexity
- Data is held in Europe, USA, Asia ...
- Research collaborations are also global
- Connecting researchers with data and applications is the challenge for the Virtual Observatory

The Evolving Scientific Process

- Astronomy becomes a computational science
 - observe all the sky in many colours
 - generate large scale simulations
 - compare and contrast with observations



The need for a Virtual Observatory



- Spitzer Wide Area Infrared Extragalactic Survey (SWIRE: PI Lonsdale) - ELAIS N1 field
- 9 sq. degrees (~ 3000 UDF)
- (moon ~ 0.2 sq. deg.)
- $\sim 600,000$ objects

All Sky $\sim 40,000$ sq. deg
or > 3 Billion objects!

Spitzer RGB image from the IRAC bands (3.6, 4.5, 8 μ m)
(Credit: J Surace)

Astronomy Data

- Most astronomy data held in on-line archives
- Diversity
 - images, spectra, 3-D, tables
 - user interface varies from archive to archive
- Major astronomy archives include:
 - ESO: <http://archive.eso.org>
 - STScI (MAST: incl HST): <http://archive.stsci.edu/>
 - Chandra (X-Ray): <http://cxc.harvard.edu/cda/>
 - IPAC (IR): <http://www.ipac.caltech.edu/>
- User required to interact with many differing services: time consuming / learning curve

NASA/IPAC Infrared Science Archive
for NASA's Infrared and Submillimeter Data

Home About Holdings Missions


Catalog Search
Basic General
Image Services
Finder Charts
2MASS Images
2MASS Ext. Srcs.
Mosalcs
Cutouts
Inventories
IRSA Holdings
NVO Sky Coverage
Tools
OASIS Visualizer
Montage Image Validation
Object Lookup
QA Tools
Dust Extinction
Data Tags
Data Sets
2MASS
COSMOS
IRAS
IRTS
ISO
MSC
MSX
NED Images
SDSS Images
Spitzer
SWAS

NASA/IPAC EXTRAGALACTIC DATABASE

OBJECTS	DATA
By Name	Images By Object Name or By Region
Near Name	Photometry & SED
Near Position	Spectra <small>NEW</small>
Advanced All-Sky	Redshifts
IAU Format	Positions
By Refcode	Notes
	Diameters

Interface last updated: 24 Oct 2007
 * 10.1 million objects
 * 15.5 million multiwavelength object coordinates
 * 188 thousand associations (candidate galaxies)
 * 1.4 million redshifts
 * 38.8 million photometric measurements

If your research benefits from the use of the data and software research has made use of the NASA/IPAC Infrared Science Archive, please contact the NASA/IPAC Infrared Science Archive, California Institute of Technology, Pasadena, CA 91125, USA. Email: irsa@ipac.caltech.edu



WFCAM Science Archive

WSA Home
Start Here
Data Overview
Known Issues
the Surveys
Schema browser
Data access
Login
Archive Listing
GetImage
MultiGetImage
Region
Menu query
Freeform SQL
CrossID
Analysis services
SQL Cookbook
Q&A
Glossary
Release History
non-Survey
Gallery
Publications
Monitor
Downtime
Links



IFA ROE

Home | Overview | Browser | Access | Login | Cookbook | nonSurvey **WSA**

Status: Not logged in.
Please reload this page if you have logged in and are not seeing the correct login status.

SQL by Menu Step 2

In this section you should select the parameters you wish to extract from the **ukidssdr1plus..lasSource** table and/or apply constraints to. **Indexed variables** are highlighted, searches making use of indexed quantities will execute faster.

You must select or enter at least one parameter.

Select:

<input type="checkbox"/> sourceID	<input type="checkbox"/> cuEventID	<input type="checkbox"/> frameSetID	<input type="checkbox"/> ra	<input type="checkbox"/> dec	<input type="checkbox"/> sigRa
<input type="checkbox"/> sigDec	<input type="checkbox"/> epoch	<input type="checkbox"/> muRa	<input type="checkbox"/> muDec	<input type="checkbox"/> sigMuRa	<input type="checkbox"/> sigMuDec
<input type="checkbox"/> chi2	<input type="checkbox"/> nFrames	<input type="checkbox"/> cx	<input type="checkbox"/> cy	<input type="checkbox"/> cz	<input type="checkbox"/> htmlID
<input type="checkbox"/> l	<input type="checkbox"/> b	<input type="checkbox"/> lambda	<input type="checkbox"/> eta	<input type="checkbox"/> priOrSec	<input type="checkbox"/> ymj_1Pnt
<input type="checkbox"/> ymj_1PntErr	<input type="checkbox"/> j_1mhPnt	<input type="checkbox"/> j_1mhPntErr	<input type="checkbox"/> hmkPnt	<input type="checkbox"/> hmkPntErr	<input type="checkbox"/> ymj_1Ext
<input type="checkbox"/> ymj_1ExtErr	<input type="checkbox"/> j_1mhExt	<input type="checkbox"/> j_1mhExtErr	<input type="checkbox"/> hmkExt	<input type="checkbox"/> hmkExtErr	<input type="checkbox"/> mergedClassStat
<input type="checkbox"/> mergedClass	<input type="checkbox"/> pStar	<input type="checkbox"/> pGalaxy	<input type="checkbox"/> pNoise	<input type="checkbox"/> pSaturated	<input type="checkbox"/> eBV
<input type="checkbox"/> aY	<input type="checkbox"/> aJ	<input type="checkbox"/> aH	<input type="checkbox"/> aK	<input type="checkbox"/> yHallMag	<input type="checkbox"/> yHallMagErr
<input type="checkbox"/> yPetroMag	<input type="checkbox"/> yPetroMagErr	<input type="checkbox"/> yPsfMag	<input type="checkbox"/> yPsfMagErr	<input type="checkbox"/> ySerMag2D	<input type="checkbox"/> ySerMag2DErr
<input type="checkbox"/> yAperMag3	<input type="checkbox"/> yAperMag3Err	<input type="checkbox"/> yAperMag4	<input type="checkbox"/> yAperMag4Err	<input type="checkbox"/> yAperMag6	<input type="checkbox"/> yAperMag6Err
<input type="checkbox"/> yGausig	<input type="checkbox"/> yEll	<input type="checkbox"/> yPA	<input type="checkbox"/> yErrBits	<input type="checkbox"/> yDeblend	<input type="checkbox"/> yClass
<input type="checkbox"/> yClassStat	<input type="checkbox"/> yppErrBits	<input type="checkbox"/> ySeqNum	<input type="checkbox"/> yObjID	<input type="checkbox"/> yXi	<input type="checkbox"/> yEta
<input type="checkbox"/> j_1HallMag	<input type="checkbox"/> j_1HallMagErr	<input type="checkbox"/> j_1PetroMag	<input type="checkbox"/> j_1PetroMagErr	<input type="checkbox"/> j_1PsfMag	<input type="checkbox"/> j_1PsfMagErr
<input type="checkbox"/> j_1SerMag2D	<input type="checkbox"/> j_1SerMag2DErr	<input type="checkbox"/> j_1AperMag3	<input type="checkbox"/> j_1AperMag3Err	<input type="checkbox"/> j_1AperMag4	<input type="checkbox"/> j_1AperMag4Err
<input type="checkbox"/> j_1AperMag6	<input type="checkbox"/> j_1AperMag6Err	<input type="checkbox"/> j_1Gausig	<input type="checkbox"/> j_1Ell	<input type="checkbox"/> j_1PA	<input type="checkbox"/> j_1ErrBits
<input type="checkbox"/> j_1Deblend	<input type="checkbox"/> j_1Class	<input type="checkbox"/> j_1ClassStat	<input type="checkbox"/> j_1ppErrBits	<input type="checkbox"/> j_1SeqNum	<input type="checkbox"/> j_1ObjID
<input type="checkbox"/> j_1Xi	<input type="checkbox"/> j_1Eta	<input type="checkbox"/> j_2HallMag	<input type="checkbox"/> j_2HallMagErr	<input type="checkbox"/> j_2PetroMag	<input type="checkbox"/> j_2PetroMagErr
<input type="checkbox"/> j_2PsfMag	<input type="checkbox"/> j_2PsfMagErr	<input type="checkbox"/> j_2SerMag2D	<input type="checkbox"/> j_2SerMag2DErr	<input type="checkbox"/> j_2AperMag3	<input type="checkbox"/> j_2AperMag3Err
<input type="checkbox"/> j_2AperMag4	<input type="checkbox"/> j_2AperMag4Err	<input type="checkbox"/> j_2AperMag6	<input type="checkbox"/> j_2AperMag6Err	<input type="checkbox"/> j_2Gausig	<input type="checkbox"/> j_2Ell
<input type="checkbox"/> j_2PA	<input type="checkbox"/> j_2ErrBits	<input type="checkbox"/> j_2Deblend	<input type="checkbox"/> j_2Class	<input type="checkbox"/> j_2ClassStat	<input type="checkbox"/> j_2ppErrBits
<input type="checkbox"/> j_2SeqNum	<input type="checkbox"/> j_2ObjID	<input type="checkbox"/> j_2Xi	<input type="checkbox"/> j_2Eta	<input type="checkbox"/> hHallMag	<input type="checkbox"/> hHallMagErr
<input type="checkbox"/> hPetroMag	<input type="checkbox"/> hPetroMagErr	<input type="checkbox"/> hPsfMag	<input type="checkbox"/> hPsfMagErr	<input type="checkbox"/> hSerMag2D	<input type="checkbox"/> hSerMag2DErr
<input type="checkbox"/> hAperMag3	<input type="checkbox"/> hAperMag3Err	<input type="checkbox"/> hAperMag4	<input type="checkbox"/> hAperMag4Err	<input type="checkbox"/> hAperMag6	<input type="checkbox"/> hAperMag6Err
<input type="checkbox"/> hGausig	<input type="checkbox"/> hEll	<input type="checkbox"/> hPA	<input type="checkbox"/> hErrBits	<input type="checkbox"/> hDeblend	<input type="checkbox"/> hClass

... towards single point access ...

- Create a system that recognises:
 - data comes from many sources: thus data interoperability
 - applications are needed to work on data
- ... so Requires
 - a system built upon agreed interoperability standards
- ... and this Exploits
 - wider IT developments: Grid and WebServices
 - power of XML/ SOAP/ REST etc
 - access to high speed networks
 - but note: backbones > 10 Gb/s, desktops ~ 1 Gb/s
 - reduced costs of h/w: all data now on spinning disks

IVOA: Stds Enabling Interoperability

- The International Virtual Observatory Alliance
<http://www.ivoa.net>
- A global partnership
- Projects represent global astronomy data providers
- IVOA a forum for interoperability standards
- VO projects build on these standards
- Global reach



IVOA Standard Areas

<http://www.ivoa.net>

- Standard vocabulary (semantics)
- Standard data model (encoding format)
- Standard query language (DB queries)
- Standard access services for retrieving catalog records or image cutouts.
- Standard mechanisms for interacting with storage systems (VOSpace)
- Standard authentication/ authorisation mechanisms

Virtual Observatories are built on these standards ...

The Wider VO Picture: another talk!

- AstroGrid is the UK VO project
- AstroGrid is one of the major partners in the Euro-VO and leads the Euro-VO Technology Centre
 - <http://www.euro-vo.org>
- In the USA, the National Virtual Observatory (NVO), provides a VO system
 - <http://www.us-vo.org>

As for Observatories, there is not a 'single' Virtual Observatory, rather a small number of regional VO systems, with implementations being built conforming to VO standards – some are better than others!

Integration with ESO Virgo browser

8/15/07 ESO VirGO 1.0.0 FOV=3.07° FPS=17.86

Group of 8 Observations ISAAC.2000-10-18T08:13:58.224
RA/DE: 5h27m40.6s/ -19h23m26.9s

HP 25482

View: All Selected
Select: All, None Selected: [Show Preview](#), [Hide Preview](#)

Date	review	ExpTime	Instrument	Bandpass
2001-02-28		10	ISAAC	H
2006-10-31		20	ISAAC	NB#1....
2001-02-28		10	ISAAC	Ks
2001-02-28		10	ISAAC	H
2006-11-01		30	ISAAC	NB#2....
1999-10-27		30	ISAAC	J
2006-10-31		60	ISAAC	NB#2....
2000-10-08		10	ISAAC	Ks
2000-10-17		0.104	ISAAC	L
2006-10-31		60	ISAAC	NB#2....

Image: ISAAC.2000-10-18T08:13:58.224

Image: ISAAC.2000-10-18T08:13:58.224
Instrument: ISAAC
Date: 2000-10-17
Pos (FK5, 2000.0): 5h27m40.6s / -69d8'15.9"
Band: L
[Data set](#) [image/fits: 1024x1024]
[Transmission Curve](#) [VOTable]

View Selector

Type:
Processing:
 Date: 1995-01-1 to 2007-08-15
 Exp Time: 0.000 to 1.000
Custom:
 VLT
 ISAAC
 2.2m
 WFI
 NTT
 SOFI

Target Selection

Simbad: 30Dor Found!
RA: 5h 38m 40.12s
Dec: -69° 6' 37.40"

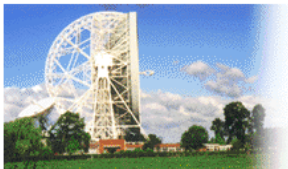
Sho... ESO Scienc... Vis... Fil... Tar...

The VO is already in use, some refs ...

- *Using VO tools to investigate distant radio starburst hosting obscured AGN in the HDF(N) region*, Richards et al., A&A, 472, 805 (2007)
- *Albus 1: a very bright White Dwarf candidate*, Caballero & Solano, ApJ, 665, L151 (2007)
- *Flare productivity of newly-emerged paired and isolated solar active regions*, Dalla, Fletcher, & Walton A&A, 468, 1103 (2007)
- *Radio-loud Narrow-Line Type 1 Quasars*, Komossa et al., AJ, 132, 531 (2006)
- *Luminous AGB stars in nearby galaxies. A study using VO tools*, Tsalmantza et al., A&A, 447, 89 (2006)

AstroGrid: UK's Virtual Observatory

- Improve the quality, ease, speed and cost effectiveness of on-line astronomy
- Make comparison and integration of data seamless
- Distributed development project
 - PS in Cambridge, PM in Leicester

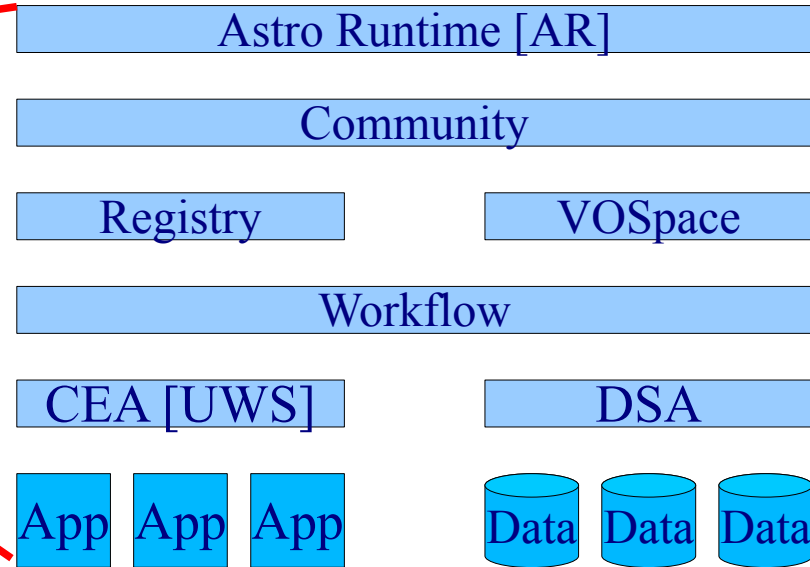
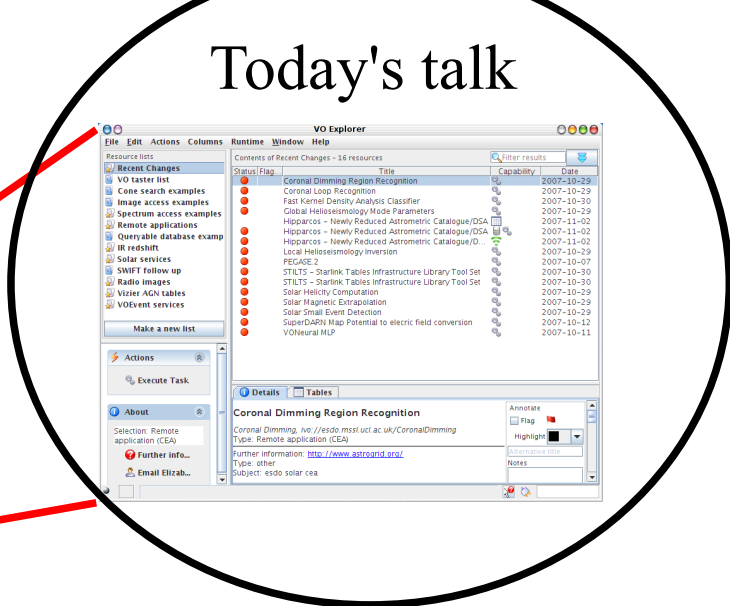
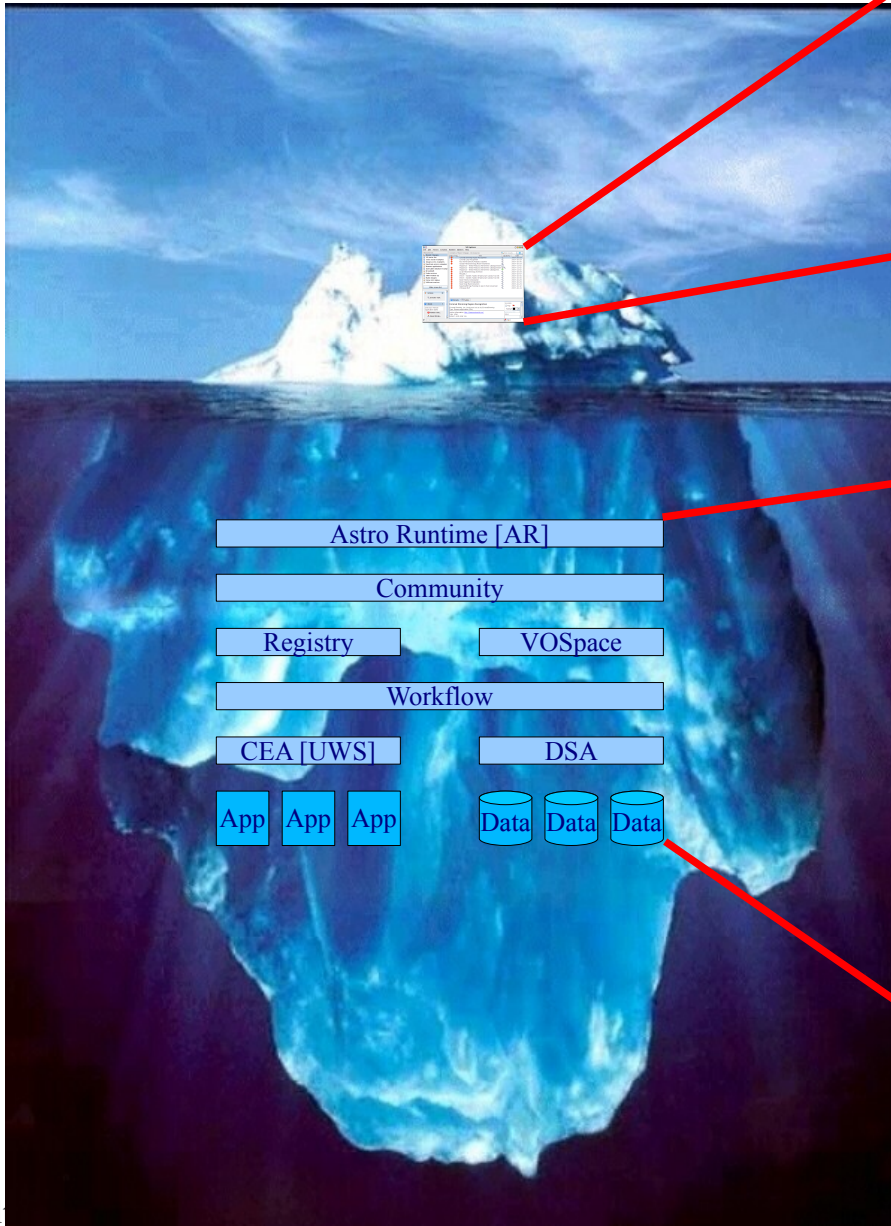


Jodrell Bank
Observatory



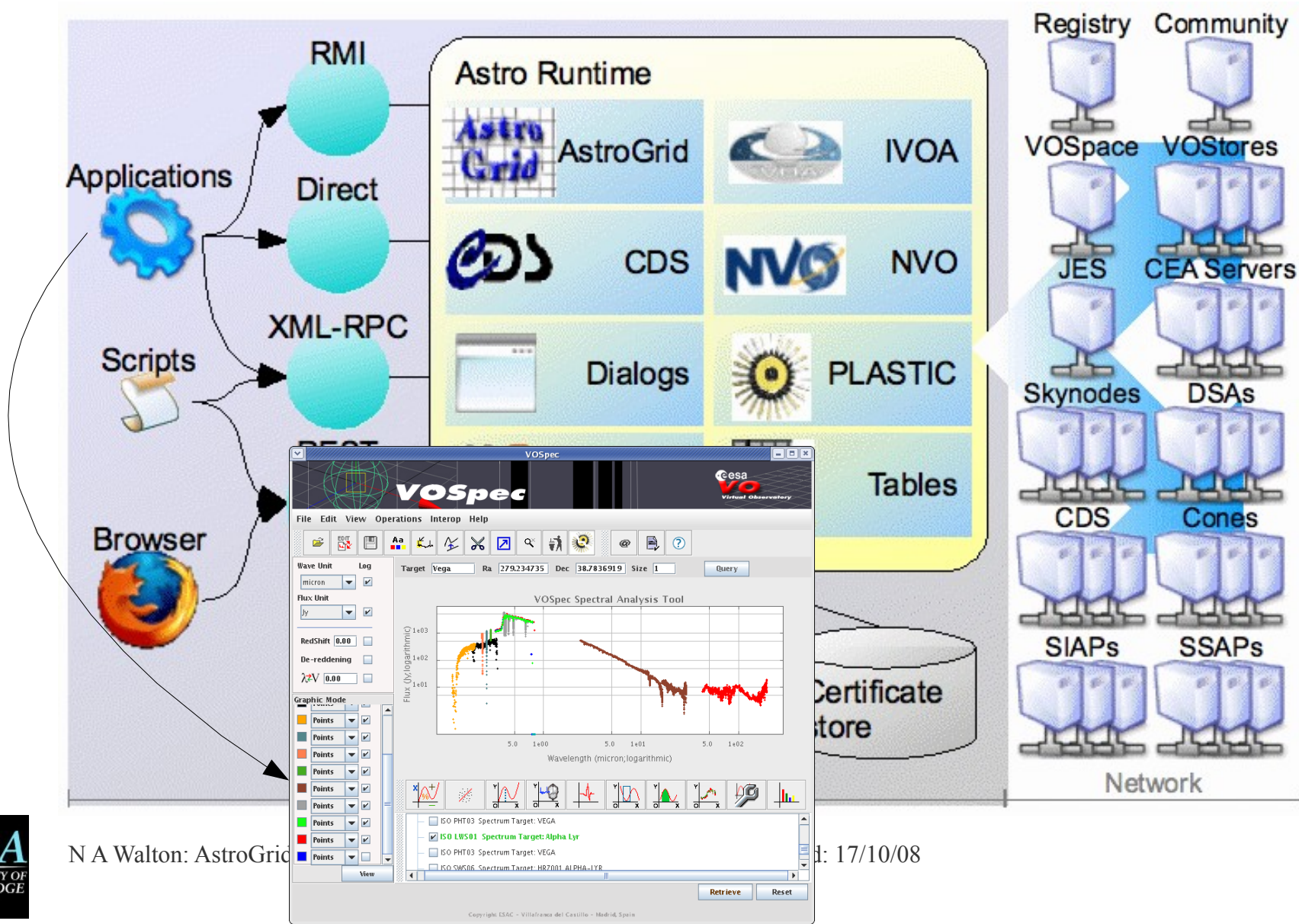
...Tip of the Iceberg

Today's talk



Astro-Run Time: VO accessibility

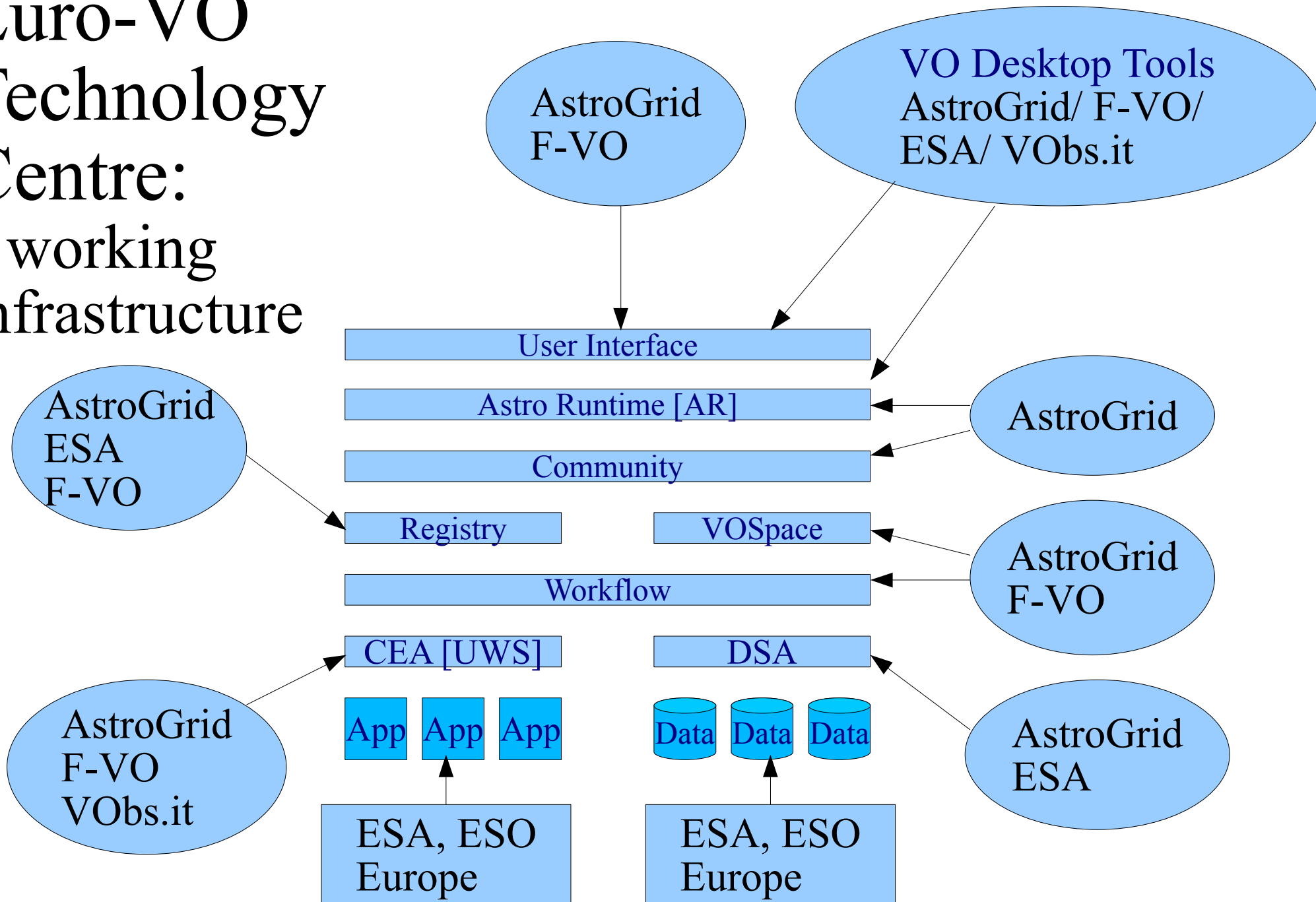
this middleware means that each new mission doesn't have to re-invent the wheel



N A Walton: AstroGrid

17/10/08

Euro-VO Technology Centre: a working infrastructure



AstroGrid

VODesktop Suite

2008.2 Release

<http://www.astrogrid.org>



VODesktop: new from Apr 2008

The screenshot displays the VODesktop application interface. A central menu overlay is visible, listing several options:

- New VO Explorer
- New File Explorer
- New All-VO Scope
- New Task Runner
- VO Desktop and Astro Runtime Preferences...
- Run Self Tests
- Show Background Processes
- Login to Community...
- Logout
- VO Desktop Help
- About VO Desktop
- Exit VO Desktop

The background interface includes a table list, current table properties, a scatter plot, and various toolbars and panels. The table list shows two tables: '1: wfs-top10000.vot' and '2: wfs-top10000-images.vot'. The scatter plot shows a distribution of points in a 2D space. The interface also features a task runner, a file explorer, and a server selector.

#	Column Name	Source
1	objID	Soc
2	ra	Ri
3	dec	De
4	htmlID	Hi
5	cx	IN
6	cy	IN
7	cz	IN
8	run_U	IN

VOExplorer

Part of VODesktop: Search, Filter, View, Use Data

The screenshot shows the VOExplorer application window. The title bar reads "org.astrogrid.VOExplorer" and "VO Explorer - VO taster list". The interface includes a menu bar (File, Edit, View, Resource, Window, Help), a sidebar with a "Start" button and a list of "Examples" (e.g., Recent Changes, VO taster list, Cone search example), and a main table of resources. Below the table are sections for "Actions" (Query) and "About" (Further Info, Email Curator). The bottom section displays detailed information for the selected resource, "2MASS All-Sky Point Source Catalog".

Status	Flag...	Title	Capability	Date
●		2MASS All-Sky Point Source Catalog	📶	2007-03-14
●		2dFGRS object catalogue	📶	2007-10-04
●		2nd Digitized Sky Survey (Blue)	📶	
●		Great Observatories Origins Deep Survey (GOODS) C...	📶	2005-03-24
●		Hubble Space Telescope Faint Object Spectrograph	📶	2004-12-09
●		HyperLeda FITS Spectrum Archive	📶	2005-01-13
●		HyperZ	📶	2007-08-28
●		Schlegel Dust Maps	📶	2007-04-02
●		Sloan Digitized Sky Survey	📶	
●		Starburst 99	📶	2007-08-28
●		SuperCOSMOS Science Archive (SSA)	📶	2007-12-05
●		Third Reference Catalog of Galaxies	📶	
●		UKIDSS DR2 (Secured Access)	📶	2007-03-06

2MASS All-Sky Point Source Catalog
Short Name 2MASS-PSC ID ivo://irsa.ipac/2MASS-PSC
Type Catalog cone search service Created 2006-02-23 Updated 2007-03-14

📶 This resource describes a **Catalog Cone Search Service**
Verbose Parameter Supported? false Maximum Search Radius 1.0
Maximum Results Returned 1000
Access URL [base](#)
Waveband Coverage infrared
Facilities Mt. Hopkins, CTIO
Instruments 2MASS 3-channel camera

Content Type catalog Subject infrared astronomy, surveys Level research
2MASS has uniformly scanned the entire sky in three near-infrared bands to

VO Explorer - Abell clusters

File Edit Actions Window Debug Help

New Search Stop Search 301 resources

Status	Title	Capability	Date
●	Superclusters of Abell and X-ray clusters (Einasto+, 2001) - Th...	Y	
●	Superclusters of Abell and X-ray clusters (Einasto+, 2001) - Th...	Y	
●	Survey at 408 MHz and 1420 MHz towards A 1314 (Vallee+, 1...	Y	
●	Survey at 408 MHz and 1420 MHz towards A 1314 (Vallee+, 1...	Y	
●	Survey at 408 MHz and 1420 MHz towards A 1314 (Vallee+, 1...	Y	
●	Survey at 408 MHz and 1420 MHz towards A 1314 (Vallee+, 1...	Y	
●	Survey at 408 MHz and 1420 MHz towards A 1314 (Vallee+, 1...	Y	
●	The APM-North Catalogue (McMahon+, 2000) - The Full Northe...	Y	
●	The CfA2S catalog (Huchra+, 1999) - Redshifts of Abell and oth...	Y	
●	The ESO Nearby Abell Cluster Survey I. (Katgert+, 1996) - Prop...	Y	
●	The ESO Nearby Abell Cluster Survey. II. (Mazure+ 1996) - *Sta...	Y	
●	The ESO Nearby Abell Cluster Survey. II. (Mazure+ 1996) - Mai...	Y	
●	The ROSAT brightest cluster sample - I. (Ebeling+, 1998) - Ref...	Y	
●	The ROSAT brightest cluster sample - I. (Ebeling+, 1998) - The...	Y	
●	The (lambda)-Orionis ring in CO (Lang+ 2000) - Clump parame...	Y	
●	UV Variations in spectrum of Abell 35 c. star (Jasiewicz+ 1994)...	Y	
●	VLA Survey of Rich Clusters of Galaxies (Slee+ 1996) - *Radio a...	Y	
●	VLA Survey of Rich Clusters of Galaxies (Slee+ 1996) - Properti...	Y	
●	VLA survey of 0016+16, Abell 665, and Abell 2218 (Moffet+, ...	Y	
●	VLA survey of Abell clusters. II. (Owen+ 1992) - Radio galaxy p...	Y	
●	VLA survey of Abell clusters. IV. (Ledlow+ 1995) - Cluster radio...	Y	
●	VLA survey of Abell clusters. IV. (Ledlow+ 1995) - Cluster radio...	Y	
●	VLA survey of Abell clusters. V. (Ledlow+ 1995) - Results of sur...	Y	
●	VLA survey of Abell clusters. V. (Ledlow+ 1995) - Results of sur...	Y	
●	Velocity data on rich clusters (Colless+ 1987) - Velocity sample ...	Y	
●	Very rich Abell clusters radio analysis (Morrison+, 2003) - Clust...	Y	
●	Very rich Abell clusters radio analysis (Morrison+, 2003) - Optic...	Y	
●	WBL Individual Galaxies Data Catalog (White et al. 1999)	Y	2007-03-28
●	WBL Poor Galaxy Clusters Catalog (White et al. 1999)	Y	2007-04-05
●	Wide-Angle-Tailed radio galaxies redshifts (Pinkney+, 2000) - ...	Y	
●	Wide-Angle-Tailed radio galaxies redshifts (Pinkney+, 2000) - ...	Y	
●	Wide-Angle-Tailed radio galaxies redshifts (Pinkney+, 2000) - ...	Y	
●	X-ray Emission from Abell Clusters of Galaxies (Briel+ 1993) - ...	Y	
●	X-ray emission of RAS Abell clusters (Ledlow+, 2003) - X-ray...	Y	

Query

About

Selected:
2 Catalog cone search service
13 TabularSkyService

Details **Tables** **XML entry**

Survey at 408 MHz and 1420 MHz towards A 1314 (Vallee+, 1987) - Source List at 408 MHz, corrected for a primary beam with Gaussian function of HPBW of 318 arcmin

URI: `///A+AS/77/31/tab, ivv://CDS/VizieR/||A+AS/77/31/table2`
Type: TabularSkyService

The cluster of galaxies Abell 1314 has been observed with the Penticon synthesis telescope simultaneously at 408 MHz (73.5 cm wavelength) with a sensitivity (7 rms) near 70 mJy and at 1420 MHz (21.1 cm wavelength) with a sensitivity (5 rms) near 4.3 mJy. In addition to the 3 cluster sources detected, a further 64 background radio sources have been detected at 1420 MHz (the 20P radio survey), and 169 background sources at 408 MHz (the 21P radio survey). The surveys extend to a radius of 3.7 degrees at 408 MHz, and to 1.0 degree at 1420 MHz from the map center at RA=1h31.5m

AstroScope : on subset

File History Actions Window Help

Search for

Catalogues Images
 Spectra Timed Data
 VizieR Tables

At

Position or Object Name
0.000000,0.000000

Search Radius (degs/')

180.000000

Degrees Sexagesimal

Navigate

Halt

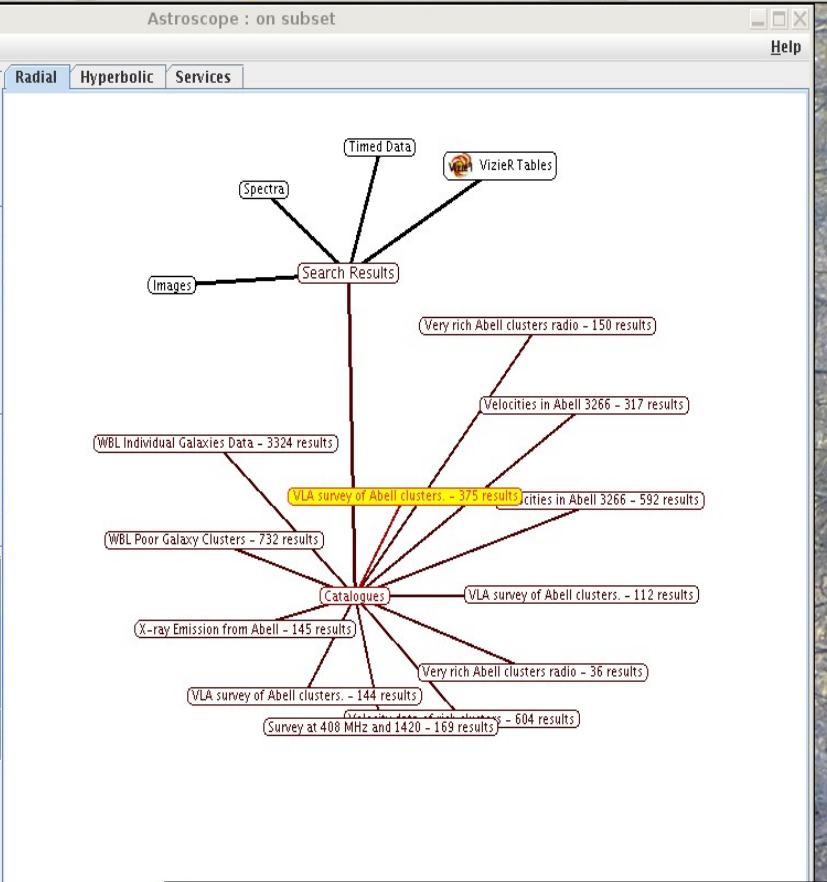
Go To Top Clear selection

Process

View in browser
Send tables to Topcat

About

Selection:
application/x-votable+xml



TOPCAT

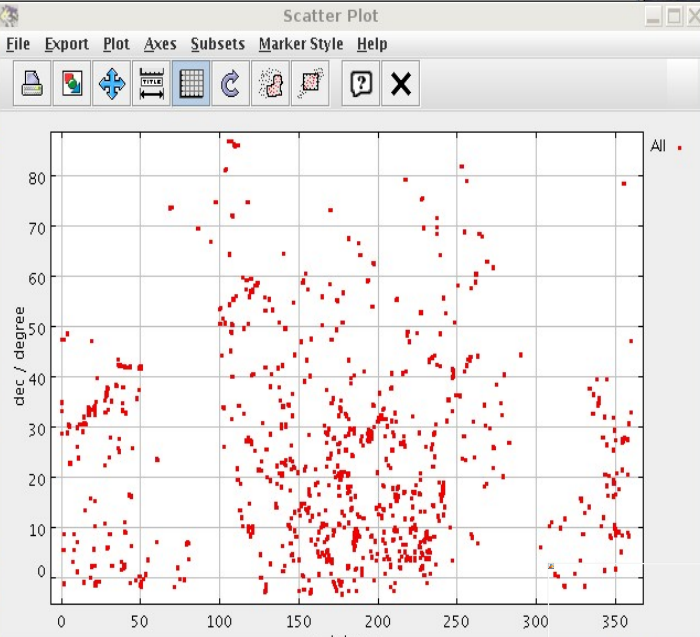
File Views Graphics Joins Windows Interop Help

Table List

- table1
- coneGet.pl?table=wblgala
- table1a

Current Table Properties

Label: coneGet.pl
Location: coneGet.pl
Name:
Rows: 3324
Columns: 14
Sort Order:
Row Subset: All
Activation Action: (no act)



Use

The screenshot displays the Aladin v5.0 software interface. On the left, a search panel is visible with options for 'Catalogues', 'Images', and 'Spectra'. The main window shows a hierarchical tree of astronomical surveys, with 'Images' selected. A 'Server selector' dialog is open in the foreground, showing a list of servers including 'F656N', 'F502N', and 'F673N'. The right side of the interface shows a multi-panel view of the Triffid nebula, with several panels displaying different images and their footprints. The bottom right corner features a dark blue box with white text.

All-VO Scope for the Triffid nebula – showing HST WFPC2 images, note the 'footprints'

VOExplorer Image Access: IC5070

VO Explorer - Image access examples

Location: hst ICRS Pixel: full

Alpha.Run 368352, CCD 4

2nd Digitized Sky Survey (Blue)

All-VO Astroscope

Search for:

- Cat. Objects
- Images
- Spectra
- Timed Data

At Position (RA,Dec) or Object Name: 312.750000,+44.366667

Search Radius (degs/arcsecs): 0.100000

Navigate: Go To Top, Clear Selection

Process: Download... Send tables to Aladin Send FITS to Aladin

Search Results:

- CCVNSVARS: General Catalog - 5 results
- HBC: Herbig & Bell Catalog of - 11 results
- INFRARED: Catalog of Infrared - 47 results
- IRASPC: IRAS Point Source - 3 results
- LBN: Lynds Catalog of Bright - 1 results
- RADIO: Master Radio Catalog - 12 results
- MSXPC: Midcourse Space - 13 results
- NVSS: NRAO VLA Sky Survey - 9 results
- OPTICAL: Master Optical - 27 results
- MITGB6CM: MIT-Green Bank - 2 results
- NGC2000: NGC2000.0 - 1 results
- TYCHO2: Tycho-2 Catalog of - 2 results
- ROSHRITOTAL: ROSAT - 1 results
- ROSID: ROSAT SIMBAD - 16 results
- SPITZMASTR: Spitzer Space - 3 results
- WENSS: Westerbork Northern - 1 results
- WDS: Washington Double Star - 2 results
- IPHAS images
- ROSAT All-Sky X-ray Survey
- Westerbork Northern Sky
- PSPC summed pointed
- NVSS
- 4850 MHz Survey (CRB)
- ROSAT High Resolution Image
- ROSAT All-Sky X-ray Survey (First)
- Galactic Atlas

ra	decl	error ra...	pmag	pmag error	pmaq band	gsc class	plate id	multiple...
312.8125...	44.41653...	0.200000...	11.80000...	0.400000...	1	0	00Vv	T
312.8125...	44.41646...	0.200000...	12.13000...	0.400000...	1	0	00C8	T
312.8125...	44.41165...	0.300000...	13.31000...	0.400000...	1	3	00Vv	T
312.8125...	44.41161...	0.200000...	13.52999...	0.400000...	1	3	00C8	T
312.8140...	44.41335...	0.300000...	13.46000...	0.400000...	1	3	00Vv	T
312.8140...	44.41335...	0.200000...	13.75000...	0.400000...	1	3	00C8	T

7 sel / 40 src 86Mb

Catalogue Access: Example - IPHAS

The screenshot shows the IPHAS Task Runner interface. The window title is "Task Runner - untitled". The interface is divided into several sections:

- Inputs:** Shows a "Query" icon, a "Format" icon, and a dropdown menu set to "VOTABLE".
- Interface:** A dropdown menu set to "adql".
- Execute:** A button labeled "Execute!".
- Outputs:** Shows a "Result" icon, a text field containing "/Galway/iphas.vot", and a "Browse.." button.
- Execution:** Shows a green status indicator, the text "adql - IPHAS", and "No change: will re-check in 64 seconds".
- ADQL:** A tree view showing the query structure:
 - Select
 - Items *
 - From PhotoObjBest as a
 - Where
 - And
 - Comparison a.coremag_r>13
 - Comparison a.coremag_r<8
 - Comparison a.coremag_i>13
 - Comparison a.coremag_i<8

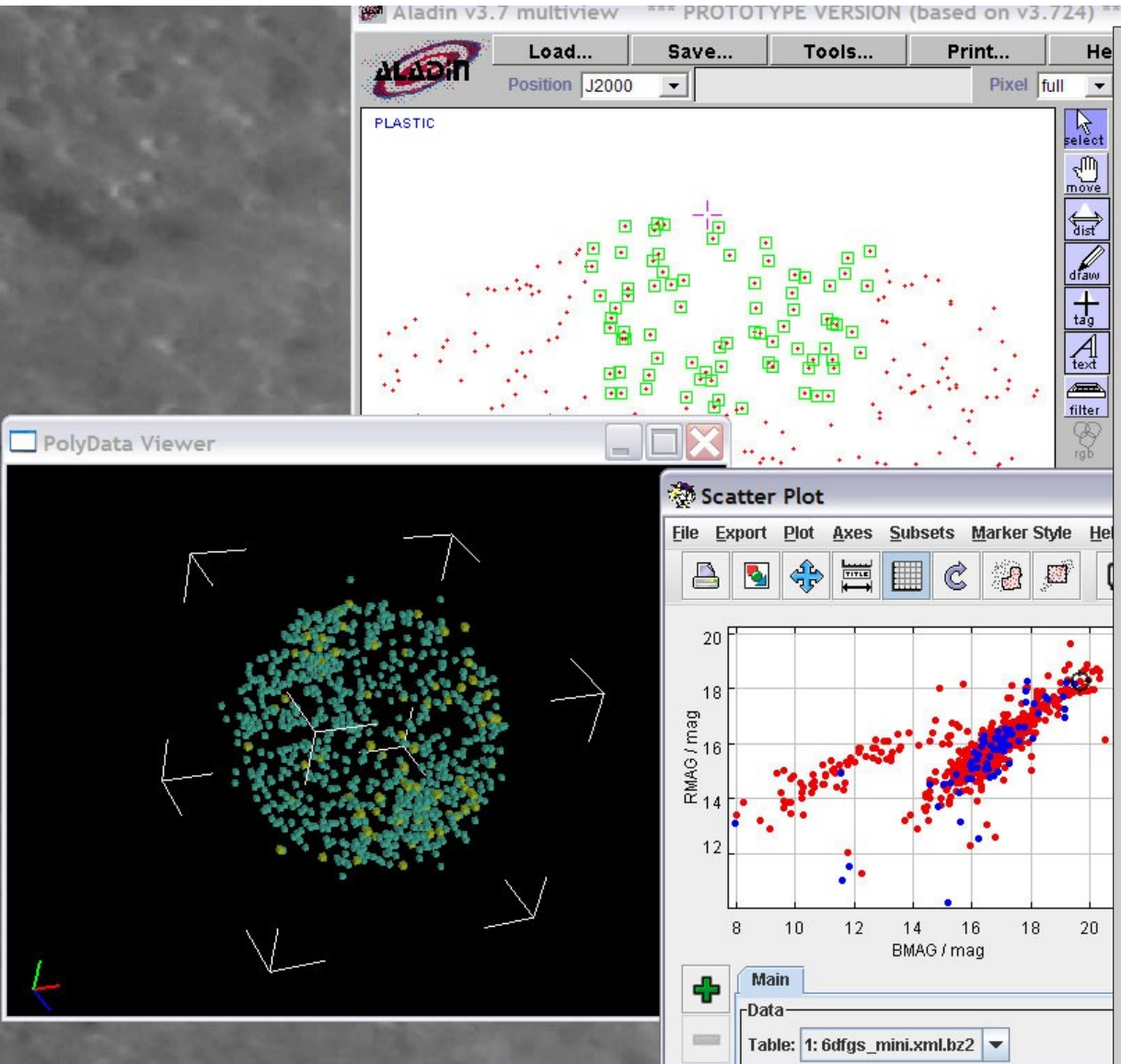
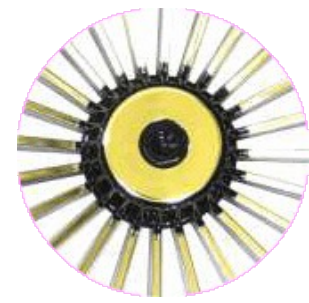
Below the tree view, the SQL query is displayed: "Select * From PhotoObjBest as a Where a.coremag_r>13 And a.coremag_r<8 And a.coremag_i>13 And a.coremag_i<8".

- IPHAS:** Shows the catalogue name "IDR" and a description: "The Isaac Newton Telescope (INT) Photometric Halpha Survey of the Northern Galactic Plane (IPHAS) is a 1800 sq. deg. CCD survey of the northern Milky Way spanning the latitude range between -5 deg. and +5 deg. and reaching down to r band magnitude of 20 (10 sigma)". Below this, the table "PhotoObjBest" is selected, and a "Filter columns" button is visible.
- Main photometric object table:** A table with the following columns: #, Column Name, Description, Datatype, UCD, Units.

#	Column Name	Description	Datatype	UCD	Units
1	objID	Object ID	long	ID_MAIN	
2	ra	R.A.	double	POS_EQ_RA_M...	deg
3	dec	Dec	double	POS_EQ_DEC_...	deg
4	glon	Galactic longitude	double		
5	glat	Galactic latitude	double		
6	chipno	Chip number	short		
7	coremag_r	Magnitude in r band	double	PHOT_MAG_R	Vega
8	coremag_i	Magnitude in i band	double	PHOT_MAG_I	
- Buttons:** "Validate Edit" and "Set Archive Definition..".
- Footer:** "Diagnostics" (checked) and "History stack".

Plastic – VO tools on the desktop

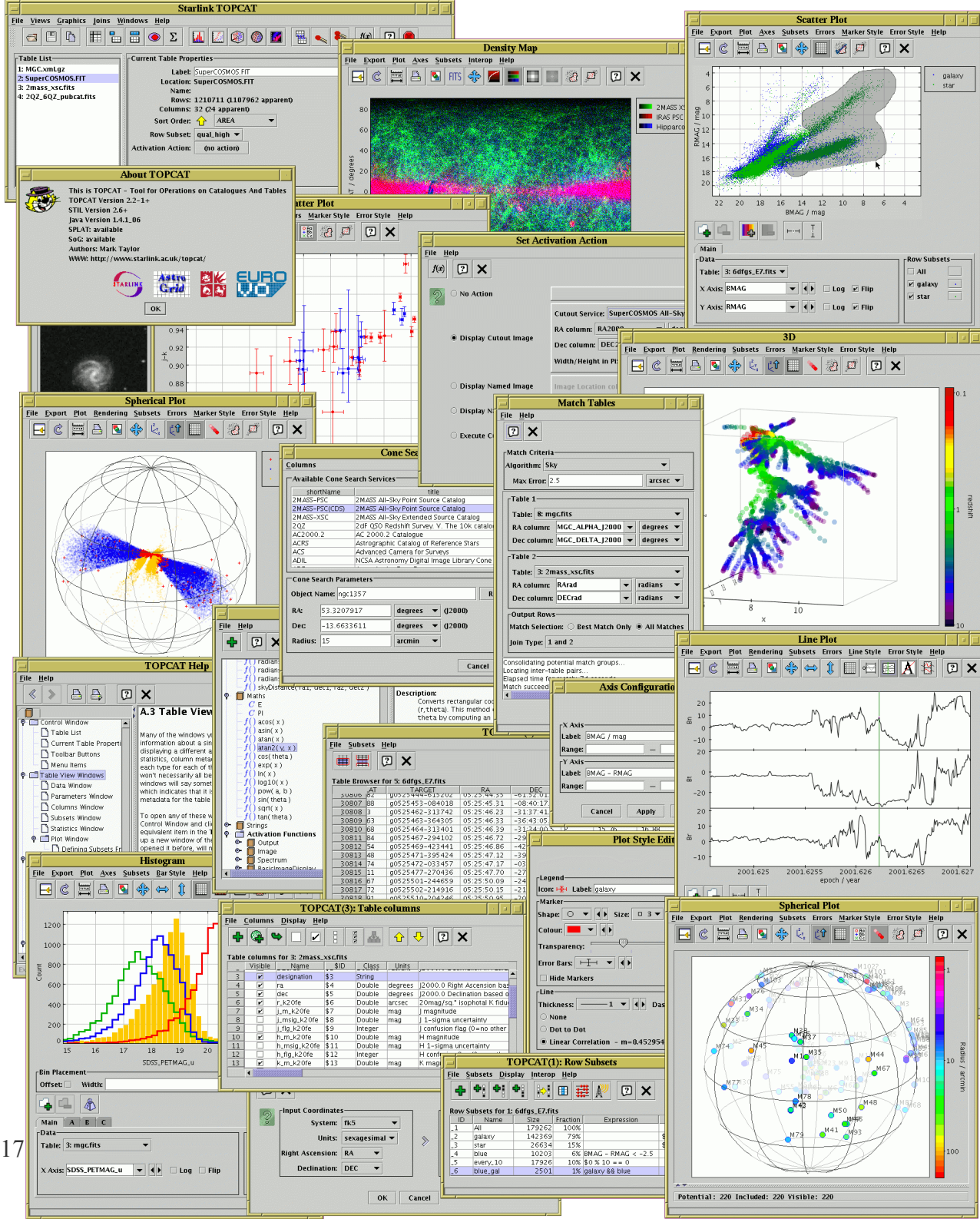
<http://plastic.sourceforge.net>



- Enables applications to 'talk' to each other
 - select sources in one application and these will show up in another application
- Communication protocol for client side VO tools
- Easy to adopt and extend
- Wide buy-in – tools from UK, France, USA, etc
- Developed mainly by AstroGrid

Desktop Tools: Topcat

- Developed by Mark Taylor
- AstroGrid funded
- Interoperates with VODesktop via PLASTC protocol



Workflows: AstroGrid-Taverna

Taverna Workbench v1.6.1.0

File Tools Workflows Advanced

Design Results

Search Watch loads

Available Processors

- Local Services
- Biomart service @ http://www.biomart.org/biomart
- Astro Runtime Myspace
- Astro Runtime DSA
- Astro Runtime VOHTTP
- Soaplab @ http://www.ebi.ac.uk/soaplab/emboss4/services/
- Astro Runtime
- Astro Runtime CEA
- WSDL @ http://eutils.ncbi.nlm.nih.gov/entrez/eutils/soap/eutils.wsdl
- WSDL @ http://www.ebi.ac.uk/ws/services/urn:Dbfetch?wsdl
- WSDL @ http://www.ebi.ac.uk/xembl/XEMBL.wsdl
- WSDL @ http://soap.bind.ca/wsdl/bind.wsdl

Advanced model explorer

Workflow Object properties

Add Nested Workflow Offline

Workflow object	Retries	Delay	Backoff	Threads	Critical
NewConeQuerySdssdr5_TwoMass					
Workflow inputs					
Workflow outputs					
ErrorOut					
UrlOut					
CeaResultOut					
CeaExelD					
Processors					
CreateOutputFilename	0	0	1	1	<input type="checkbox"/>
Dec : 0.0	0	0	1	1	<input type="checkbox"/>
Size : 0.05	0	0	1	1	<input type="checkbox"/>
Filename : crossmatch.vot	0	0	1	1	<input type="checkbox"/>
SDSSDR5 CONE	0	0	1	1	<input type="checkbox"/>
2MASSCONE	0	0	1	1	<input type="checkbox"/>
RA : 180.0	0	0	1	1	<input type="checkbox"/>
astrogrid.myspace.getHome	0	0	1	1	<input type="checkbox"/>
CROSSMATCH	0	0	1	1	<input type="checkbox"/>
SaveSDSS	0	0	1	1	<input type="checkbox"/>
Save2MASS	0	0	1	1	<input type="checkbox"/>
Data links					
2MASSCONE:URLs-Save2MASS:					
CROSSMATCH:ExecutionID-CeaExelD:					

Save diagram Refresh Configure diagram

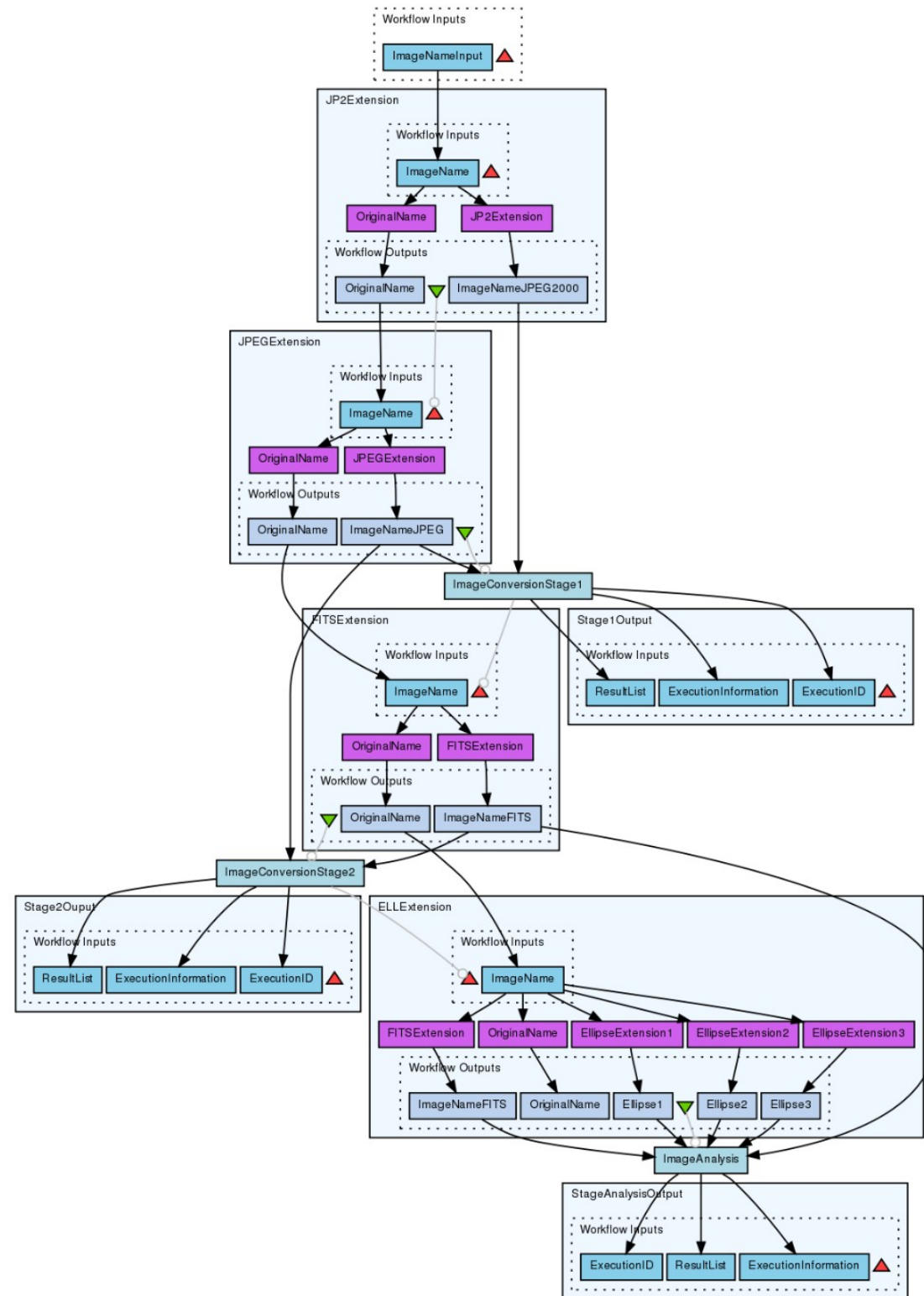
Rendering done.

Running a workflow: via Astro-Taverna

This shows the applications configured in the 'AstroGrid' applications environment, the applications physically located on a server at the IoA, orchestrated in a workflow.

The results, in this case a catalogue, are stored in the VOSpace and thus available to the remote user.

Note: this workflow is actually running astronomy applications to process medical imaging data.



... and Scripts

- access all the AstroGrid VO functionality from the command line – connecting via AstroGrid's 'Astro-Runtime'
- use python, perl, C++, etc

```
*siapsearch.py - /data/AstroGrid/ACR-Examples/Python-Scripts/siapsearch.py*
File Edit Format Run Options Windows Help

#!/usr/bin/python
"""
Query a SIAP service and returns a list of images which are loaded into Aladin
Usage:
python siapsearch.py sdss 180.0 0.0
python siapsearch.py iphas 312.75 44.37
python siapsearch.py 2mass 312.75 44.37
"""

import sys
from math import cos, radians
import time
from astrogrid import acr
from astrogrid import Applications, DSA, MySpace, SiapSearch

while not acr._connected:
    print 'Connecting to AR...'
    time.sleep(10)

ssiap = {'sdss': 'ivo://sdss.jhu/services/SIAPDR6-images',
         'iphas': 'ivo://uk.ac.cam.ast/IPHAS/images/SIAP',
         '2mass': 'ivo://irsa.ipac/2MASS-QL'}

s = sys.argv[1]
ra, dec = sys.argv[2:4]
siap = SiapSearch(ssiap[s])
res = siap.execute(ra, dec, 0.5 )

try:
    acr.plastic.broadcast(res)
except:
    print 'Failed to send table to Aladin.'
```

Ln: 34 Col: 0

Coming Up ... some usage examples

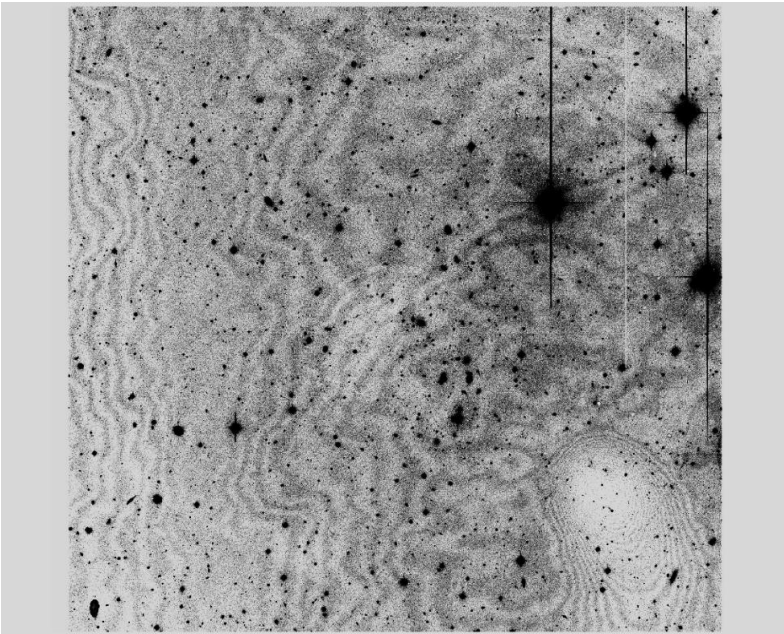
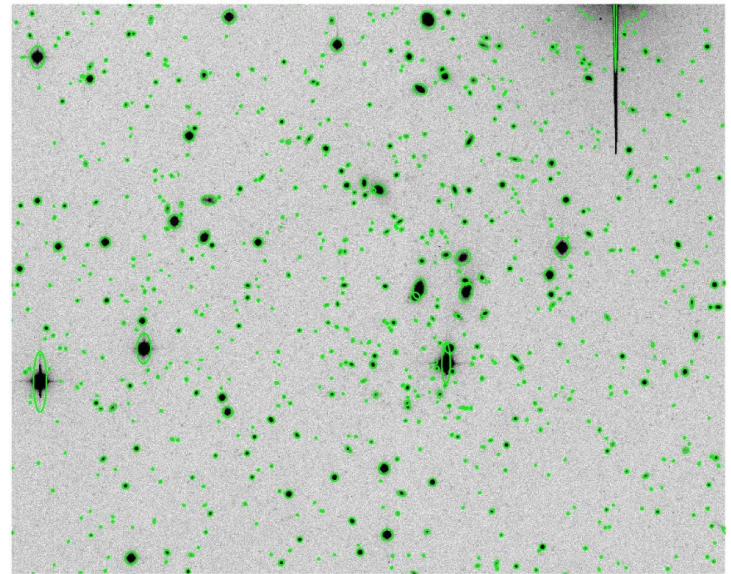
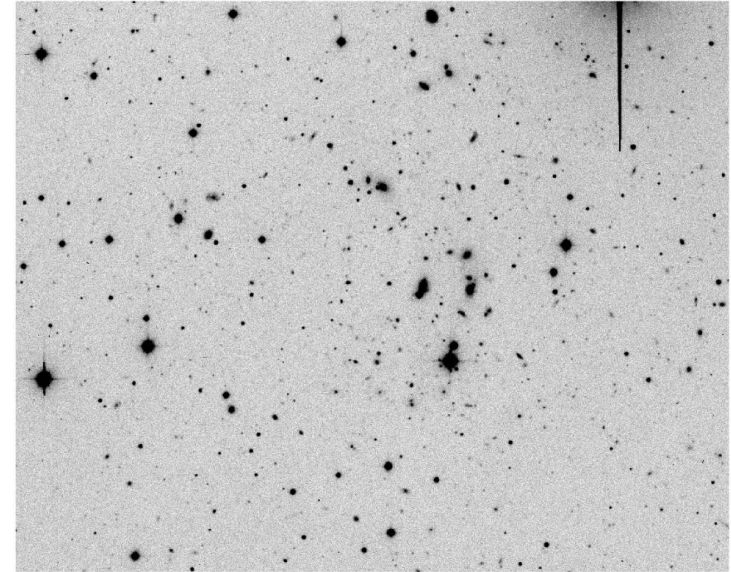
- Single Object: 3C295, X-ray binaries, Jets in YSOs
 - demonstrates use of visual tools, including AstroScope
 - radio, x-ray, optical data comparison
 - direct access to Vizier tables
- Statistical Studies: investigating Galactic structure
 - Field of Streams
 - large data access example

Example Large Scale Survey: the IPHAS Survey of the Galactic Plane

- IPHAS: H-alpha Survey of the Northern Galactic Plane (PI: Janet Drew: Herts, UK)
- Key Goals: Large scale Milky Way structure and study of early and late type populations (preferentially selected via H-alpha emission line properties)
- All data reduced at CASU (IoA, Cambridge)
- VO access work partly implemented through the May 2006 AG Tools Call programme - <http://www.astrogrid.org/calls>

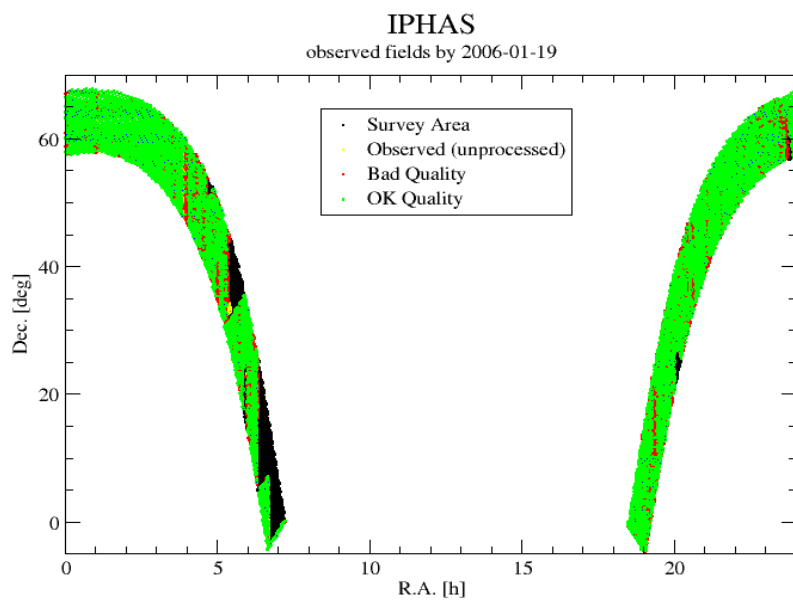
Survey Products

- Photometric catalogue ~200 million objects
- Detection of ~50000 H α -emitting objects

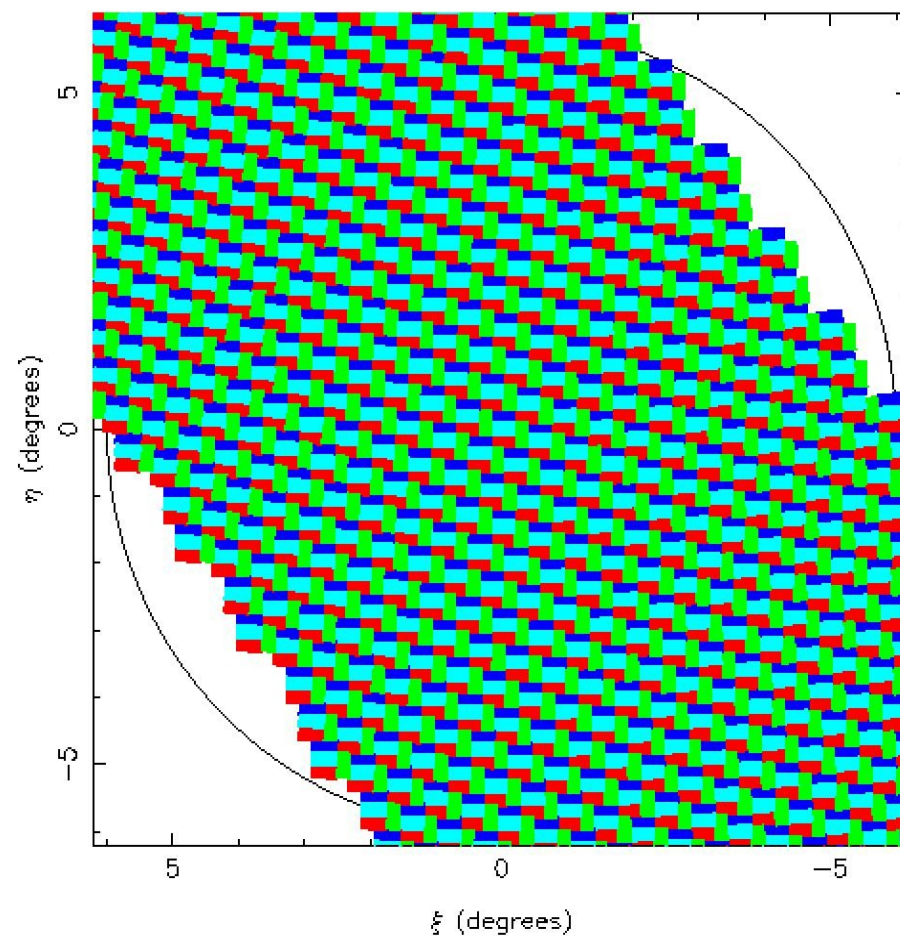


IPHAS Survey

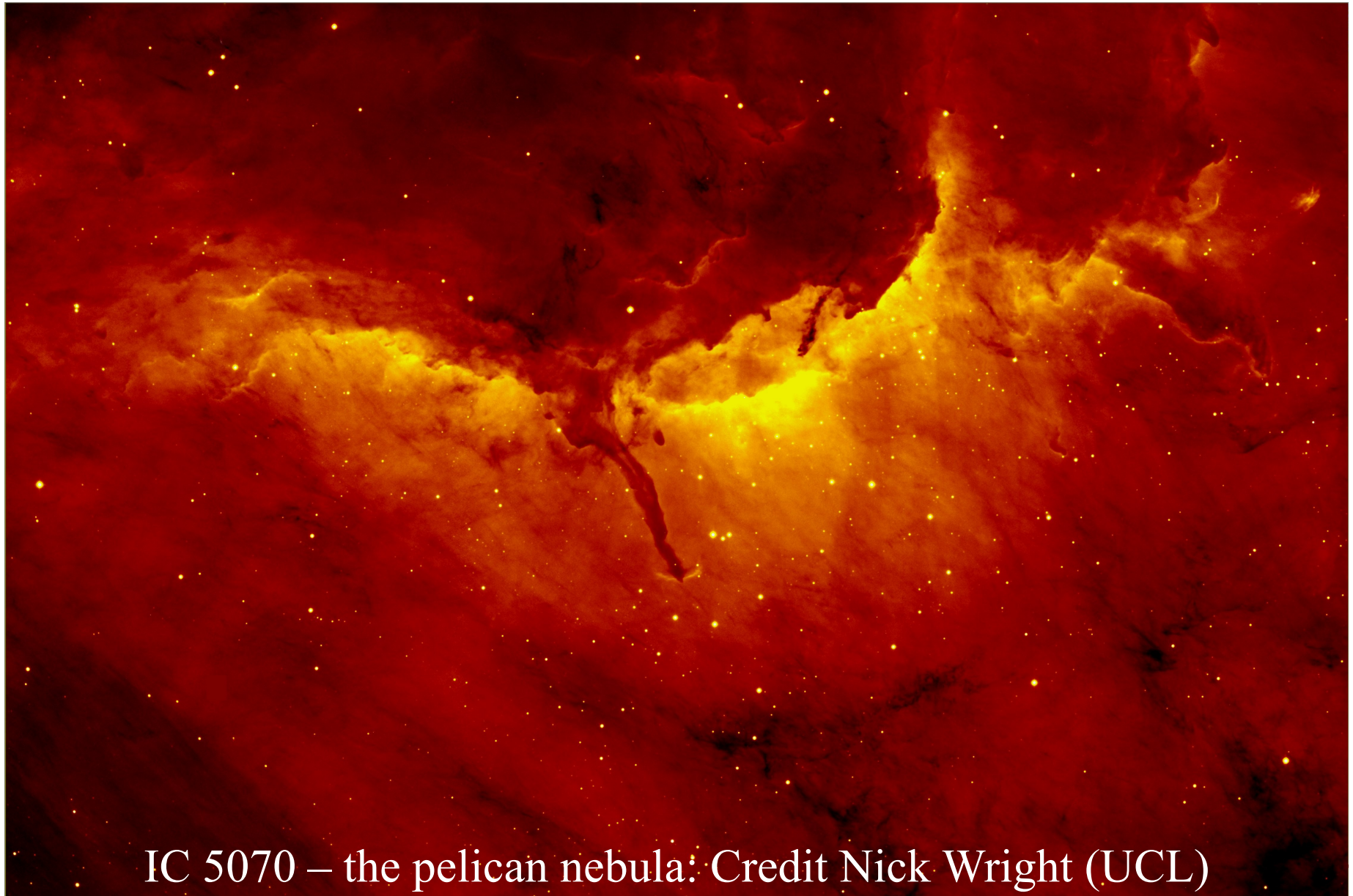
- 7635 Pointings \sim 2000 sq deg
- x 2 (overlap, 5'x5' offset)
- thus 15270 Pointing in total
- r, Ha, and i
- \sim 30 GB/night of data = > 1TB total



CENTRE: 20 20 55.0 36 36 20 (J2000) Beamswitch = N



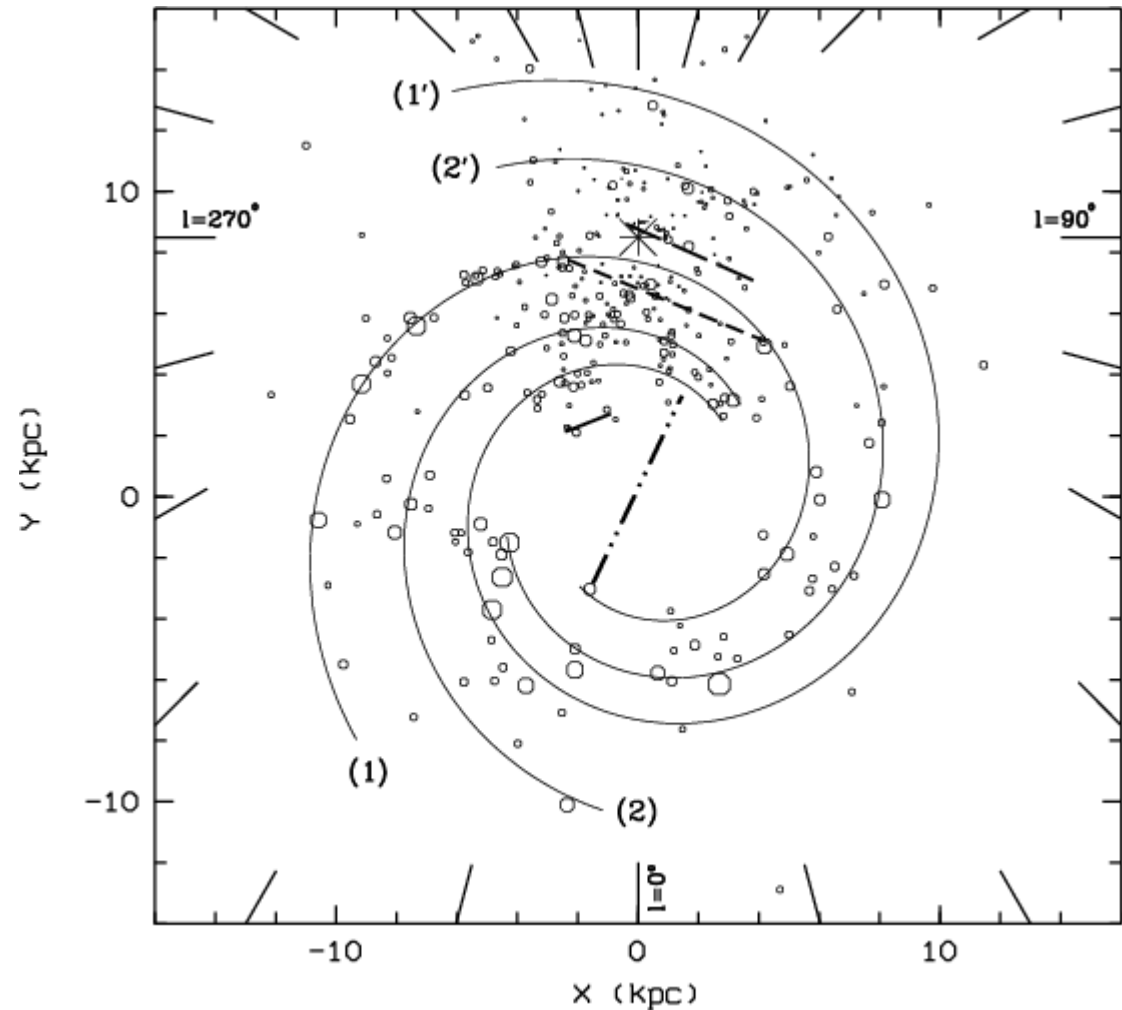
IPHAS: Images



IC 5070 – the pelican nebula: Credit Nick Wright (UCL)

Models for Galactic Structure

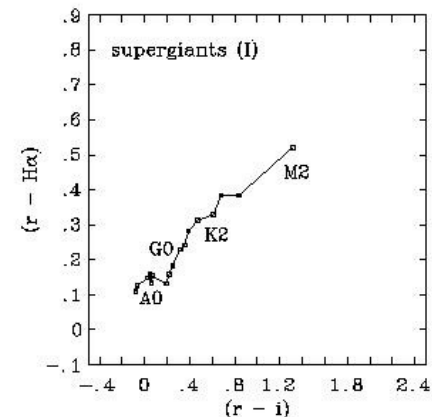
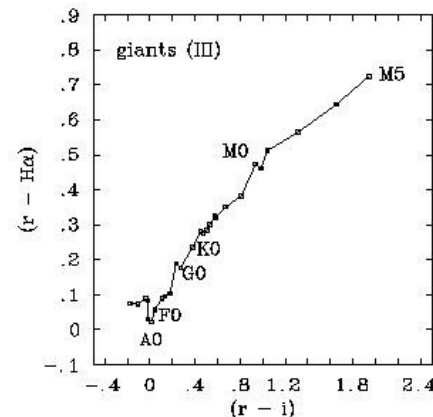
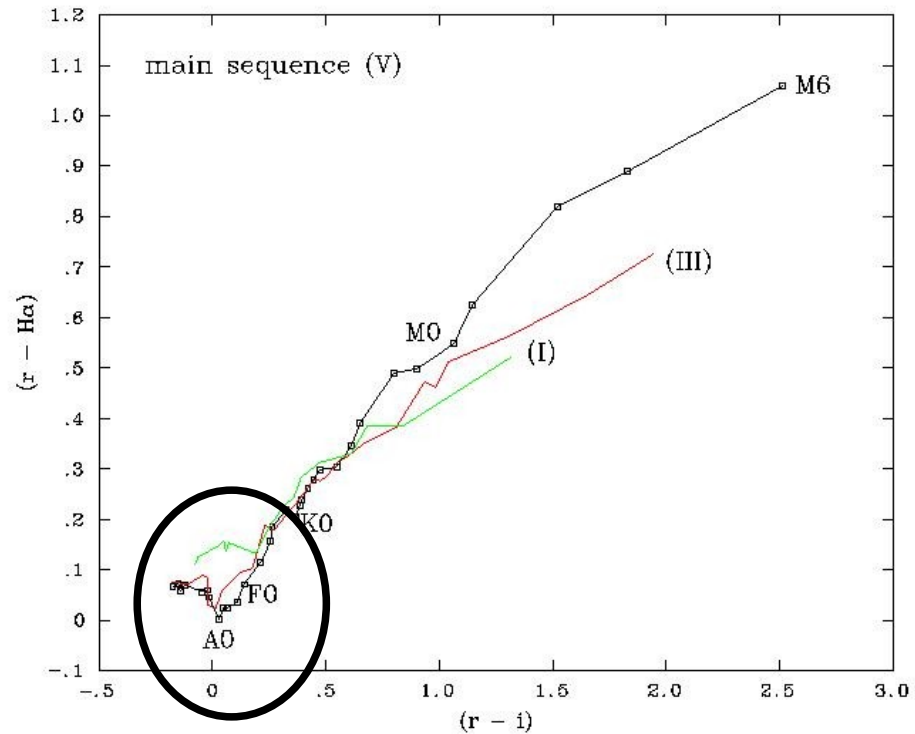
- Young populations good tracers of galactic structure
- e.g. Russeil (2003) study based on positions of star forming complexes (from HI, HII, CO observations)
- IPHAS – find the tracers which map the structure ...



Russeil 4-arm model - 1) Sagittarius-Carina, 2) Scutum-Crux, 1') Norma-Cygnus, 2') Perseus arms – sun marked by X

Structure: use of the IPHAS survey

- IPHAS is deep enough to sample most of the plane
 - $r \sim 20$ = unreddened A0 dwarfs at 20kpc
- A0V reddening line \rightarrow a population of easily-modelled 'standard candles'
- Find early type (A, B stars) from their position in the colour-colour plane



Pickles 1998 stellar library

IPHAS Initial Data Release

- IDR: photometric catalogue of about 200 million unique objects, coupled with associated image data covering about 1600 square degrees in three passbands
- Access to the primary data products:
 - uses AstroGrid / VO interfaces
 - traditional web access +
 - access via AstroGrid VO Desktop opens up the full range of analysis options
- The IDR represents the largest dataset published primarily through VO interfaces to date



Search Site

- WFCAM
- VISTA
- GAIA
- INT-WFS
- IPHAS**

- About IDR
- News and Updates
- Survey Instruments
- Data Products
- Data Access
- Data Flow
- Known Problems
- Help and Feedback
- Publications
- Credits
- Source Nomenclature

Astronomical Data Centre

NEWS

- Cone Search Portal Dec 03, 2007
- IPHAS Initial Data Release Available Dec 03, 2007
- AAT Data Archive Online Jun 07, 2007
- VIRCAM Data Reduction Pipeline Manual Dec 11, 2006
- VIRCAM Dark and Flat

> Home > Surveys & Projects > IPHAS

Log in Site Map Accessibility Contact

Cambridge Astronomical Survey Unit

Home News Surveys & Projects Quick Links Publications

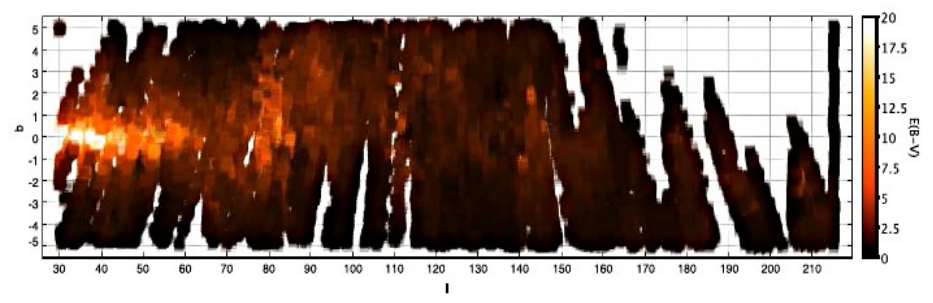
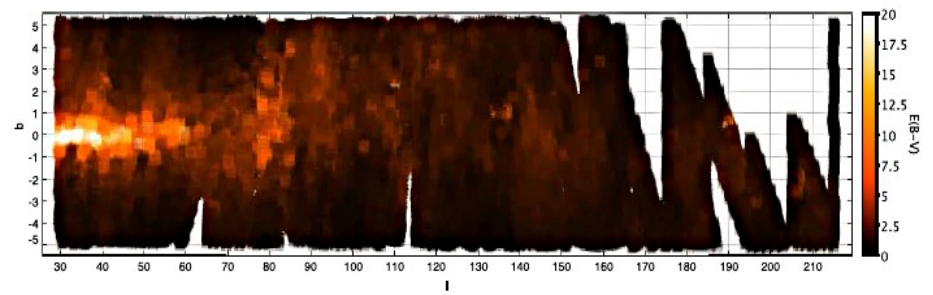
IPHAS INITIAL DATA RELEASE

The INT Photometric H α Survey of the Northern Galactic Plane (IPHAS, [Drew et al. 2005](#) -- see www.iphas.org for general information) is mapping the northern Galactic Plane in the latitude range $|b| < 5$ deg in the H α , r' and i' bands using the Wide Field Camera on the 2.5-m INT telescope at La Palma to a depth of $r' = 20$ (10σ). The Initial Data Release (IDR) is the first major public data release, providing access to [images and catalogs](#) through [Astrogrid](#).



IDR Cone Search Interface

The IDR ([Gonzalez-Solares et al. 2008](#)) contains the data obtained between September 2003 and December 2005 during a total of 212 nights. Between these dates, approximately 60 percent of the total survey area was covered in terms of final survey quality.



IPHAS Initial Data Release sky coverage in galactic coordinates (degrees). The top figure displays the coverage of



N A Walt



Mozilla Firefox

File Edit View History Bookmarks Tools Help

IPHAS Initial Data Release —... http://casu.a...k/ag/portal/

CSU Astro Grid About Cone Search Image Search Postage Stamps Go astrogrid.org

Image server: IPHAS

Name Resolver:

Coordinates: 01:25:07.9 +63:56:52

Size (arcsec): 30

Options:

- Draw Center Cross
- Align with RA/Dec
- Label Axis

r367781.fit[4]
Halpha

Filename	CCD No	Filter	Airmass	MJD	Exp Time (s)	Exp Time (s)
r367783.fit	4	i	1.224473	52925.045678	10.1	10.1
r367782.fit	4	r	1.224538	52925.045035	9.59	9.59
r367781.fit	4	Halpha	1.224697	52925.043756	120.04	120.04
r367780.fit	4	i	1.223554	52925.042472	10.09	10.09
r367779.fit	4	r	1.22366	52925.041818	10.08	10.08
r367778.fit	4	Halpha	1.223903	52925.040516	120.08	120.08

Submit Print

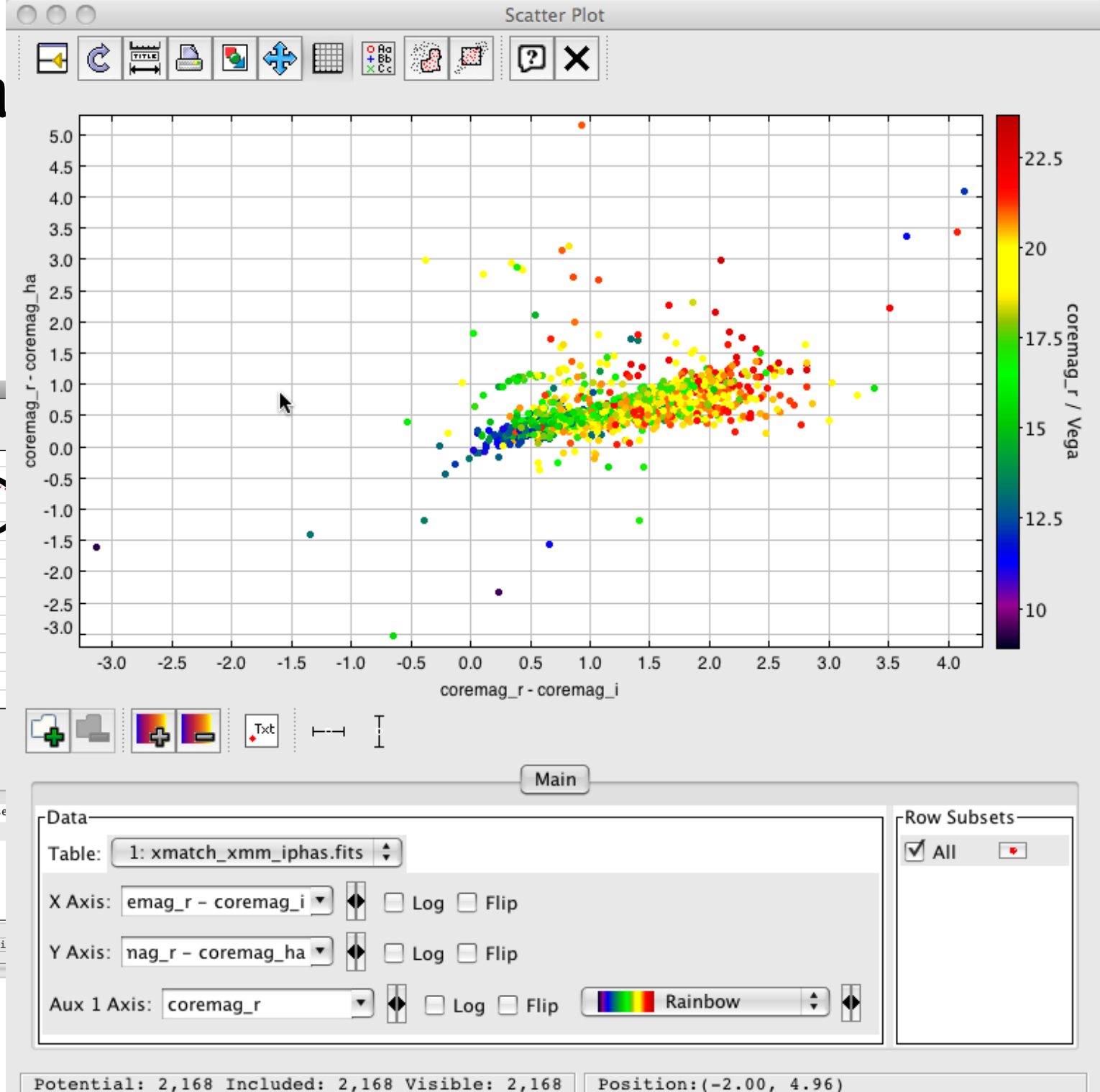
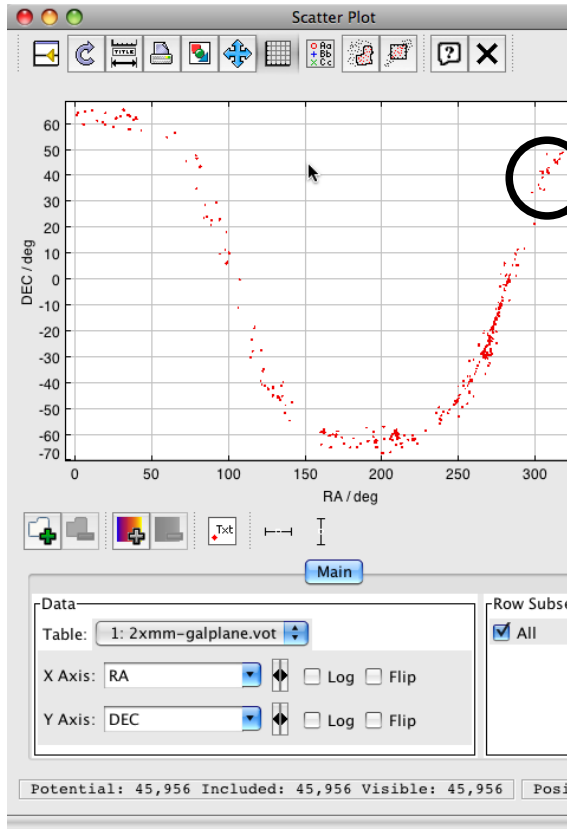
Read casu.ast.cam.ac.uk 2001:630:200:4240:213:72ff:fe66:46d9 +1 Adblock



N A Walton: A



Finding a



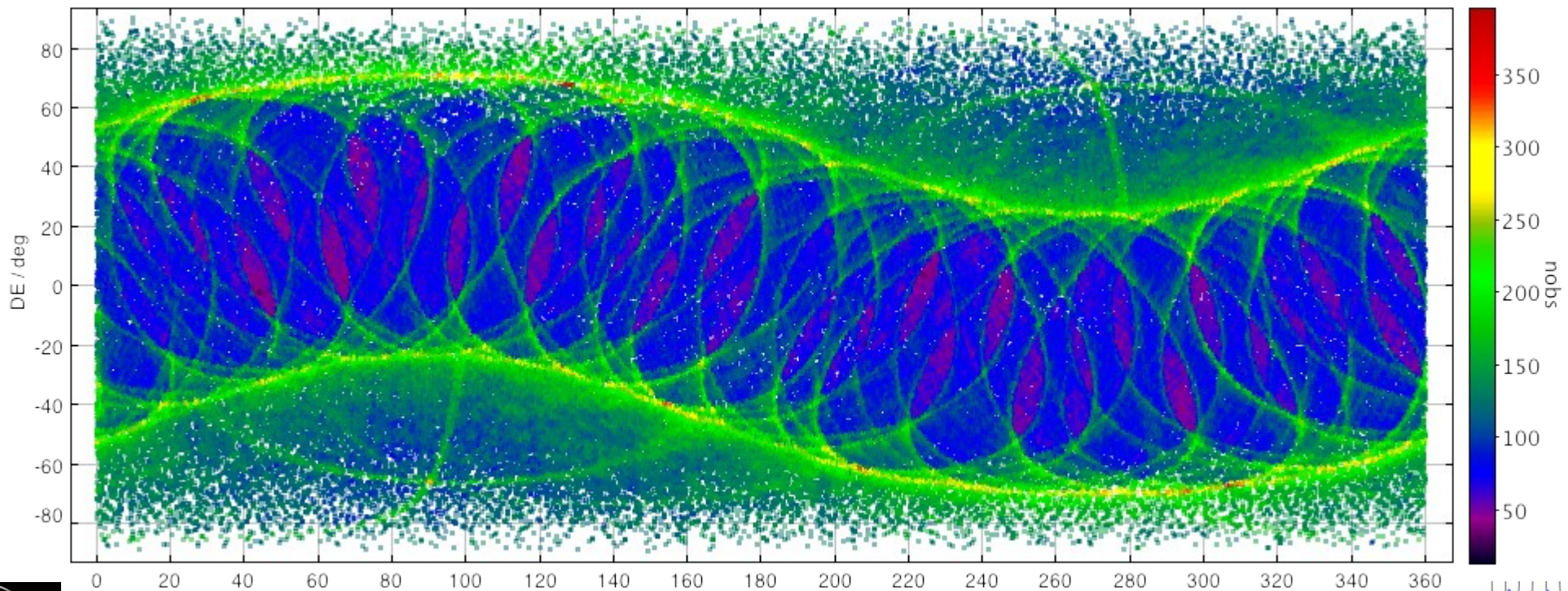
Finding accreting binaries ...

The image displays a complex astronomical software interface with several key components:

- VO Explorer - xmm**: A panel on the left showing a hierarchical list of data sources (e.g., iphas, ukidss, FIRST, xmm) and a 'Content - Subject' filter. It includes a 'New Smart List' button and an 'Actions' menu.
- Scatter Plot (Top Center)**: A plot of $\text{coremag_r} - \text{coremag_ha}$ versus $\text{coremag_r} - \text{coremag_i}$. The data points are red dots, with a cluster of points showing a positive correlation. A single point is highlighted with a crosshair.
- Aladin v5.0**: A large central panel showing a field of stars. A specific star is highlighted with a crosshair. The panel includes a toolbar with various tools like 'select', 'pan', 'zoom', 'dist', 'draw', 'tab', 'text', 'filter', 'rgb', 'assoc', 'rsamp', 'cont', 'mglss', 'pixel', 'prop', and 'del'. A zoom level of 2x is indicated.
- Table (Bottom Right)**: A table listing source information for the selected star. The table has columns: SRCID, IAUname, RA 1, DEC 1, POSERR, LII, BII, RADEC ERR, SYSERR, and EP 1. The selected row is SRCID 173857, IAUname 2XMM J203249.0+412403, RA 1 308.20428, DEC 1 41.400978, POSERR 1.44952, LII 80.245476, BII 0.90451485, RADEC ERR 1.40663, SYSERR 0.35, and EP 1.096.
- Scatter Plot (Bottom Center)**: A plot of DEC / deg versus an unlabeled x-axis. The data points are red dots, showing a clear trend.
- Data Panel (Bottom Left)**: A panel showing the current data table '9: xmm-iphas-2mass'. It includes fields for X Axis (ag_r - coremag_i) and Y Axis (coremag_r - coremag_i), with options for Log and Flip. It also shows 'Row Subsets' (All, Aladin, t) and statistics: 'Potential: 326 Included: 326 Visible: 326' and 'Position: (1.03, 1)'. Several data points are highlighted with yellow boxes and connected to the main scatter plot by lines.

Gaia and the Virtual Observatory

- ESA/ DPAC create the required software infrastructure to process and generate intermediate and final data products
- Scientific & Cost effective delivery of these projects will be facilitated by use of the Euro-VO/AstroGrid Virtual Observatory infrastructure
 - reduces cost of development: no bespoke interfaces



Hipparcos via AstroGrid in 4 clicks

The image displays a VO Desktop environment with several windows open:

- Scatter Plot:** A plot showing RA (deg) on the x-axis (0 to 360) and DE (deg) on the y-axis (-90 to 90). The plot is color-coded by magnitude, with a color bar on the right ranging from 50 (purple) to 350 (red).
- Task Runner for Hipparcos catalogue - untitled:** Shows the execution of a task. The interface is set to ADQL. The output is a VOTABLE file named 'all.vot'. The task is completed.
- Table Metadata:** Shows the metadata for the 'Hipparcos catalogue' resource. It includes the ID, type, and a description of the resource.
- Table:** A table listing the columns of the 'maincat' table. The columns are: #, Column Name, Description, Datatype, UCD, and Units.

#	Column Name	Description	Datatype	UCD	Units
1	HIP	Hipparcos identifier	int	ID_MAIN	
2	isol_n	Solution type new reduction	int		
3	isol_o	Solution type old reduction	int		
4	ncomp	Number of components	int		
5	RA	Right Ascension (ICRS) in degrees (not in original catalogue)	double	POS_EQ_RA_MAIN	deg

Field of Streams

L138

BELOKUROV ET AL.

Vol. 642

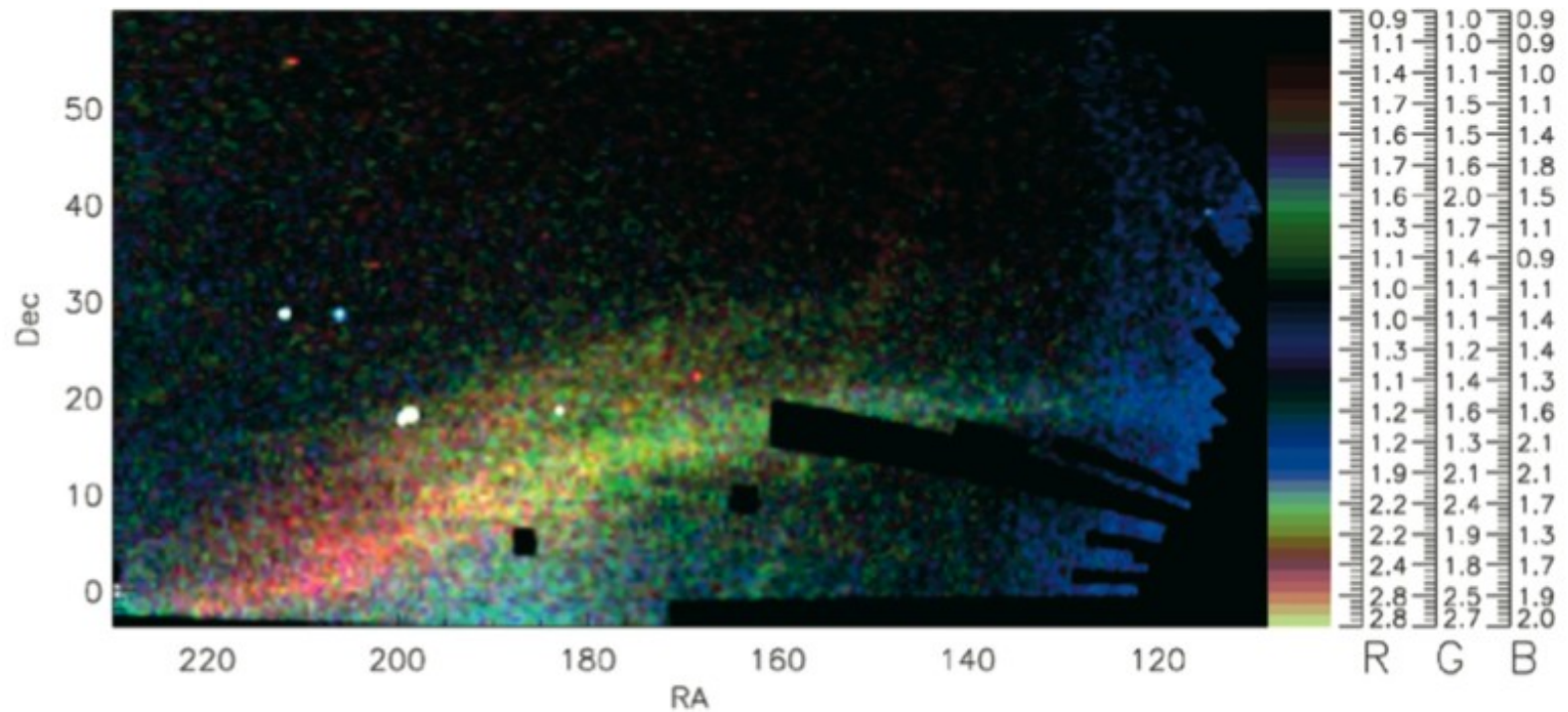


FIG. 1.—Spatial density of SDSS stars with $g - r < 0.4$ around the north Galactic cap in equatorial coordinates, binned $0^{\circ}5 \times 0^{\circ}5$. The color plot is an RGB composite with blue for the most nearby stars with $20.0 < r \leq 20.66$, green for stars with $20.66 < r \leq 21.33$, and red for the most distant stars with $21.33 < r \leq 22.0$. Note the bifurcation in the stream starting at $\alpha \approx 180^{\circ}$. Further structure that is visible includes the Monoceros Ring at $\alpha \approx 120^{\circ}$ and a new thin stream at $150^{\circ} \approx \alpha \approx 160^{\circ}$ and $0^{\circ} \approx \delta \approx 30^{\circ}$. The color bar shows a palette of 50 representative colors labeled according to the stellar density (in units of 100 stars per square degree) in each of the red, green, and blue components. The displayed density ranges are 102–330 (*red*), 107–304 (*green*), and 98–267 (*blue*).

Your 'Field of Streams' with the VO ...

The screenshot displays the VO Explorer interface for SDSS Data Release 5 (DR5). The main window is titled "Task Runner - untitled" and shows the "Interface: adql" and "Execute!" button. The "Inputs" section includes "Query" and "Format" options, with "VOTABLE-BINARY" selected. The "Outputs" section shows a "Result" field with the path ":am/field-dec20-". The "Execution" section indicates "adql - SDSS Data Release 5 (DR5)" and "No change: will re-check in 16 seconds".

The "ADQL" query editor shows the following query:

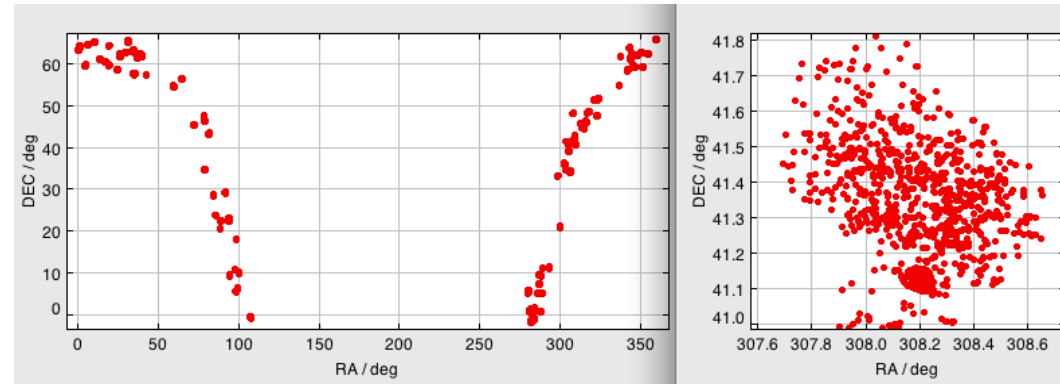
```
Select  
  Items a.ra, a.dec, a.psfMag_g, a.psfMag_r  
From PhotoTag as a  
Where  
  And  
    Comparison a.ra>110  
    Comparison a.ra<230
```

The "SDSS Data Release 5 (DR5)" section provides a description: "This is an AstroGrid Dataset Access installation of the Sloan Digital Sky Survey Data Release 5 (SDSS DR5) hosted by the Wide Field Astronomy Unit (WFAU), University of Edinburgh. WFAU would like to thank John Hopkins University and the University of Chicago for permission to host the data." The "Table" is set to "PhotoTag" and "Filter columns" is available.

The visualization at the bottom shows a field of streams, a dense field of stars with a color scale on the right. The axes are labeled "ra/deg" (ranging from 225 to 115) and "dec/deg" (ranging from 5 to 35). A large black rectangular region is visible on the right side of the field.

X-Ray Binaries in the Galactic Plane

Select data (IPHAS + 2XMM)



This screenshot shows the Aladin software interface. It features a main window displaying a star field with blue crosses. A toolbar on the right includes tools like 'select', 'pan', 'zoom', 'dist', 'draw', 'tag', 'text', 'filter', 'assoc', 'rsamp', 'cont', 'mqlss', 'pixel', 'prop', and 'del'. A position field at the top shows '20:32:49.07 +41:24:...' in ICRS coordinates.

Visualize catalogue and select candidates

This screenshot shows a zoomed-in view of a star field with a 1" scale bar. Below the image is a table with the following columns: objID, ra 1, dec 1, glon, and glat. The first row is highlighted in red.

objID	ra 1	dec 1	glon	glat
59851040...	308.2044...	41.40076...	80.24538...	0.904279

TIP: Resize the measurement columns [click&drag the head]

Cross Match Catalogues

Match Criteria

Algorithm: Sky

Max Error: 2.0 arcsec

Table 1

Table: 1: iphas_cygb.fits

RA column: ra degrees

Dec column: dec degrees

Table 2

Table: 3: twoxmm.fits

RA column: RA degrees

Dec column: DEC degrees

Output Rows

Match Selection: Best Match Only All Matches

Join Type: 1 and 2

This screenshot shows a cross-matched catalogue visualization. The main plot shows coremag_r-coremag_i on the x-axis (-2 to 6) and coremag_r-coremag_i on the y-axis (-2 to 6). Red dots represent 'All' and blue dots represent 'A.All'. A legend in the top right corner shows a red dot for 'All' and a blue dot for 'A.All'. Below the plot are various toolbars and a 'Row Subsets' panel with a 'match(1,3)' filter and 'Log' and 'Flip' options.





Virtual Observatory Software for Astronomers

Search

- HOME
- INSTALL
- HELP
- SUPPORT
- COMMUNITY

[page editor login](#)

Welcome to AstroGrid



AstroGrid is the doorway to the Virtual Observatory (VO). We provide a suite of desktop applications to enable astronomers to explore and bookmark resources from around the world, find data, store and share files in VOSpace, query databases, plot and manipulate tables, cross-match catalogues, and build and run scripts to automate sequences of tasks. Tools from other Euro-VO projects inter-operate with AstroGrid software, so you can also view and analyse images and spectra located in the VO.

These web pages hold our software for downloading, as well as links to other people's software. They also provide the help documentation, and other support material such as FAQs and the Helpdesk ticket system.

A new updated version of the **AstroGrid desktop software (V1.2.0)** for astronomers was released on **October 8th 2008**.

Our latest server component suite (v2008.2) for data centres and individual developers was also released on October 8th 2008 and is available from [⇒ deployer.astrogrid.org](http://deployer.astrogrid.org).

Previous versions of our software will still be available for some time: see [previous Astrogrid releases](#).



Read a little [about the Virtual Observatory](#)
 Read a little [about the AstroGrid Desktop suite](#).
 Go to the [Install area](#) and download the software.
 Have a look at the documentation in the [Help area](#).
 Start trying it out !

Latest News

October 8th 2008 : new VODesktop release 1.2.0 : AstroGrid is pleased to announce the latest release of it's VODesktop suite version 1.2.0. This release offers a number of new features including more user control in running applications on the VO. Many bug fixes have been made. The full list of new features etc is to be found at [⇒ http://www.astrogrid.org/wiki/ReleaseNotes](http://www.astrogrid.org/wiki/ReleaseNotes)

Older news is [in the Community section](#)

http://www.astrogrid.org

Acknowledging AstroGrid. If you make use of the AstroGrid system or tools, we would be grateful if you could acknowledge this use in any resulting publications. You could use these words: 'This research has made use of data obtained using, or software provided by, the UK's AstroGrid Virtual Observatory Project, which is funded by the Science and Technology Facilities Council and through the EU's Framework 6 programme.' Use of any data discovered or accessed through AstroGrid should of course be mentioned as noted by the data providers.

Documentation
 Help
 Worked Examples
 The software



N A Walton: AstroGrid @ is