



Introduction to VO

The google telescope? (Chris) Not so ambitious but in that direction...

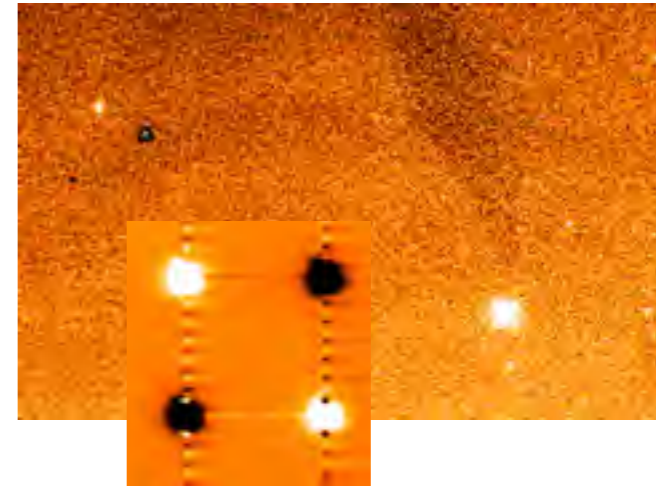


Amelia Bayo

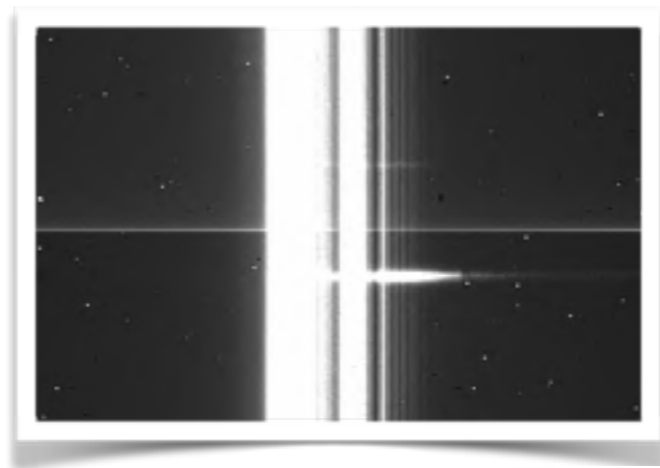
Disclaimer: decent amount of slides shamelessly stolen from E. Solano

What are “Astronomical data”??

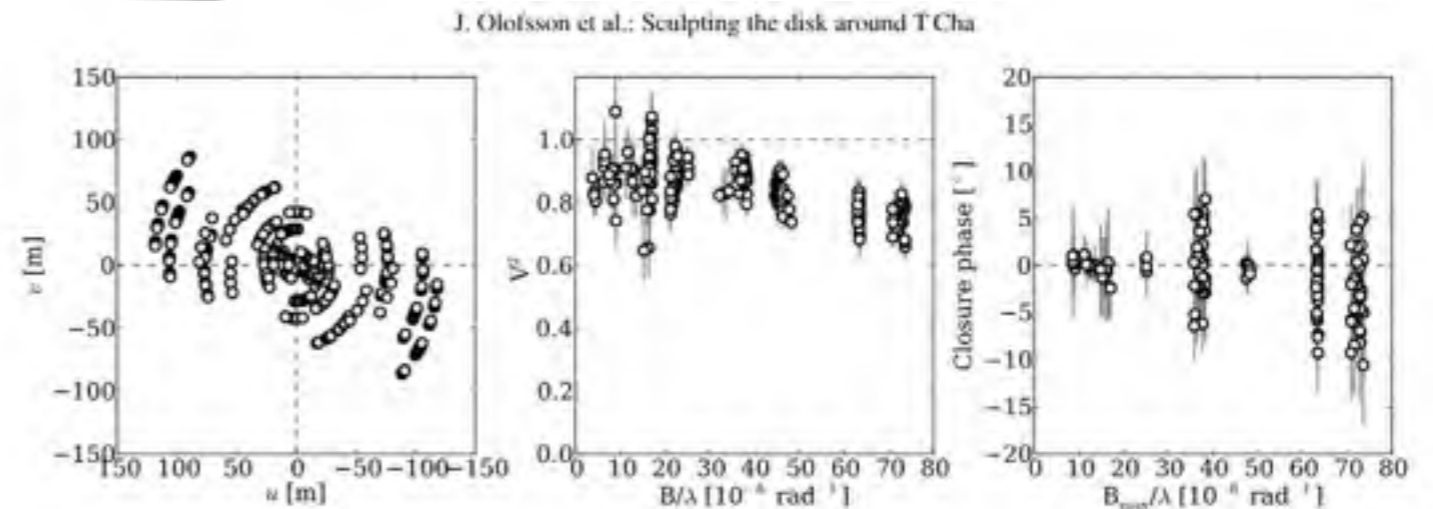
- Raw images (with no processing, B.A.B = before Andrew Becker)



- 2-D spectra



- A collection of visibilities from some interferometer?



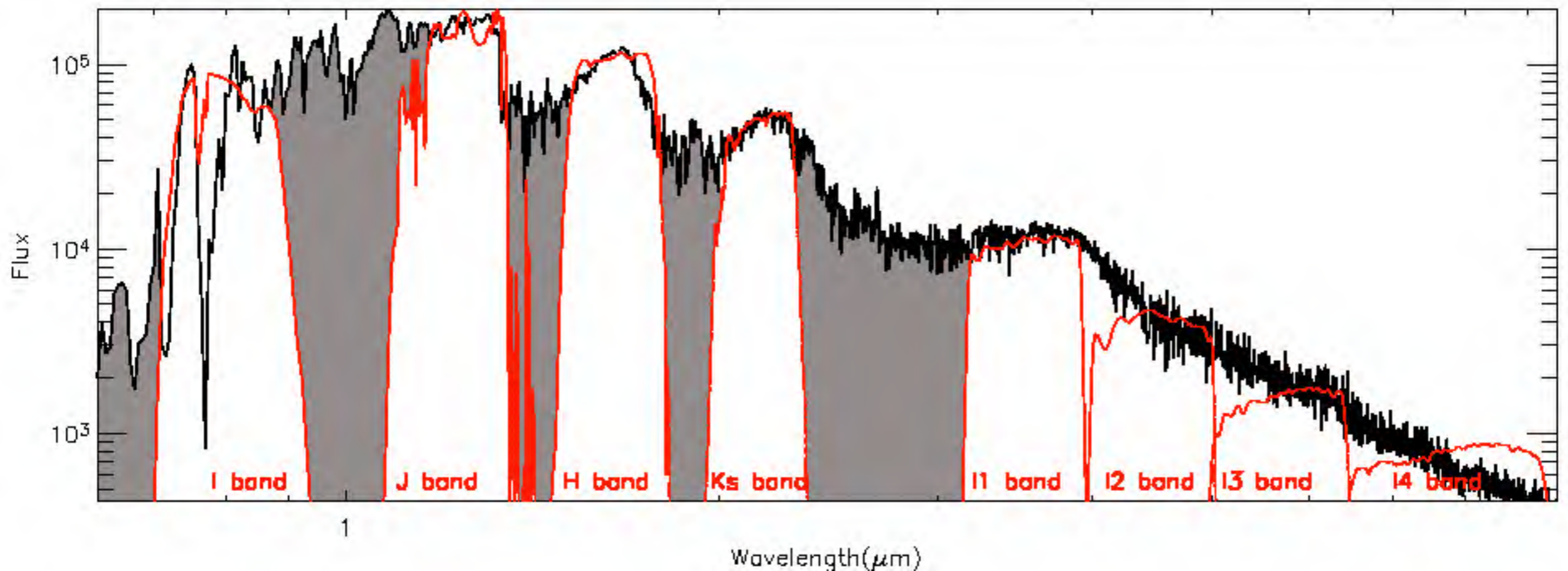
- Theoretical models: predicted images, fluxes, spectra, low or high resolution simulations of structures, etc.

What are “Astronomical data”??

- Calibrated images with all metadata concerning spatial and flux metadata
- 1D spectra (calibrated to what extent?)
- A data cube (again calibrate to what extent?)
- A catalog of observables
- A time series
- Theoretical predictions of stellar/population spectra (what resolution? high? extremely low, -SED-), of a functional form for the behavior of a multiple system, etc.

What are “Astronomical data”??

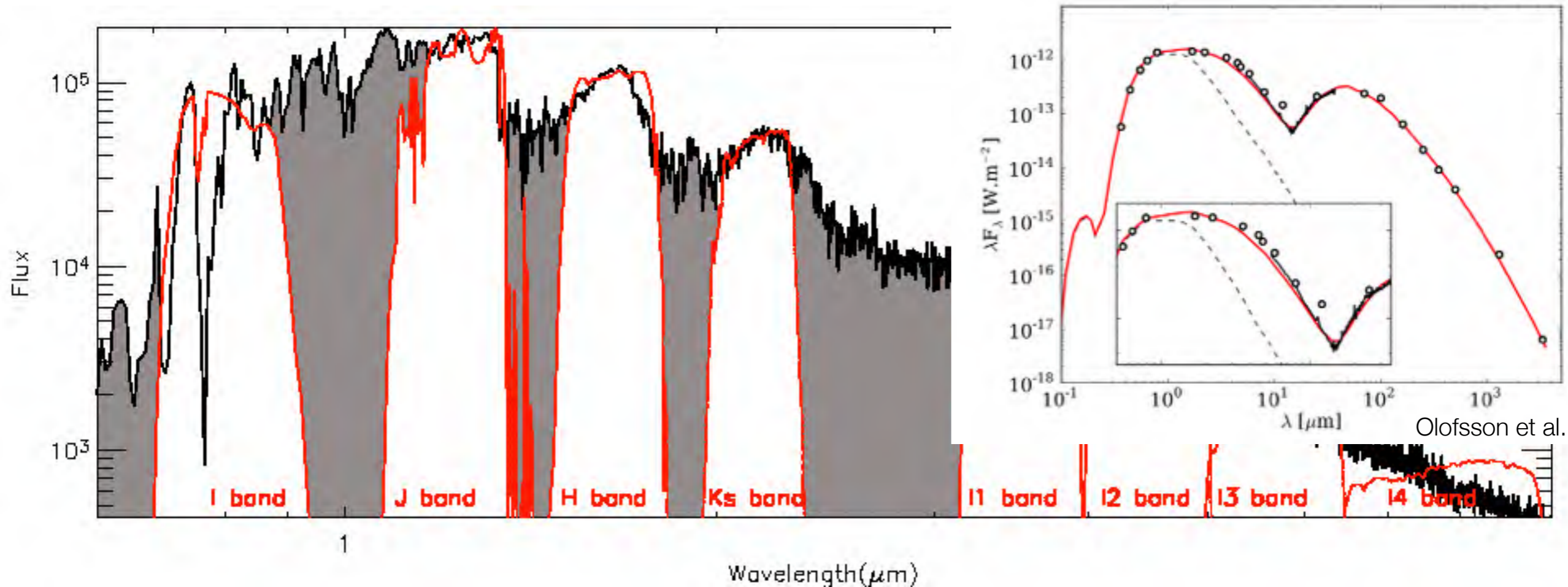
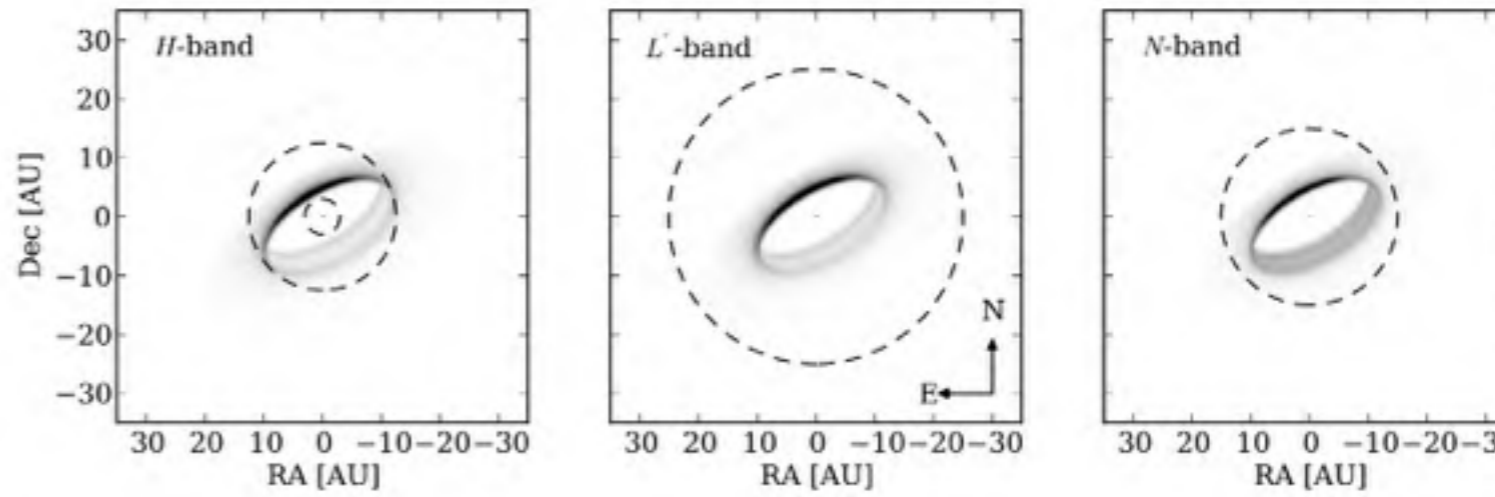
- Calibrated images with all metadata concerning spatial and flux metadata



- Theoretical predictions of stellar/population spectra (what resolution? high? extremely low, -SED-), of a functional form for the behavior of a multiple system, etc.

What are “Astronomical

- Calibrated images with all metadata



- Theoretical predictions of stellar/population spectra (what resolution? high? extremely low, -SED-), of a functional form for the behavior of a multiple system, etc.

What are “Astronomical data”??

- A catalog of parameters derived “directly” from one dataset, from several including literature, (line widths, velocities, strengths, integrated fluxes, periods, etc.).
- The results from some model fitting (not only derived parameters but goodness of the fit, etc.), some more “handwaving” or just general interpretation of the data in a broader context.
- Momentum maps, any kind of direct or “massaged” projections of a cube
-

All of the above!!!

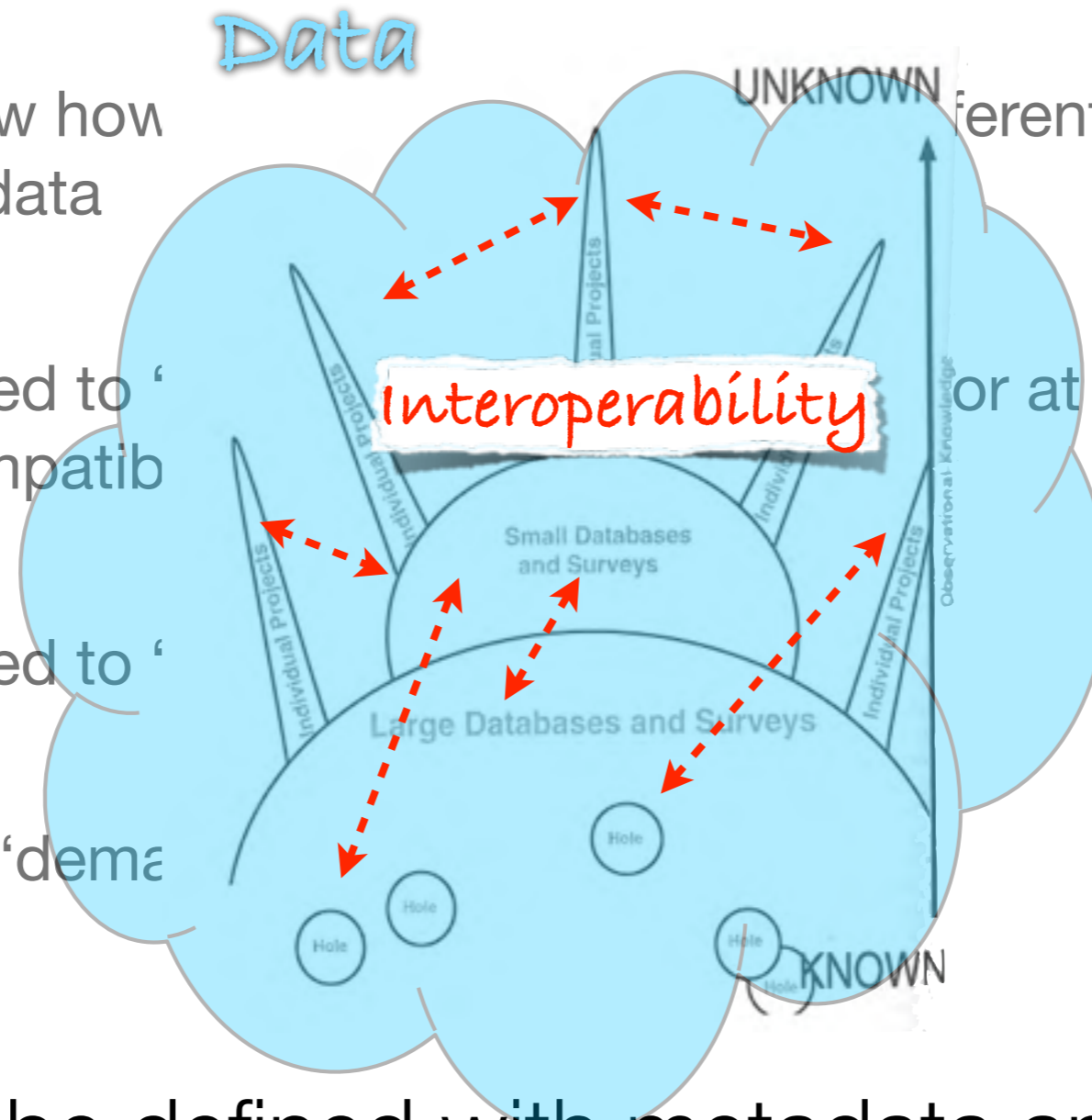
How do we deal with this mess??

- One needs to know how to “ask” for data: to the different servers, for the different kinds of data
- Data providers need to “speak the same language” or at least interpret the questions in a compatible way
- Data providers need to “compile” and answer
- Provided it to the “demander” in a compatible way

Data needs to be defined with metadata and standardization is needed for this exchange to be efficient!

How do we deal with this mess??

- One needs to know how different kinds of data
- Data providers need to ‘ questions in a compatib
- Data providers need to ‘
- Provided it to the “dema



Data needs to be defined with metadata and standardization is needed for this exchange to be efficient!

Why do we need a “Virtual” Observatory?

“I want to know everything about vega”

Why do we need a “Virtual” Observatory?

“I want to know everything about vega”

Google [Búsqueda avanzada](#)
Buscar en: la Web páginas en español páginas de España

La Web

Resultados 1 - 10 de aproximadamente 239.000

Sugerencia: [Buscar sólo resultados en español](#). Puede especificar el idioma de búsqueda en [Preferencias](#).

[Vega \(estrella\) - Wikipedia, la enciclopedia libre](#) 

Vega (Alfa **Lyrae** / α Lyr) es una estrella de primera magnitud (en la clasificación de Ptolomeo) de la constelación de la Lira y la principal de la misma. ...

[es.wikipedia.org/wiki/Vega_\(estrella\)](http://es.wikipedia.org/wiki/Vega_(estrella)) - [En caché](#) - [Similares](#)

[Vega \(Alpha Lyrae\)](#)  - [[Traducir esta página](#)]

The brightest star in the constellation **Lyra**, the brightest star in the northern summer sky (forming the northwestern apex of the Summer Triangle), ...

www.daviddarling.info/encyclopedia/V/Vega.html - [En caché](#) - [Similares](#)

* [Alpha Lyrae - \(Astronomy\): Definition](#)  - [[Traducir esta página](#)]

Alpha Lyrae - Topic:Astronomy - Online Encyclopedia.

en.mimi.hu/astromy/alpha_lyrae.html - [En caché](#) - [Similares](#)

Resultados de imágenes de [alpha lyrae](#) - [Informar sobre las imágenes](#)



hundreds of thousands of results without “quality control”

COMFLOP..

Why do we need a "Virtual" Observatory?

"I want to know everything about vega"

SAO/NASA ADS Astronomy Query Form for Sun Oct 19 15:41:12 2008

Sitemap What's New Feedback Basic Search Preferences FAQ HELP

La Web (imadamente 239.000)

Hint: To select only references by a specific author use "Require Field for Selection" in the [Settings section](#)

Sugerenc

Databases to query: Astronomy Physics arXiv e-prints

Authors: (Last, First M, one per line) SIMBAD NED LPI IAUC Objects

Exact name matching Require author for selection

Object name/position search Require object for selection

(OR AND simple logic) (Combine with: OR AND)

Publication Date between 01 2007 and 12 2007
(MM) (YYYY) (MM) (YYYY)

Enter [Title Words](#) Require title for selection

(Combine with: OR AND simple logic boolean logic)

vega

inds of
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Why do we need a “Virtual” Observatory?

“I want to know everything about vega”

VizieR Service

[Browsing through Catalogues](#) · [Output Preferences](#)

Direct access to Catalogues from Name or Designation ([tips and examples](#))

Clear

Find catalogues or Data ([tips and examples](#))

Find catalogues among 7687 available

Words matching author's name, word(s) from title, description, etc.

Select from **Wavelength**, **Mission**, and controlled **Astronomical** keywords:

Radio	ANS	AGN
IR	ASCA	Abundances
optical	BeppoSAX	Ages
UV	CGRO	Associations
EUV	COBE	Atomic_Data
X-ray	Chandra	BL_Lac_objects
Gamma-ray	CoRoT	Binaries:cataclysmic

Target Name (resolved by [Simbad](#)) or **Position**:
vega J2000

Position in Sexagesimal, or Decimal°

Target radius: 2 arcmin
 Radius or Box size

Search by Position across 7931 tables

inds of
ality

Resulta

Enter [Title Words](#) Require title for selection
(Combine with: OR AND [simple logic](#) [boolean logic](#))
vega

Adding theoretical data: example



The image shows a Google search interface. The search bar contains the text "kurucz models". To the right of the search bar is a button labeled "Buscar". Below the search bar, there are radio buttons for "la Web" (selected), "páginas en español", and "páginas de España".

La Web Resultado

Sugerencia: [Buscar sólo resultados en español](#). Puede especificar el idioma de búsqueda en [Preferencias](#)

[Kurucz 1993 Models](#)  - [[Traducir esta página](#)]
A list of solar metallicity stars of different spectral types and luminosity classes together with their closest **Kurucz model** spectrum is presented in Table ...
www.stsci.edu/hst/observatory/.../k93models.html - [En caché](#) - [Similares](#)

[Robert L. Kurucz](#)  - [[Traducir esta página](#)]
Some files taken from **Kurucz** CD-ROMs 1-26 are given for historical checks although many ...
Molecules · Linelists · Opacities · Grids of **model** atmospheres ...
kurucz.harvard.edu/ - [En caché](#) - [Similares](#)

[Kurucz/Grids](#)  - [[Traducir esta página](#)]
CASTELLI: 2004 New grids of ATLAS9 **model** atmospheres (Castelli and **Kurucz**) **THESE ARE THE PREFERRED **MODELS**** *** 4 Nov 2008 ALL A*ODFNEW. ...
kurucz.harvard.edu/grids.html - [En caché](#) - [Similares](#)

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This is a combined Web/outgoing-FTP site, KURUCZ.HARVARD.EDU or CFAKU5.CFA.HARVARD.EDU. It provides up-to-date public access to my data and programs. These are the same programs and files that I use in my research. Many bugs and problems have been corrected but there are still many more errors remaining to be found. Programs and data that I would not use myself because they are still under development are not on this computer. Many of the files are large and are also available on CDs or DVDs, and I am willing to write DVDs on demand. Some files taken from Kurucz CD-ROMs 1-26 are given for historical checks although many have been replaced by new versions. Binary versions will eventually be replaced by (much larger) ASCII versions. I am willing to rewrite them in ASCII on demand. Neither the programs nor data are "black boxes". You should not be using them if you do not have some understanding of the physics and of the programming in the source code.

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Email RKURU@alum.mit.edu

This is a copy of the
CFAKU5.CFA.H
my data and
I use in my
but there are
Programs and
under develop
large and are
write DVDs o
given for hi
versions. E
larger) ASCI
demand. Nei
should not k
of the physi

¹ Available via anonymous FTP from <ftp://calvin.physast.uga.edu/pub/NextGen> or via the WWW URL <http://dilbert.physast.uga.edu/~yeti>.



Servidor no encontrado

Firefox no puede encontrar el servidor en dilbert.physast.uga.edu.

- Compruebe que no ha cometido errores al escribir la dirección, como **ww**.example.com en lugar de **www**.example.com
- Si no puede cargar ninguna página, compruebe la conexión de red de su ordenador.
- Si su ordenador o su red están protegidos por un cortafuegos o un proxy, cerciórese de que se le permite acceder a la Web con Firefox.

Reintentar

Table of Contents

Adding theoretical data: example

```
SDSC GRID [+0.0] VTURB 2.0 KM/S L/H 1.25
PROGRAM READFLUX
C SAMPLE PROGRAM READS THIS FILE ON UNIT 1
  DIMENSION Hnu(1221),HnuCONT(1221),WAVE(1221)
  CHARACTER*80 TITLE
  DO 11 ISKIP=1,22
11 READ(1,1)
C wavelength in nm
  READ(1,1)WAVE
  1 FORMAT(10F10.2)
  DO 8 MODEL=1,500
C ergs/cm**2/s/hz/ster
  READ(1,2,END=9)TITLE
  2 FORMAT(A80)
  PRINT 3,MODEL,TITLE
  3 FORMAT(I5,1X,A80)
  READ(1,4)Hnu
  READ(1,4)HnuCONT
  4 FORMAT(8E10.4)
  8 CONTINUE
  9 CALL EXIT
  END
  9.09      9.35      9.61      9.77      9.96      10.20      10.38      10.56
  10.77     11.04     11.40     11.78     12.13     12.48     12.71     12.84
  13.05     13.24     13.39     13.66     13.98     14.33     14.72     15.10
  15.52     15.88     16.20     16.60     17.03     17.34     17.68     18.02
  18.17     18.61     19.10     19.39     19.84     20.18     20.50     21.05
  21.62     21.98     22.30     22.68     23.00     23.40     24.00     24.65
```


Adding theoretical data: example with VO

Adding theoretical data: example with VO

The screenshot displays the VOSpec software interface. At the top, the title bar reads "VOSpec" and the header features the "VOspec" logo and the "Gesa VO Virtual Observatory" logo. The menu bar includes "File", "Edit", "View", "Operations", "Plastic", "SAMP", and "Help".

The main configuration area contains the following elements:

- Wave Unit:** A dropdown menu set to "micron" with a checked "Log" box.
- Flux Unit:** A dropdown menu set to "Jy" with a checked box.
- RedShift:** A text input field containing "0.00" with an unchecked checkbox.
- De-reddening:** An unchecked checkbox.
- $\lambda \rightarrow V$:** A text input field containing "0.00" with an unchecked checkbox.

Below these settings is a "Graphic Mode" section with a "View" button.

The central panel is titled "Target" and contains the following fields:

- Target:
- Ra:
- Dec:
- Size:
- Query:

At the bottom of the interface, there is a "Spectra List" area and a row of buttons: "RETRIEVE", "Unmark All", and "Reset".

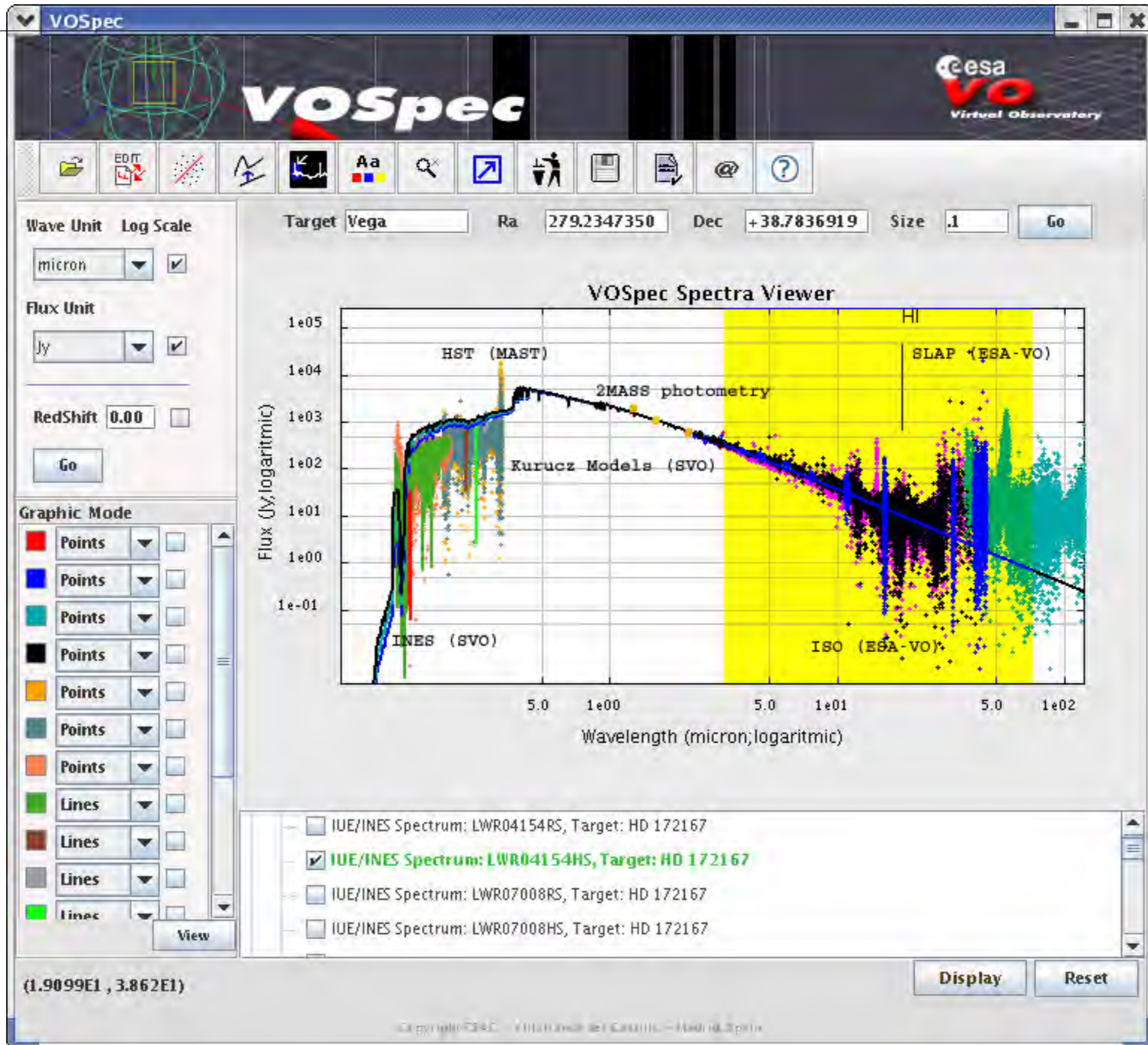
Copyright ESAC - Villafranca del Castillo - Madrid, Spain

Adding theoretical data: example with VO

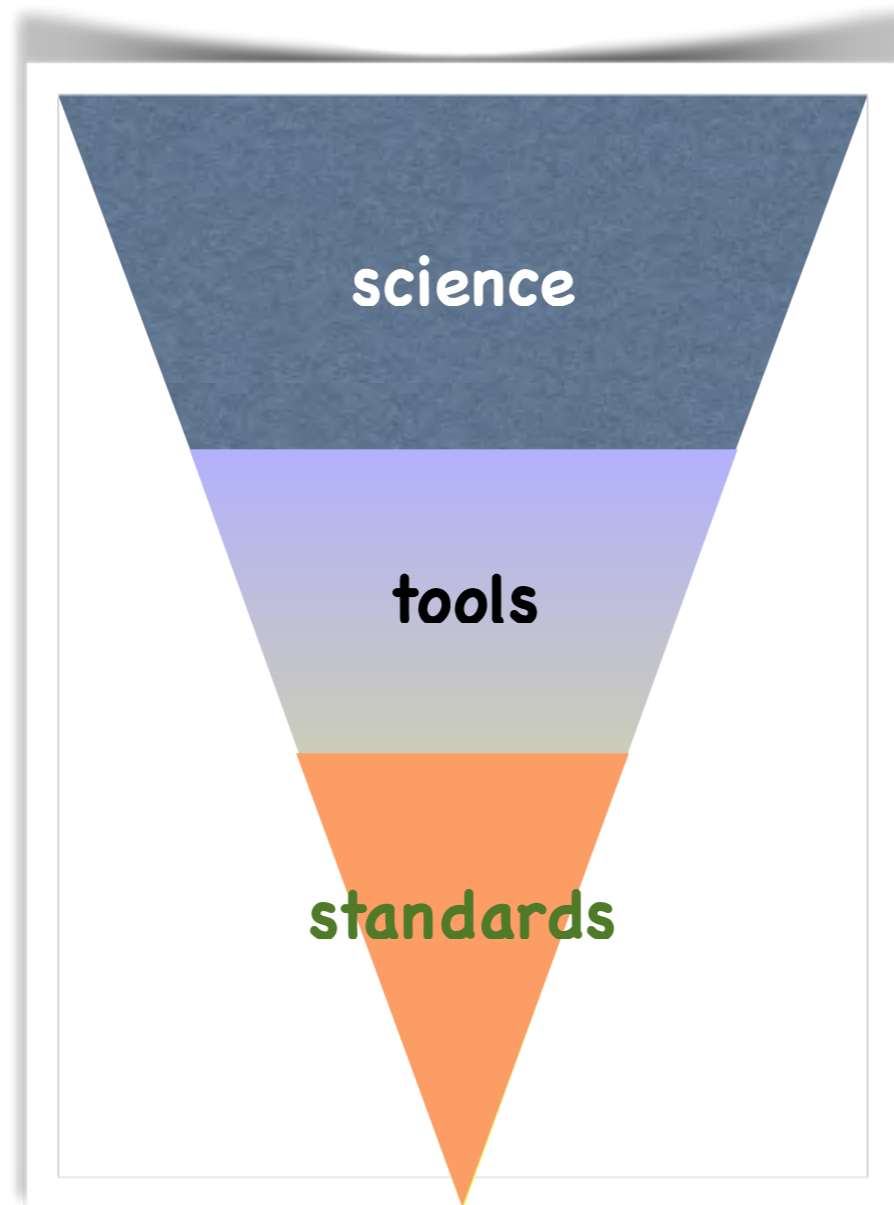
The screenshot displays the VOSpec application interface, specifically the Server Selector window. The window is divided into several sections:

- Query by Service:** A tree view on the left showing various services. The "Kurucz ODFNEW /NOVER models" service is selected, indicated by a checked checkbox.
- Query by params:** A tree view on the right showing the query parameters. The parameters are: TARGET.NAME vega, POS 279.234735,38.78369194, SIZE 1, teff_min 3500, teff_max 3500, logg_min 0.00, logg_max 0.00, meta_min -2.50, and meta_max -2.50.
- Query Outlook:** A section at the bottom left containing buttons for "Refresh", "Add SSA/TSA", and "Select All SSA", along with a URL field.
- Insert Param Value:** A section at the bottom right containing a text input field, an "Add" button, and "Query" and "Reset" buttons.

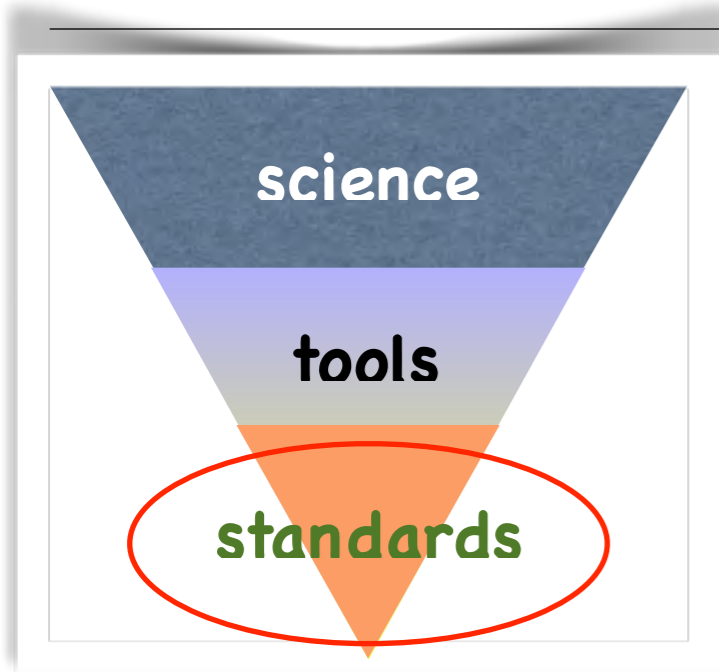
Adding theoretical data: example with VO



The VO approach



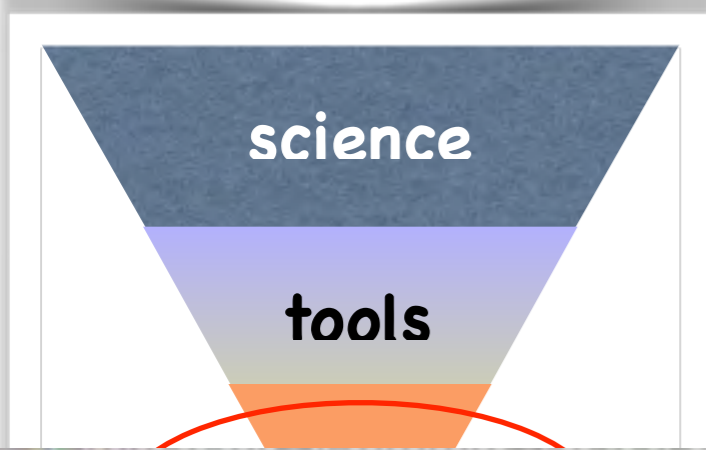
Principles of the philosophy behind the VO



Standards:

- ❑ fits format for imaging (established)

Principles of the philosophy behind the VO



Standards:

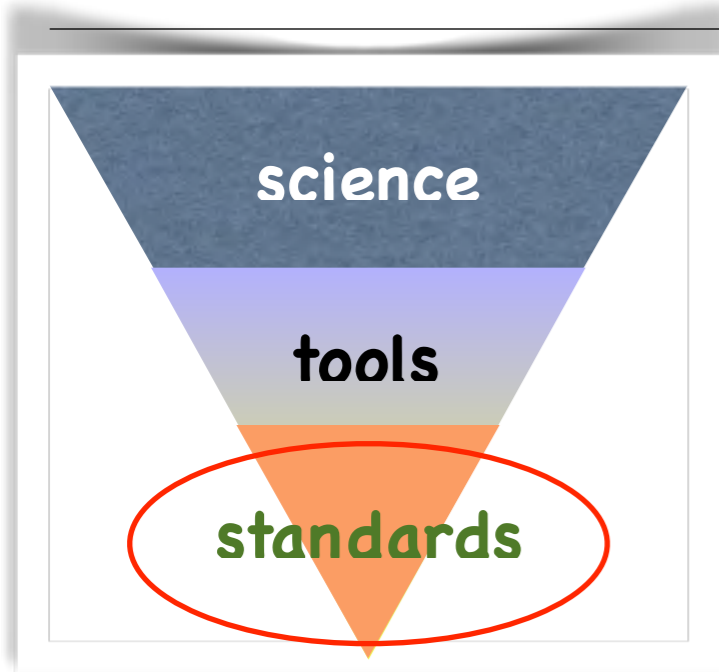
FITS header

```
SIMPLE = T /FITS header
BITPIX = 16 /No.Bits per pixel
NAXIS = 2 /No.dimensions
NAXIS1 = 1782 /Length X axis
NAXIS2 = 1786 /Length Y axis
EXTEND = T /
DATE = '21/03/12' /Date of FITS file creation
ORIGIN = 'CASB -- STScI' /Origin of FITS image
PLTLABEL= 'SF02904' /Observatory plate label
PLATEID = 'A21Q' /GSSS Plate ID
REGION = 'XP695' /GSSS Region Name
DATE-OBS= '1989/11/07' /UT date of Observation
UT = '#####' /UT time of observation
EPOCH = 1.9898502197270E+03 /Epoch of plate
PLTRAH = 5 /Plate center RA
PLTRAM = 22 /
PLTRAS = 4.6105959333330E+01 /
PLTDECSN= '+' /Plate center Dec
PLTDECD = 10 /
PLTDECM = 5 /
PLTDECS = 3.0591079999998E+01 /
EQUINOX = 2.0000000000000E+03 /Julian Reference frame equinox
EXPOSURE= 7.0000000000000E+01 /Exposure time minutes
BANDPASS= 35 /GSSS Bandpass code
PLTGRADE= 0 /Plate grade
PLTSCALE= 6.7199996948240E+01 /Plate Scale arcsec per mm
SITELAT = '+33:24:24.00' /Latitude of Observatory
SITELONG= '-116:51:48.00' /Longitude of Observatory
TELESCOP= 'Palomar 48-in Schm' /Telescope where plate taken
CNPIX1 = 3294 /X corner (pixels)
CNPIX2 = 18277 /Y corner
DATATYPE= 'INTEGER*2' /Type of Data
SCANIMG = 'XP695_A21Q_01_00.PIM' /Name of original scan
SCANNUM = 1 /Identifies scan of the plate
DCHOPPED= F /Image repaired for chopping effects
```

ESO POSS2UKSTU_Red

29.36' x 29.96'

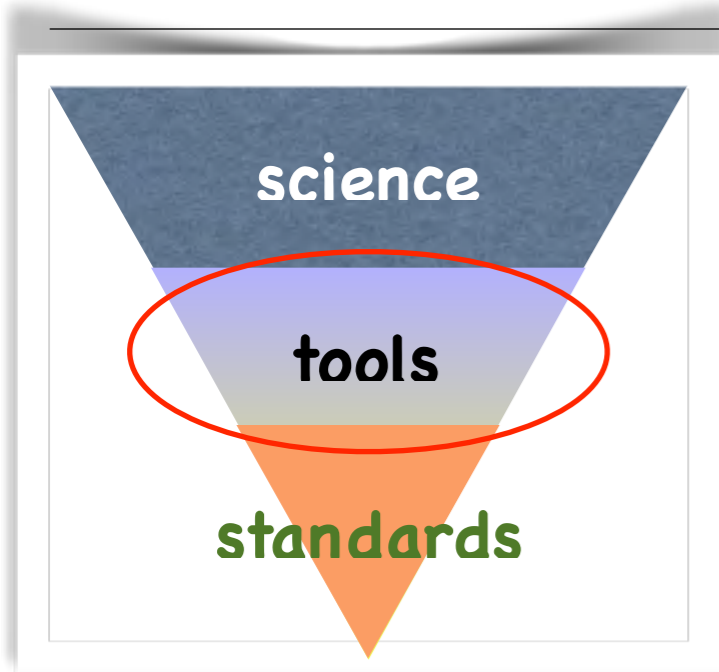
N
E



Standards:

- fits format for imaging (established)
- Table format?
- Photometric systems and how to mix data from different ones? + data coming in physical units?

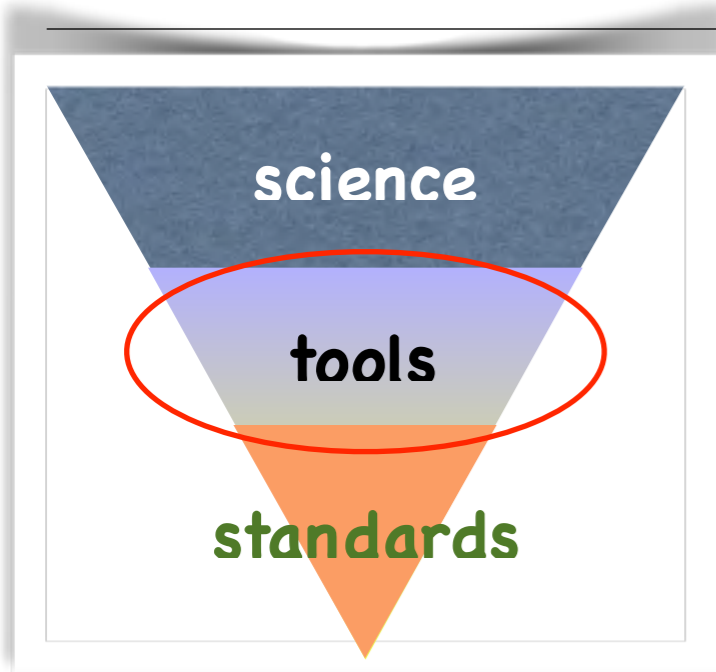
Principles of the philosophy behind the VO



Tools:

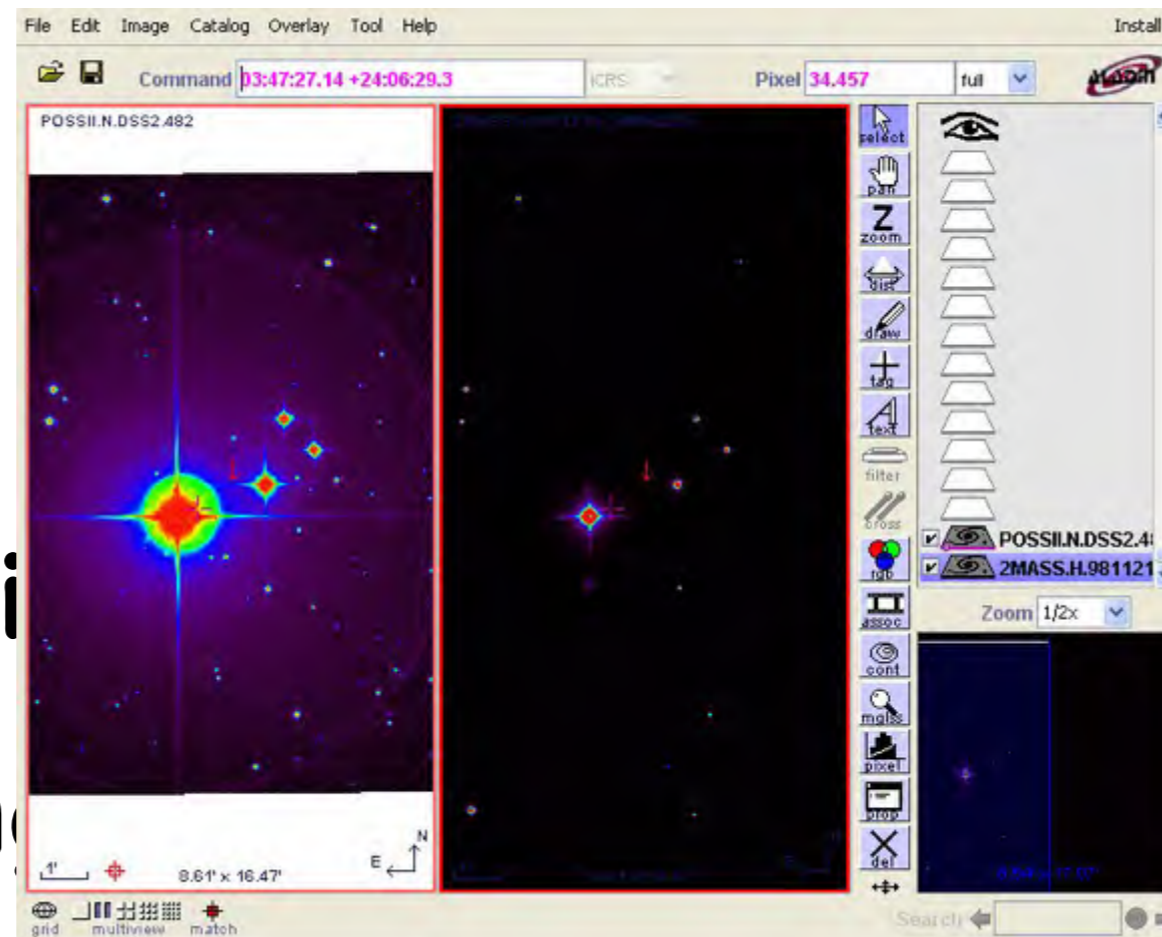
- ❑ **Aligning, rotating, scaling, arithmetics**
- ❑ **Combining local and archival data**

Principles of the philosophy behind the VO



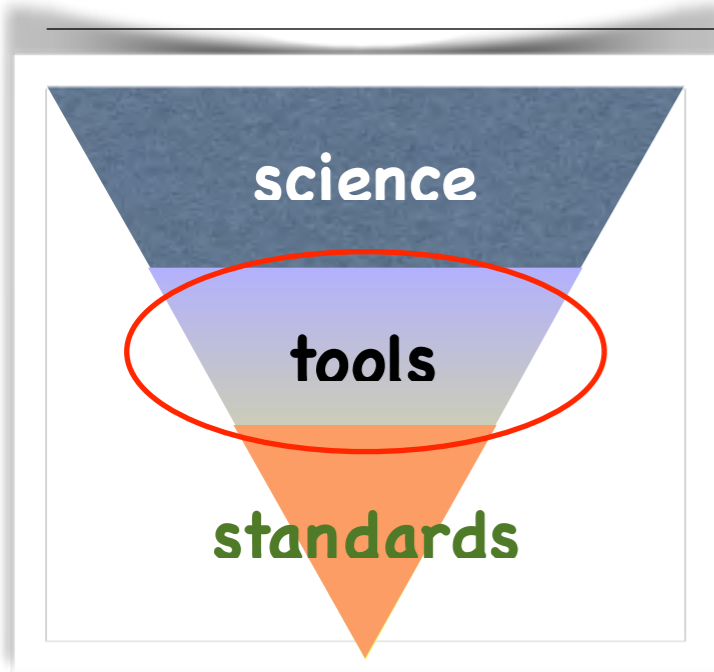
Tools:

- Aligning, arithmetic
- Combining



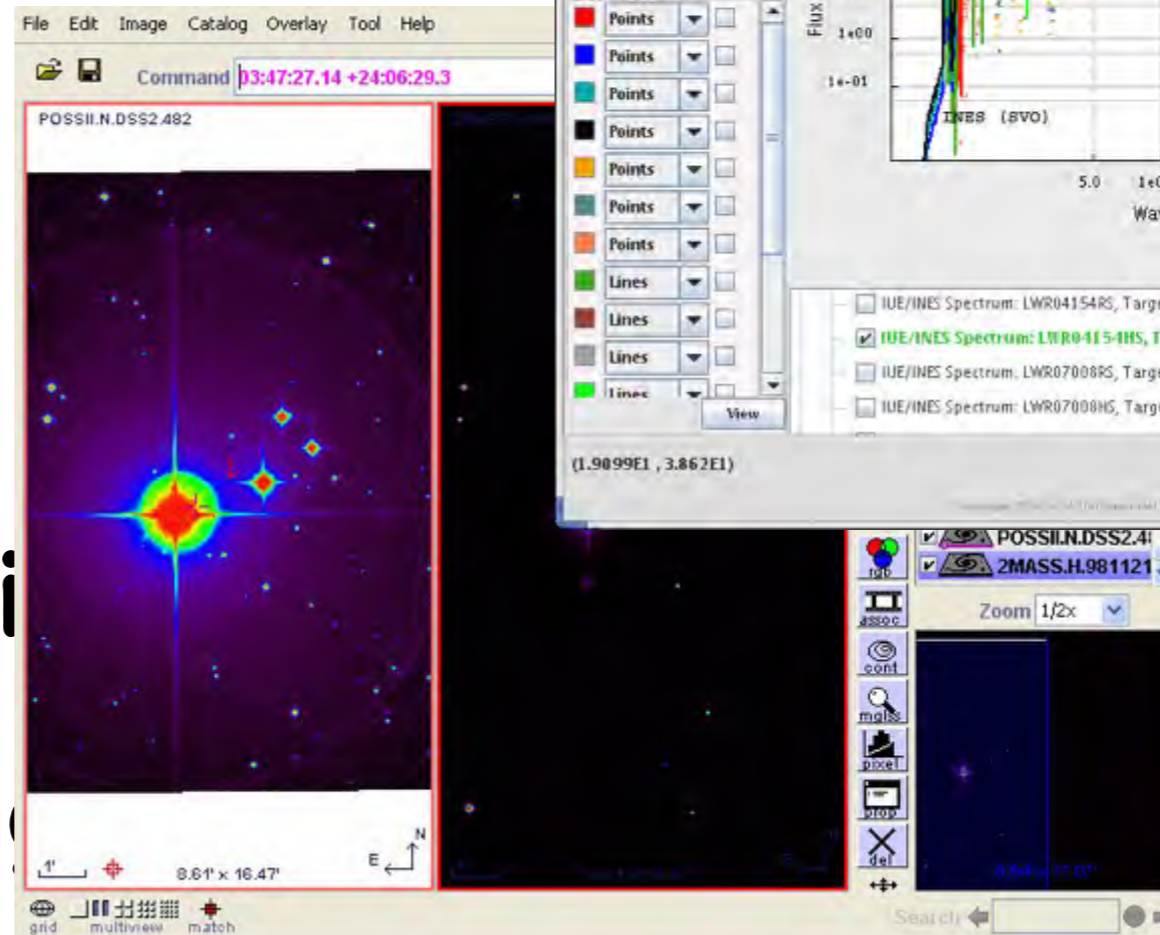
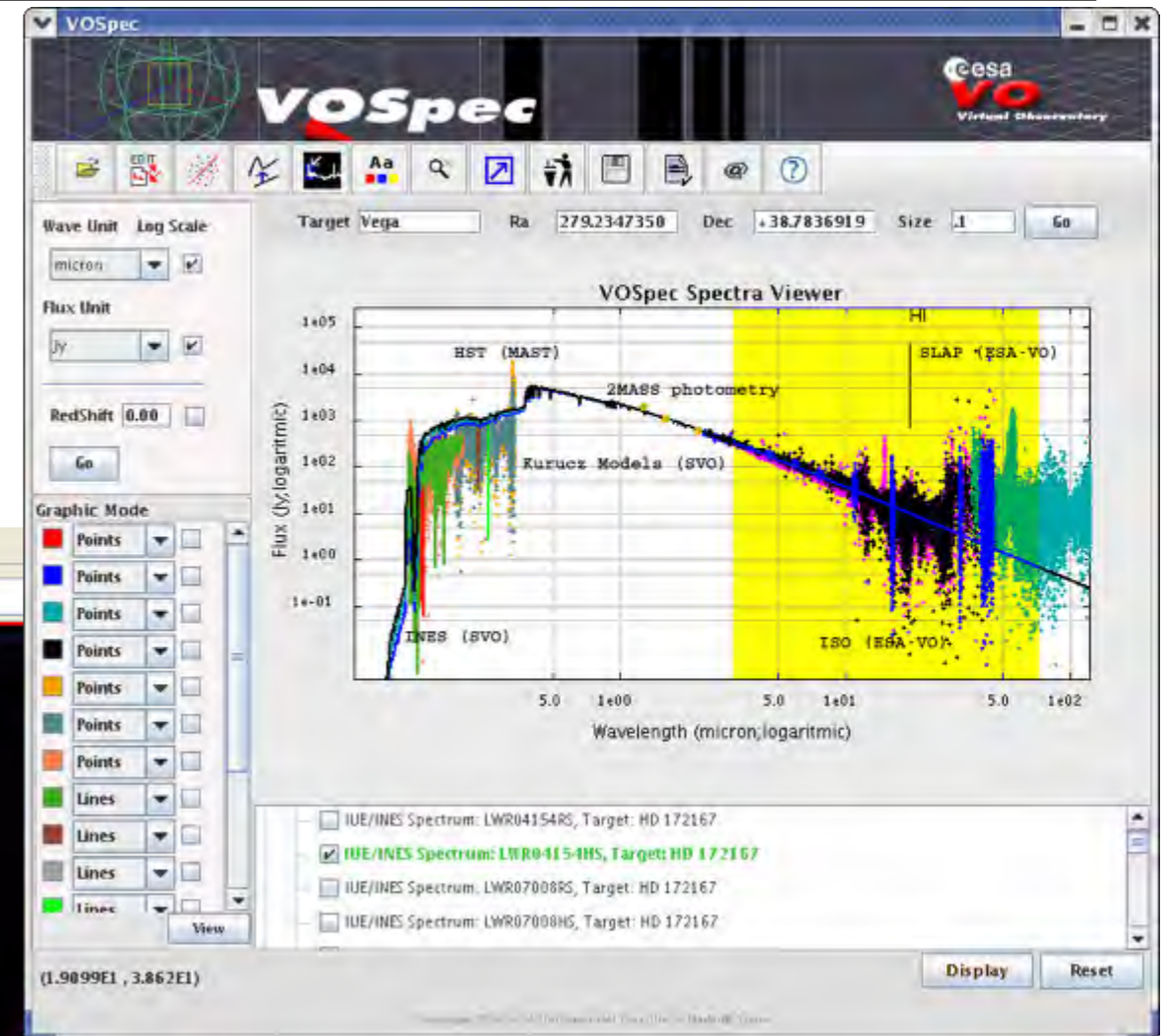
ata

Principles of the philosophy behind the VO



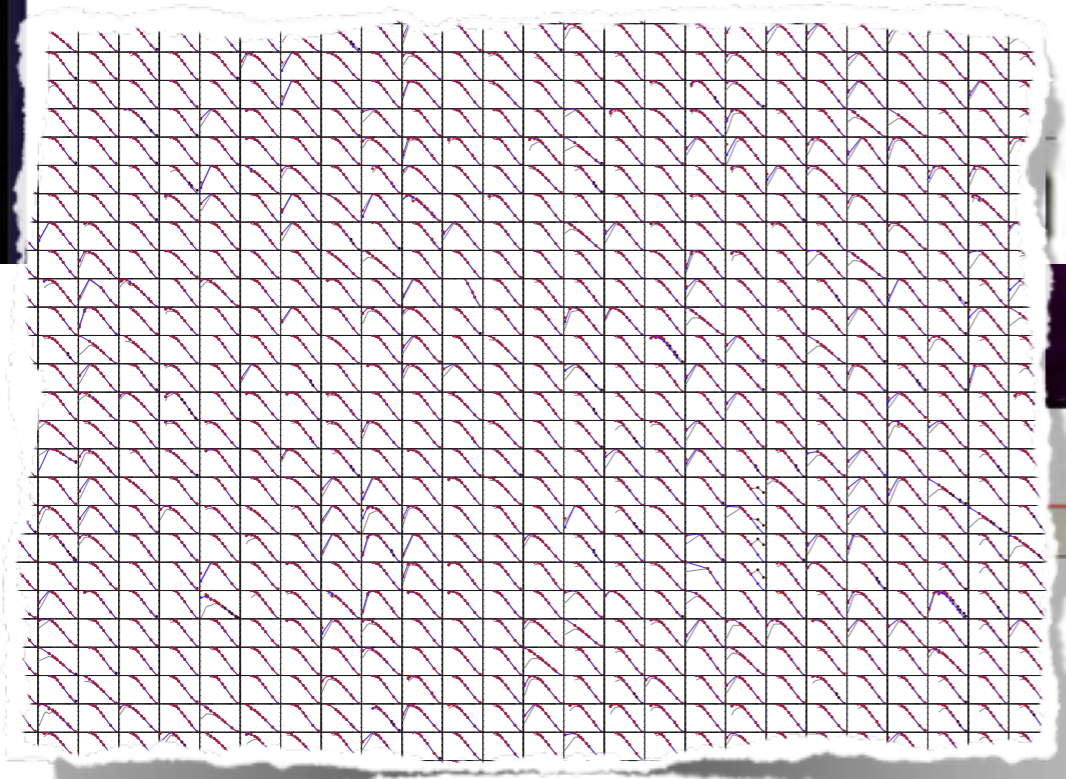
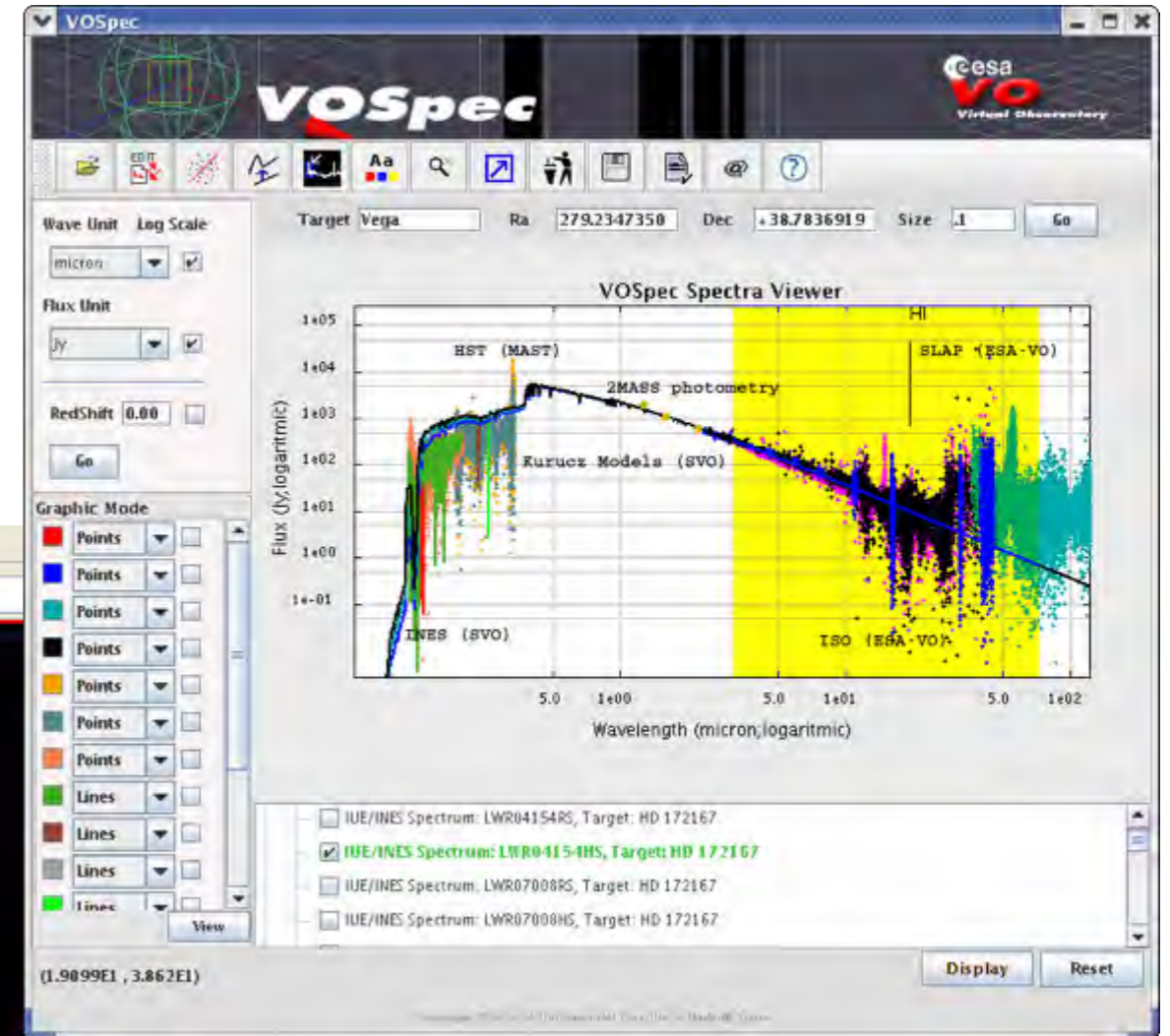
Tools:

- Aligning, arithmetic
- Combining



ata

Principles of the philosophy behind the VO



ata

Principles of the philosophy behind the VO

VOSA (VO Sed Analyzer) is a tool designed to perform the following tasks in an autor:

- Read user photometry-tables.
- Query several photometrical catalogs accessible through VO services (crosses #NAMES).
- Query VO-compliant theoretical models (spectra) and calculate their synthetic photometry.
- Perform a statistical test to determine which model reproduces best the observed data.
- Use the best-fit model as the source of a bolometric correction.
- Provide the estimated bolometric luminosity for each source.
- Generate a Hertzsprung-Russell diagram with the estimated parameters.
- Provide an estimation of the mass and age of each source.

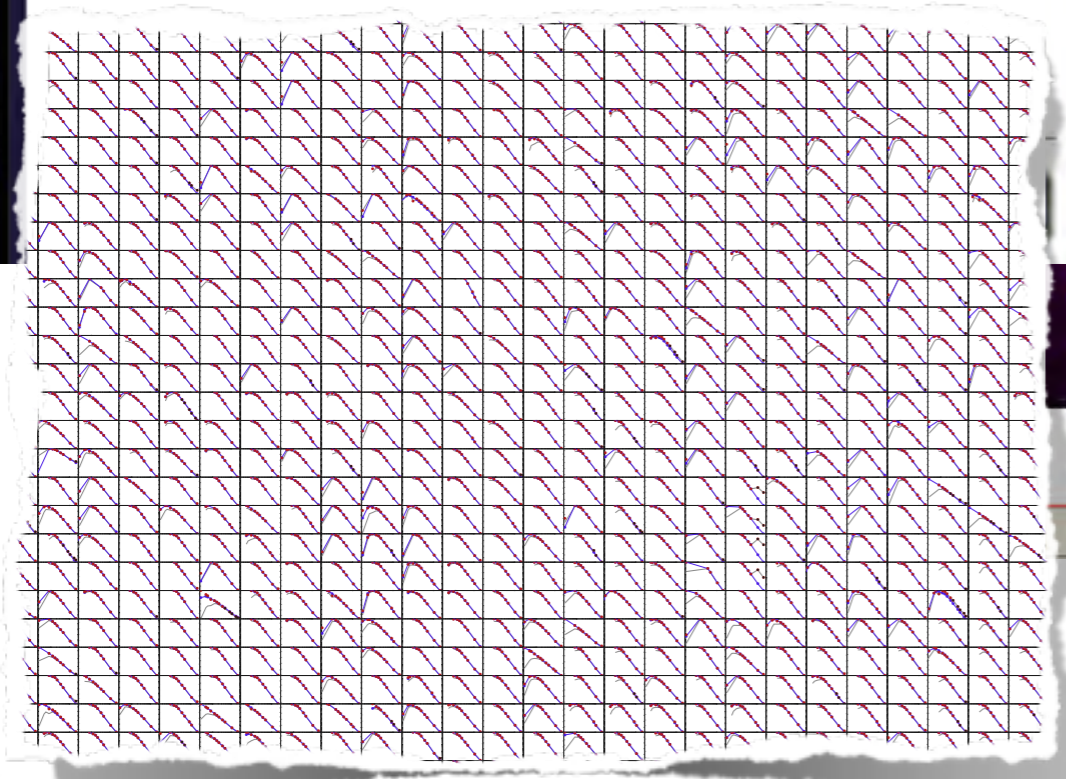
You need a username and password to use the application because it keeps a number of files and database entries with your results and we need to be able to identify which results belong to each user so that you can recover them in future sessions. If you don't have a username and password yet, please feel free to register.

Acknowledging VOSA in publications:
Please include the following in any published material that makes use of VOSA:

This publication makes use of VOSA, developed under the Spanish Virtual Observatory project supported from the Spanish MICINN through grant AYA2008-02136.

Referencing VOSA in publications:
If your research benefits from the use of VOSA, we would appreciate if you could include the following reference in your publication:

Bays, A., Rodrigo, C., Barrado y Navascués, D., Solano, E., Gutiérrez, R., Morales-Calderón, M., Allard, F. 2008, A&A 492, 277B.



Principles of the philosophy behind the VO: tools

Home

Science

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Data Centres

- IVOA 'VO Publishing'

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The European Virtual Observatory EURO-VO

The Virtual Observatory is an international astronomical community-based initiative. It aims to allow global electronic access to the available astronomical data archives of space and ground-based observatories and other sky survey databases. **EURO-VO** aims at deploying an operational VO in Europe. It supports the utilization of VO tools and services by the scientific community, technology take-up and VO compliant resource provision, and building of the technical infrastructure.

The left menu provides links to information relevant to **Scientists, Data Centres, Software Developers** and **Educators**.

News

- **Workshop on [Virtual Observatory Tools and their Applications](#)**, Krakow, Poland June 16-18, organized by HECOLS (Polish-French collaboration in astrophysics) and supported by Euro-VO CoSADIE
- **May 2014 IVOA Newsletter now [available](#)**

www.euro-vo.org

Principles of the philosophy behind the VO: tools

The screenshot displays the Virtual Observatory (VO) tools page, organized into two main columns. The left column, titled "Applications/Services (alphabetical)", lists tools in alphabetical order: Aladin, AstroStat, CASSIS, CDS Cross-Match Service, Iris, Seleste, Skyview, SIMBAD, Specview, and SPLAT. The right column, titled "Applications/Services (by function)", groups tools by their primary function: Search for Images (Aladin, Data Discovery Tool, TOPCAT), Search for Spectra (VOSpec, SPLAT, Aladin, Data Discovery Tool, TOPCAT, CASSIS), Search for Catalogues/Tables (Aladin, Data Discovery Tool, TOPCAT, VizieR, Xamin, TAPHandle), Image Visualisation (Aladin), Catalogue/Table Visualisation (TOPCAT, VOPlot), Catalogue Cross-matching (Aladin, CDS Cross-Match Service, TOPCAT/STILTS, Cross-Comparison Tool), Scatter, 3D plots and histograms (TOPCAT, VOPlot), Statistics (AstroStat), Coverage Maps (Aladin), Table format conversion (TOPCAT/STILTS, VOPlot), SEDs (Iris, VOSA, VOSpec), TAPHandle, TOPCAT/STILTS, VAO Cross-Comparison Tool, VAO Data Discovery Tool, VAO Time Series Search Tool, VisIVO, VizieR, VOConvert, VOPlot, VOSA, VOSpec, and Xamin. A section on the far right lists "Other VO Compliant Tools: IRAF, SAOImage DS9". The page footer includes the text "• May 2014 IVOA Newsletter now available" and a URL "www.euro-vo.org".

Applications/Services (alphabetical)	Applications/Services (by function)
Aladin	Search for Images: Aladin, Data Discovery Tool, TOPCAT
AstroStat	Search for Spectra: VOSpec, SPLAT, Aladin, Data Discovery Tool, TOPCAT, CASSIS
CASSIS	Search for Catalogues/Tables: Aladin, Data Discovery Tool, TOPCAT, VizieR, Xamin, TAPHandle
CDS Cross-Match Service	Image Visualisation: Aladin
Iris	Catalogue/Table Visualisation: TOPCAT, VOPlot
Seleste	Catalogue Cross-matching: Aladin, CDS Cross-Match Service, TOPCAT/STILTS, Cross-Comparison Tool
Skyview	Scatter, 3D plots and histograms: TOPCAT, VOPlot
SIMBAD	Statistics: AstroStat
Specview	Coverage Maps: Aladin
SPLAT	Table format conversion: TOPCAT/STILTS, VOPlot
	SEDs: Iris, VOSA, VOSpec
	TAPHandle
	TOPCAT/STILTS
	VAO Cross-Comparison Tool
	VAO Data Discovery Tool
	VAO Time Series Search Tool
	VisIVO
	VizieR
	VOConvert
	VOPlot
	VOSA
	VOSpec
	Xamin

Other VO Compliant Tools:
IRAF, SAOImage DS9

• May 2014 IVOA Newsletter now available

www.euro-vo.org

Principles of the philosophy behind the VO: tools

The screenshot displays the Virtual Observatory (VO) website interface. At the top, a navigation bar includes links for Home, Science Tools & Services, About the VAO, VO News, Support & Community, and Contact & Connect. The main content area features a 'Time Series Search Tool' section with two plots: a scatter plot of AP CORREL FLUX vs. Star ID 11440443 and a power spectrum plot for the same star ID. A 'Read More' button is present above the plots. Below the plots, a text box describes the tool: 'Discover time-series data from three major archives & analyze them with the NASA Exoplanet Archive periodogram application.' To the right, a sidebar titled 'VAO Tools & Services' lists several tools: Data Discovery Tool, Iris: SED Analysis Tool, Time Series Search Tool, Cross-Comparison Tool, and VOClient. Below this, a 'More News from the VO' section lists recent news items, including the 'Montage BSD 3-Clause License' announcement. At the bottom of the screenshot, a banner for the 'Center for Astrostatistics' at Penn State is visible, along with a navigation menu and the text 'VOStat (rev 2) Statistical Analysis for the Virtual Observatory Start using VOStat right now'.

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

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.
- **VOClient** – Access the VO from Your Desktop.

Science Service Monitor

More News from the VO

- ▶ Montage BSD 3-Clause License
- ▶ IVOA Newsletter 012 – May 2014
- ▶ VO Client Release – Access the VO from Your Desktop
- ▶ Aladin v8
- ▶ Comet VOEvent Implementation Update
- ▶ CASSIS Spectrum Analyzer Update
- ▶ VisIVO Contest 2014
- ▶ VAO@AAS223

Older Posts >>

PENNSYLVANIA STATE UNIVERSITY
Eberly College of Science
Center for Astrostatistics

Home | People | Partners | VOStat | StatCodes | Data & Tutorials | Programs | Bibliographies

VOStat
(rev 2)

Statistical Analysis for the Virtual Observatory

Start using VOStat right now

Chile is part of this effort

[HOME](#)[INSTITUTIONS](#)[ABOUT US](#)

UTFSM

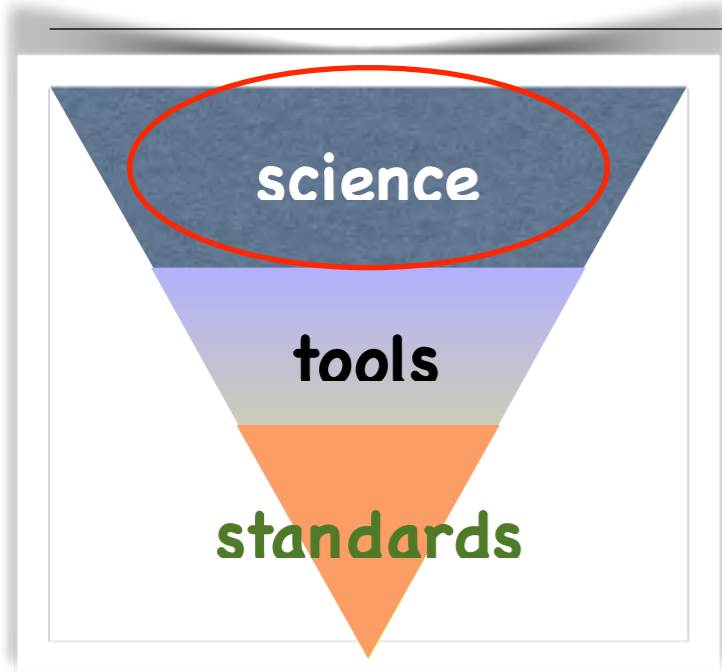
ASTROINFORMATIC



What is CHIVO?

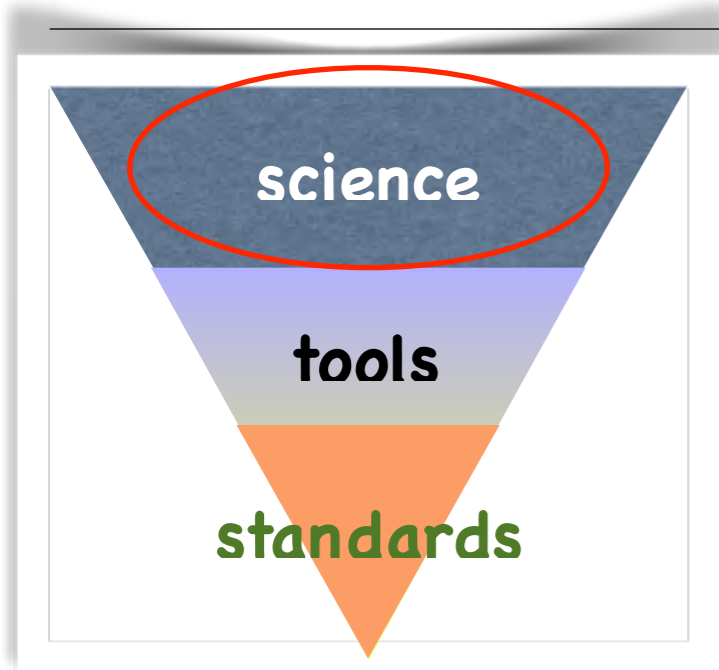
The Chilean Virtual Observatory (CHIVO) is a VO developed in Chile and it is one of many VO projects currently underway in the world. It was born out of the need to archive data that require large storage capacities and the need to develop new tools for the analyzing large volumes of data and better algorithms for intelligent processing of astronomical data, this due to the volumes of large scale data that will generate the astronomical observatories in Chile, mainly the ALMA project that will generate over 1TB of data per day, and in this form be to able to store the data in the

Principles of the philosophy behind the VO

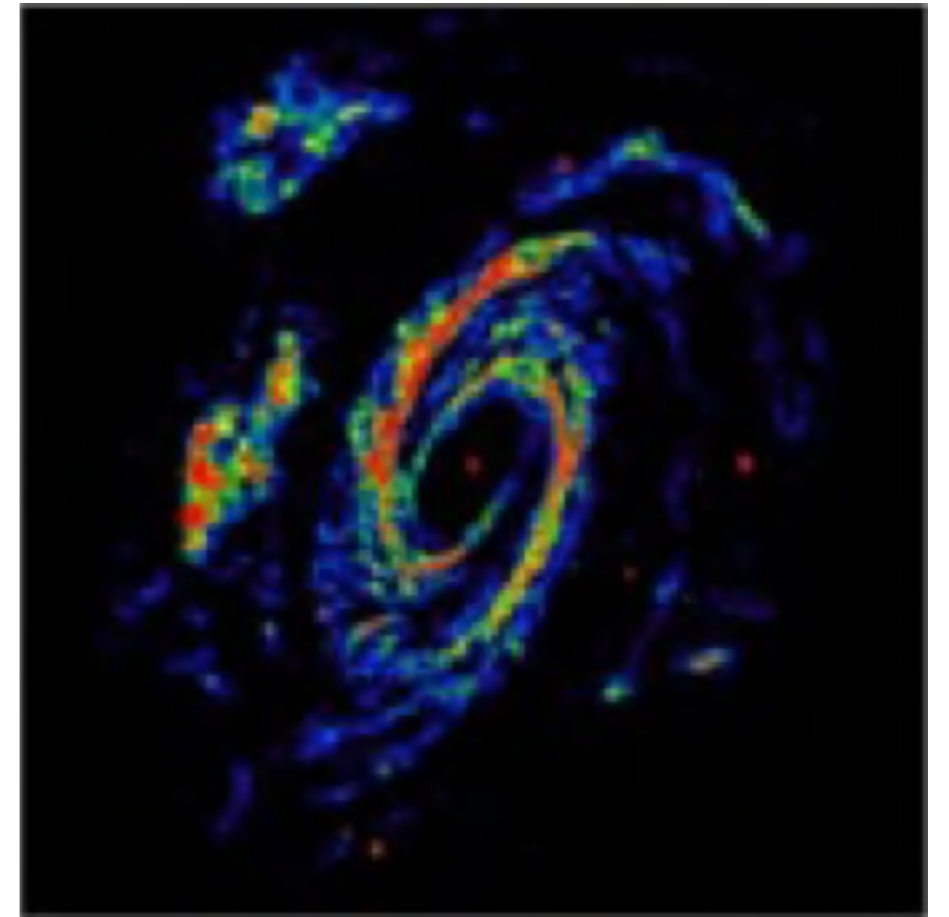


Science:

Principles of the philosophy behind the VO

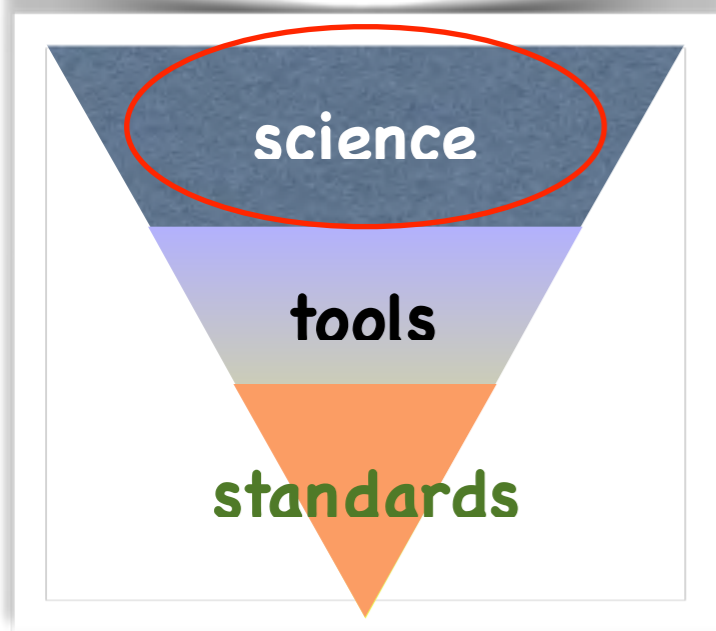


Science:

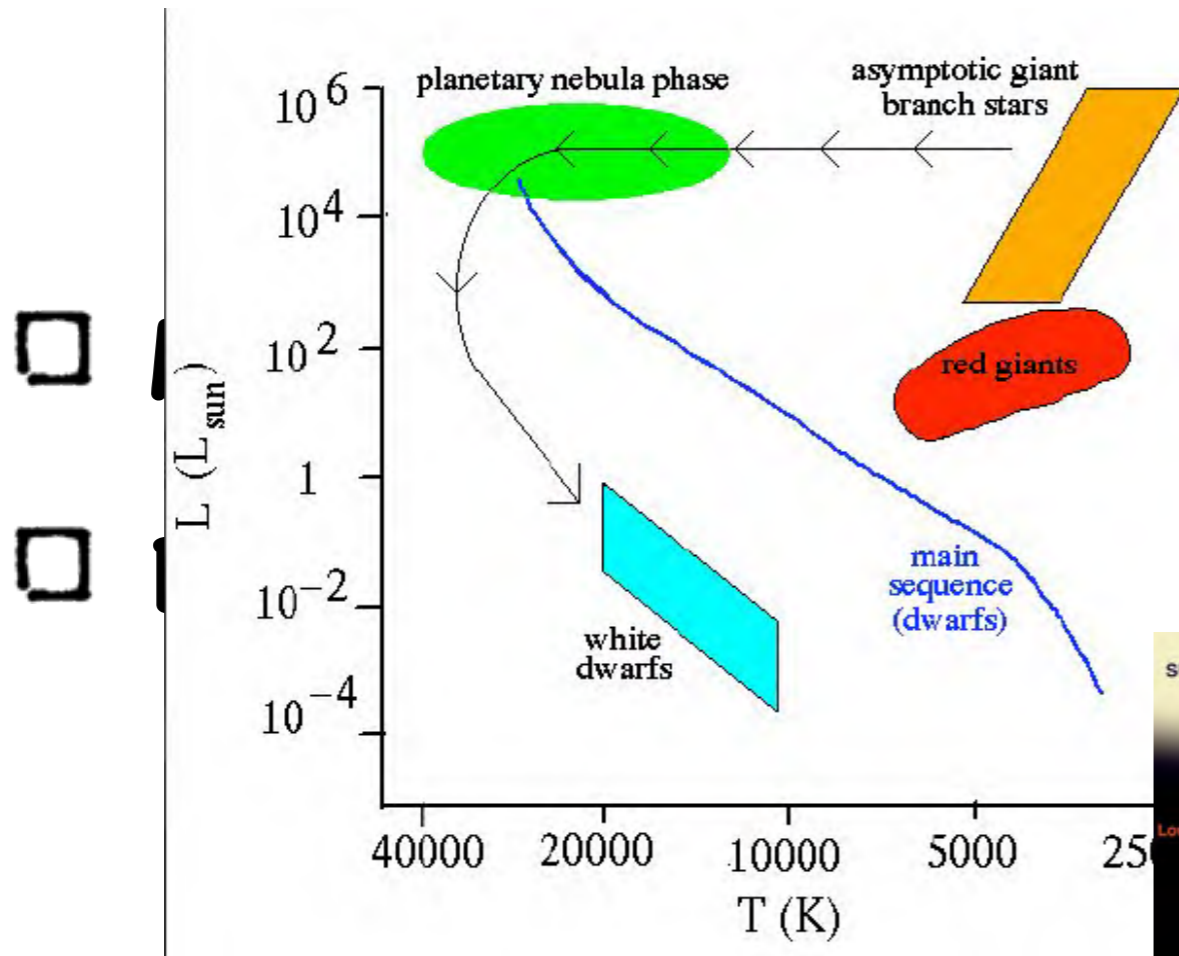
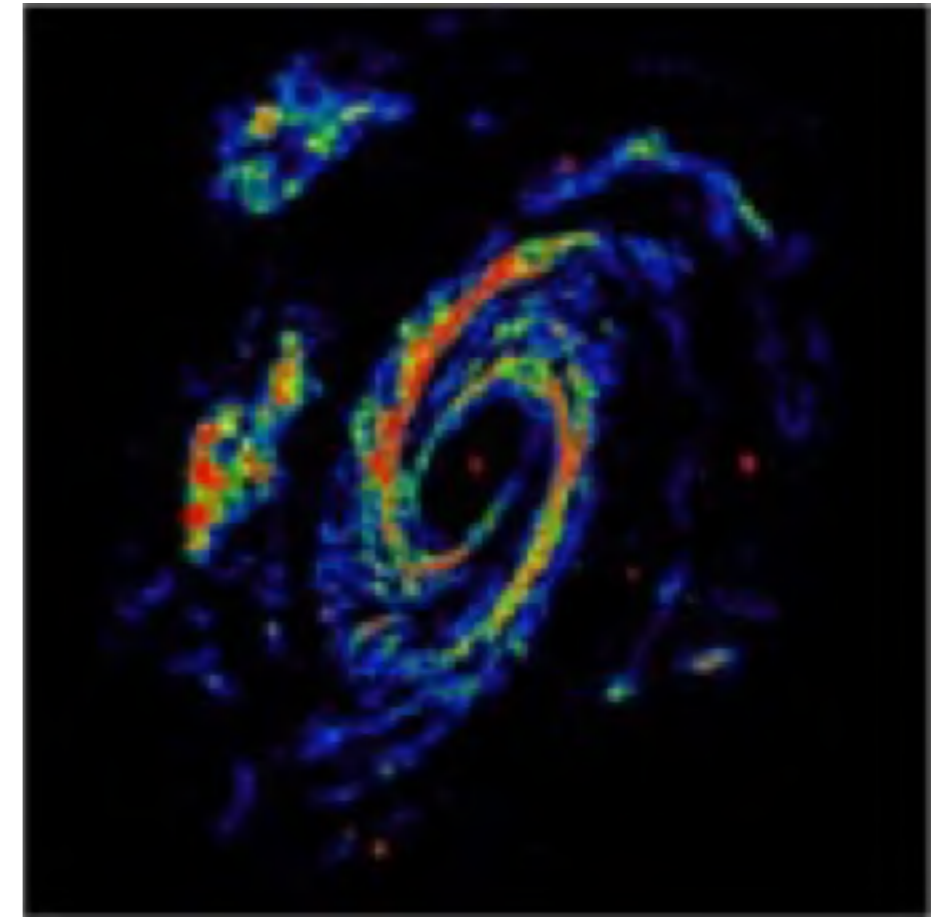


- Multiwavelength**
- Exotic objects identification**

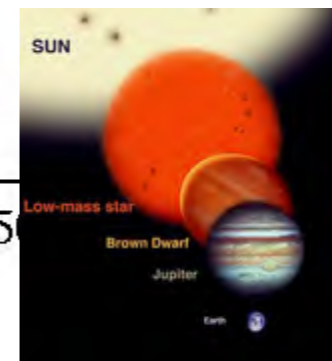
Principles of the philosophy behind the VO



Science:



cation



Does really anybody use the VO??

Disclaimer: I am not claiming to be complete or unbiased, in fact quite some part is a collection of my own experiences

What do these papers “talk” about?

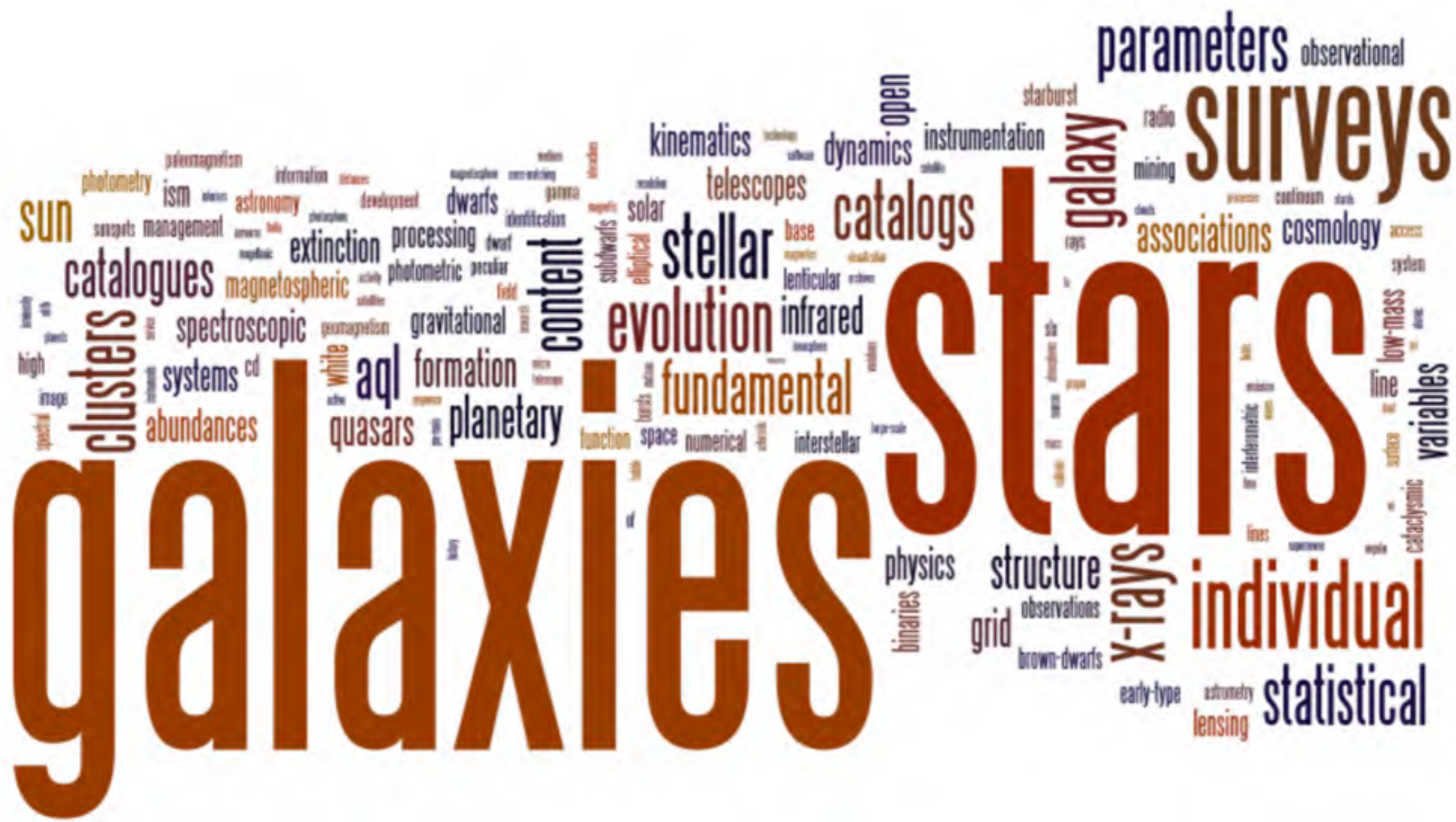
“H-index” of ~50 vs SDSS ~70 (to be taken with a pinch of salt,
and I personally believe these comparisons are... not too smart)



What do these papers “talk” about?

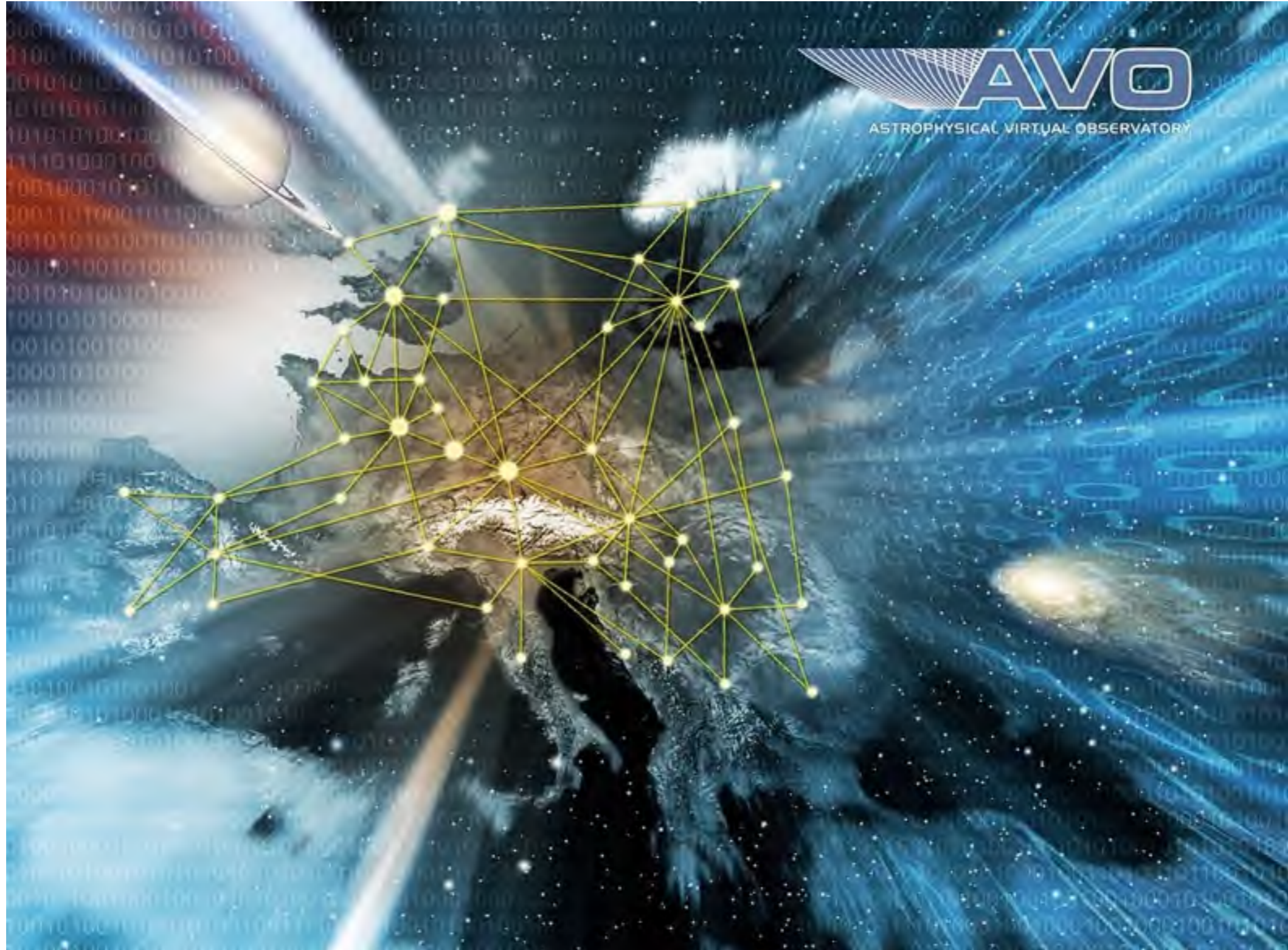
“H-index” of ~50 vs SDSS ~70 (to be taken with a pinch of salt,
and I personally believe these comparisons are... not too smart)



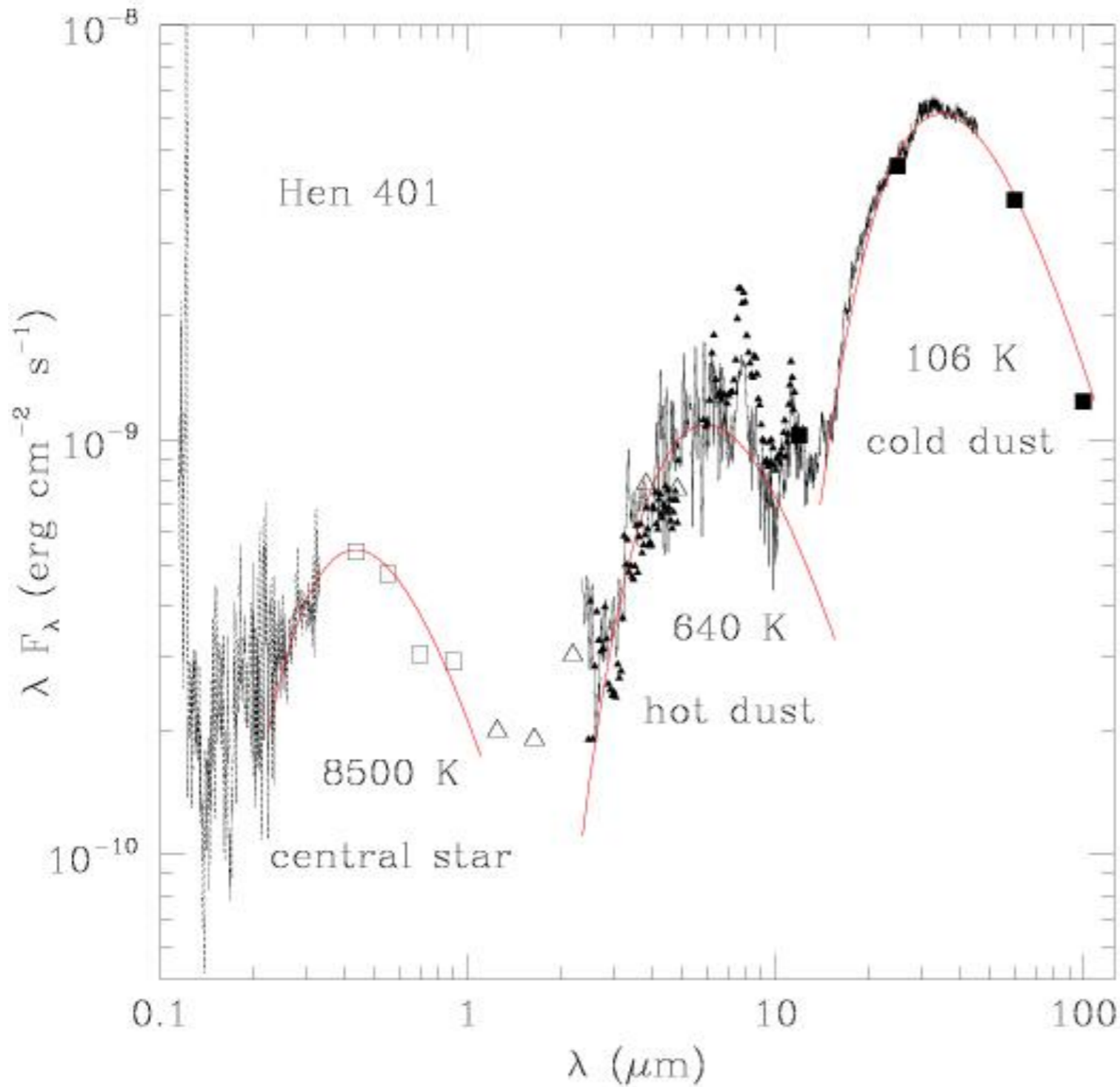




Some examples: 1.- Back in 2004-2005 the AVO



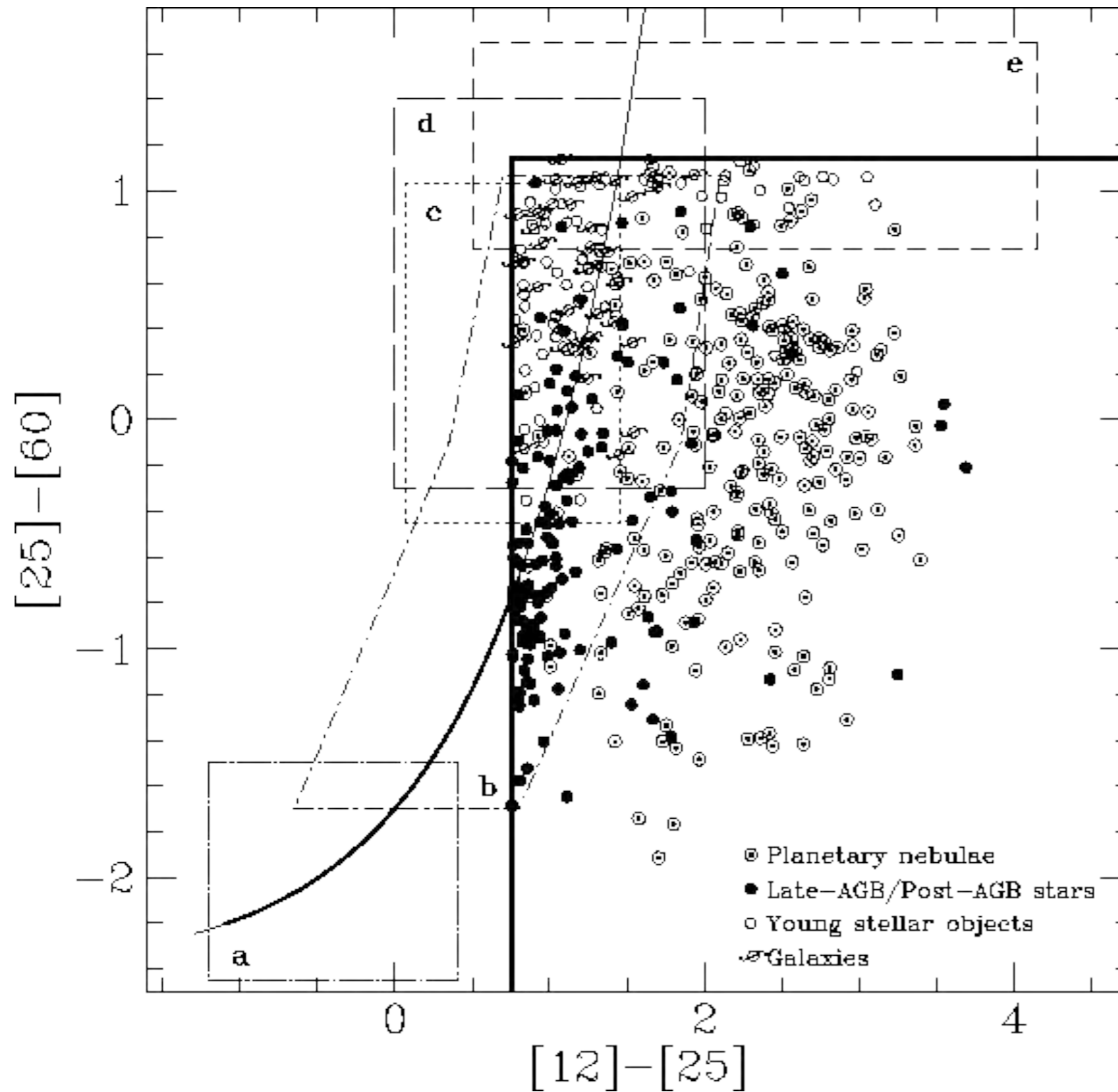
Some examples: 1.- Back in 2004-2005 the AVO



Transition phase
AGB \rightarrow PN

Multiple (and
variable) components
in their SEDs

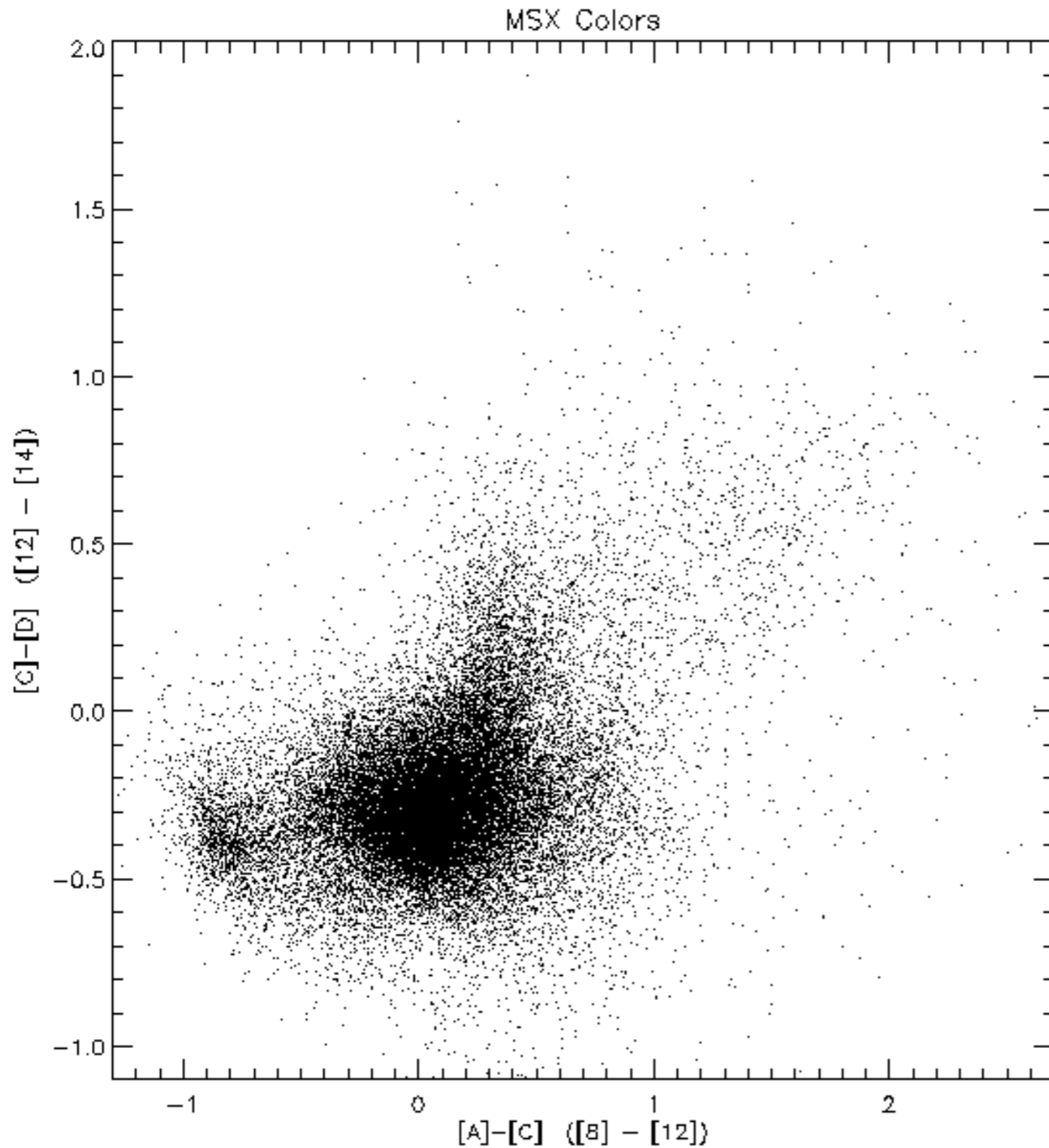
Some examples: 1.- Back in 2004-2005 the AVO



Distribution of identified sources in the GLMP catalog

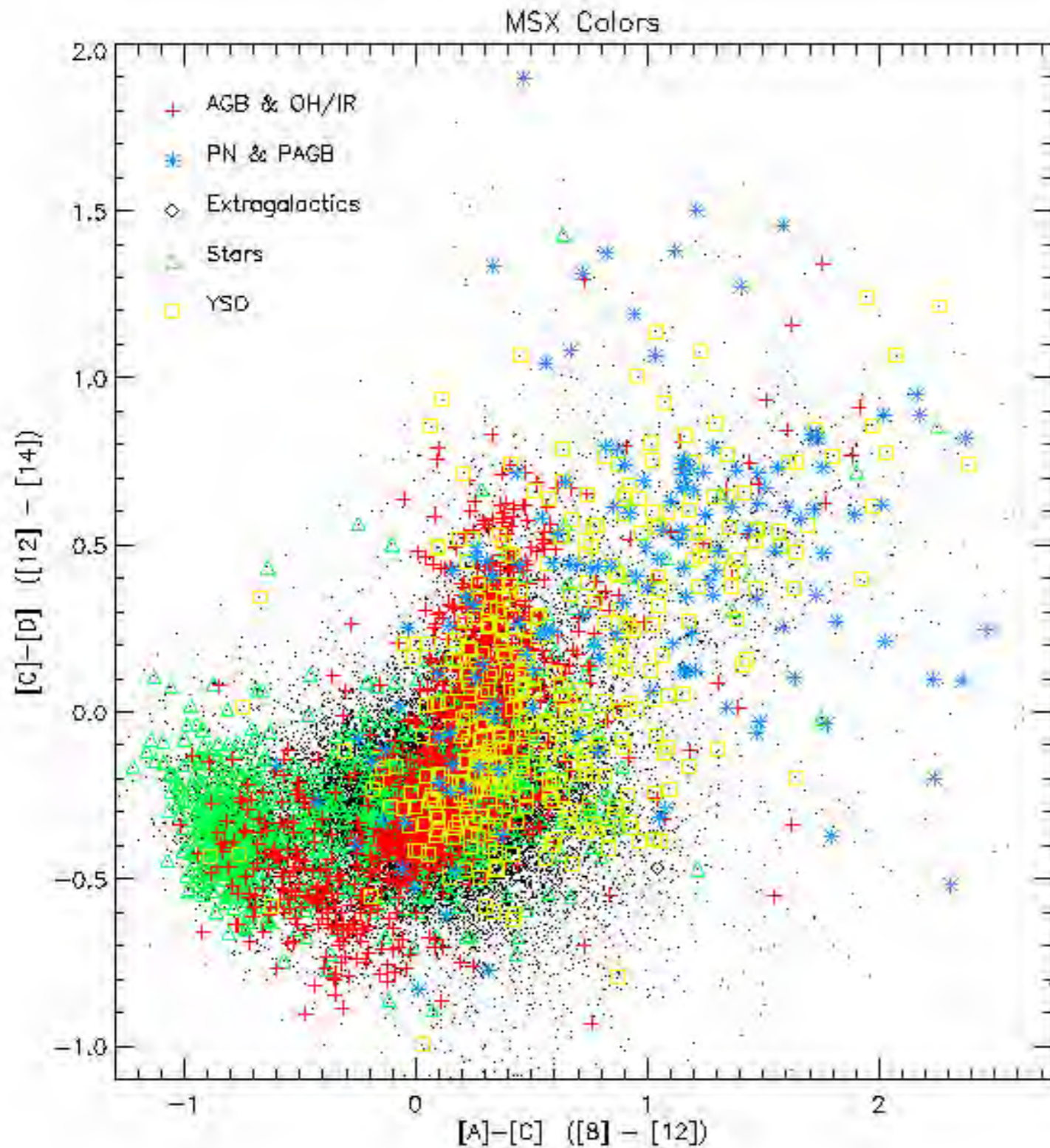
Garcia-Lario et al. (1997)

Some examples: 1.- Back in 2004-2005 the AVO



✓ 17657 sources
with good quality
MSX photometry
8-14 micron

Some examples: 1.- Back in 2004-2005 the AVO



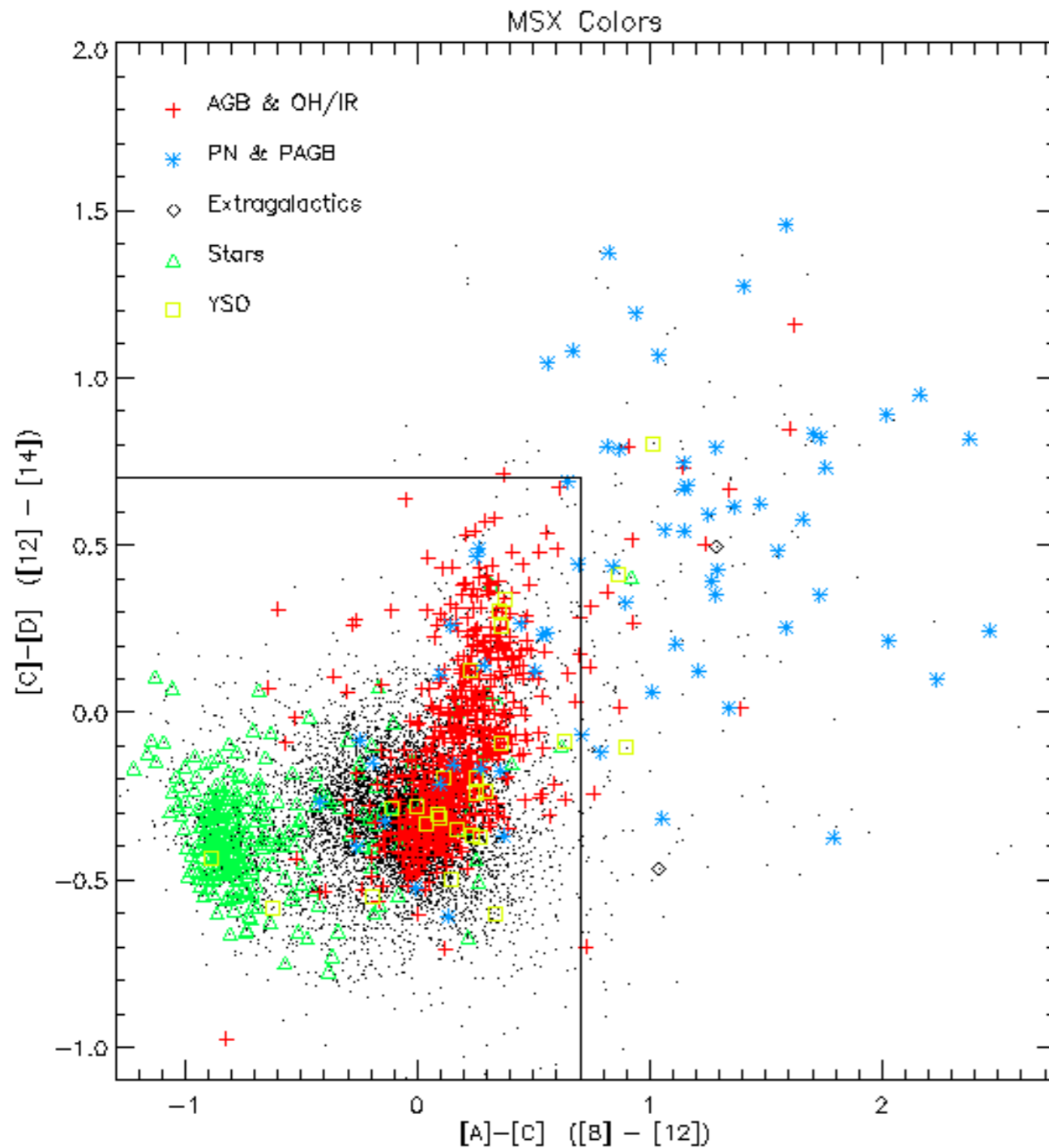
✓ 17657 sources
with good quality
MSX photometry
8-14 micron

✓ 3278 with
SIMBAD class.

✓ 155 known PNe
or Post-AGB stars

✓ Confusion with
other type of
sources

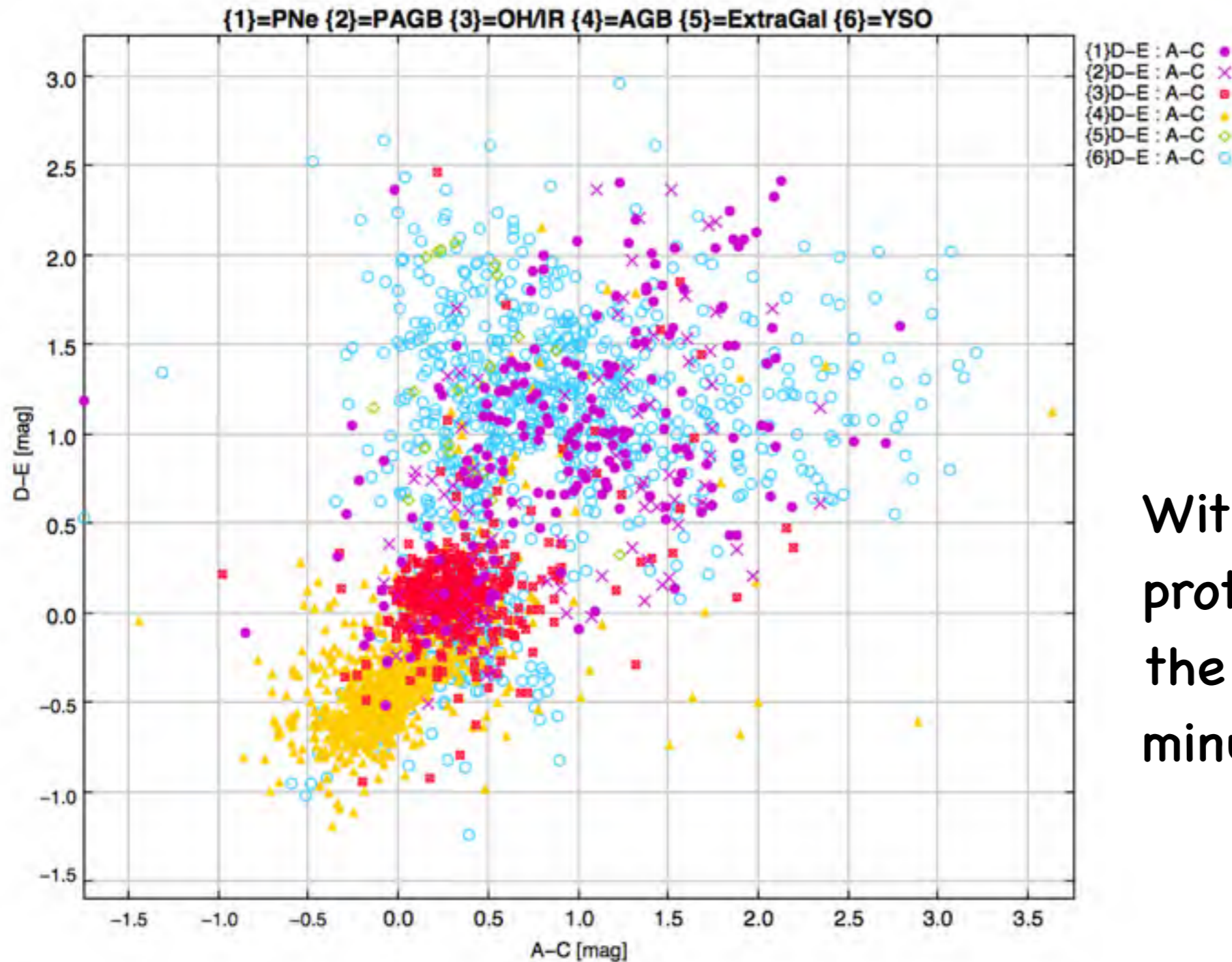
Some examples: 1.- Back in 2004-2005 the AVO



If we harden our selection criteria:
 $\sqrt{|b|} \geq 2$ degrees
 $\sqrt{[A]-[C]} \geq 0.7$
 $\sqrt{[C]-[D]} \geq 0.7$

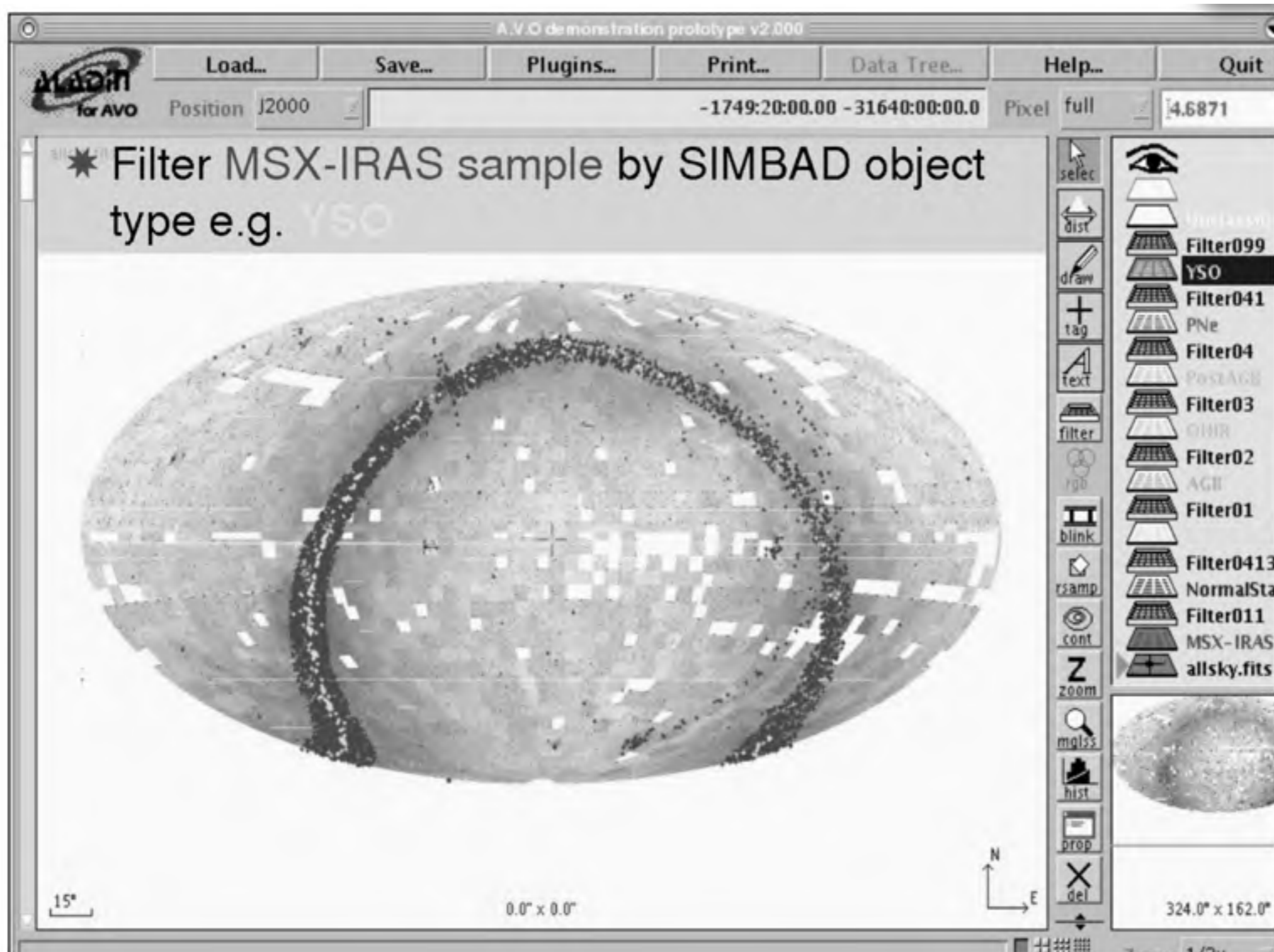
Large majority of PNe and Post-AGB stars...
and many new candidates!

Some examples: 1.- Back in 2004-2005 the AVO



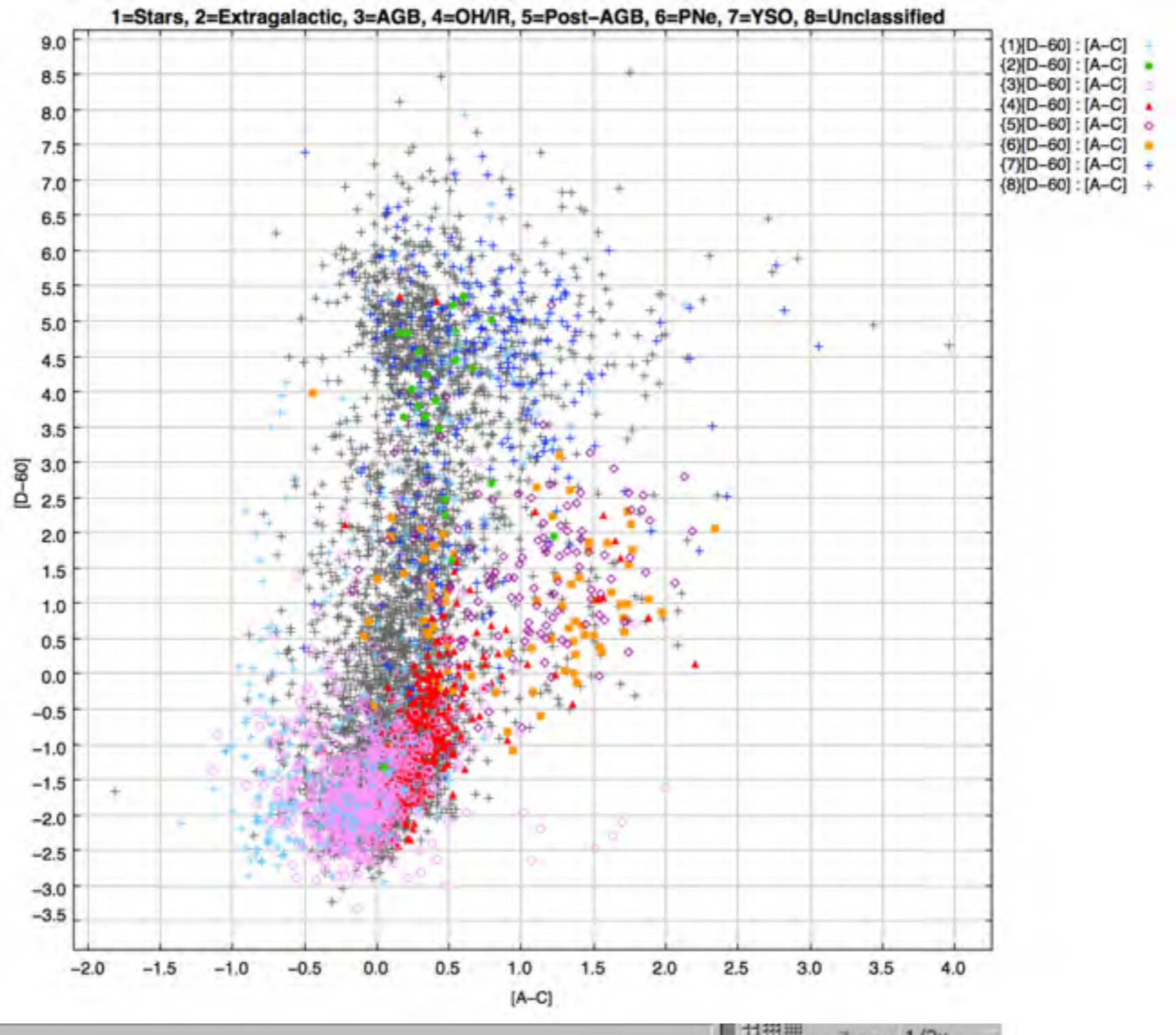
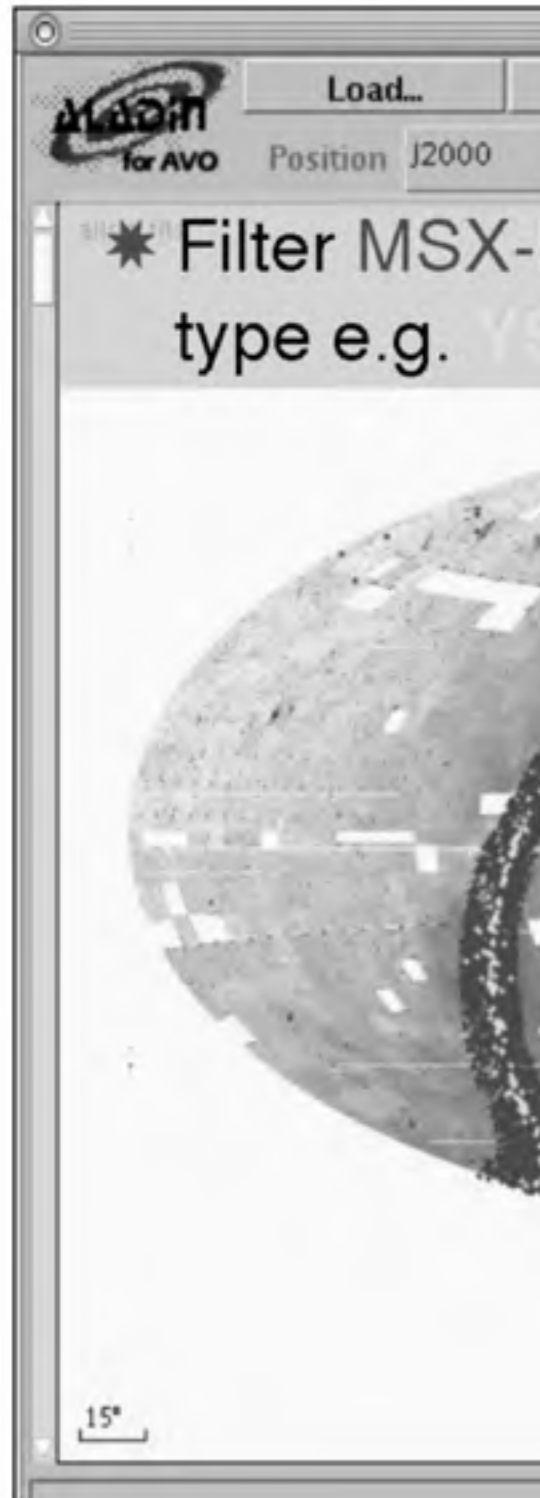
With the AVO
prototype → reach
the same point in
minutes...

Some examples: 1.- Back in 2004-2005 the AVO

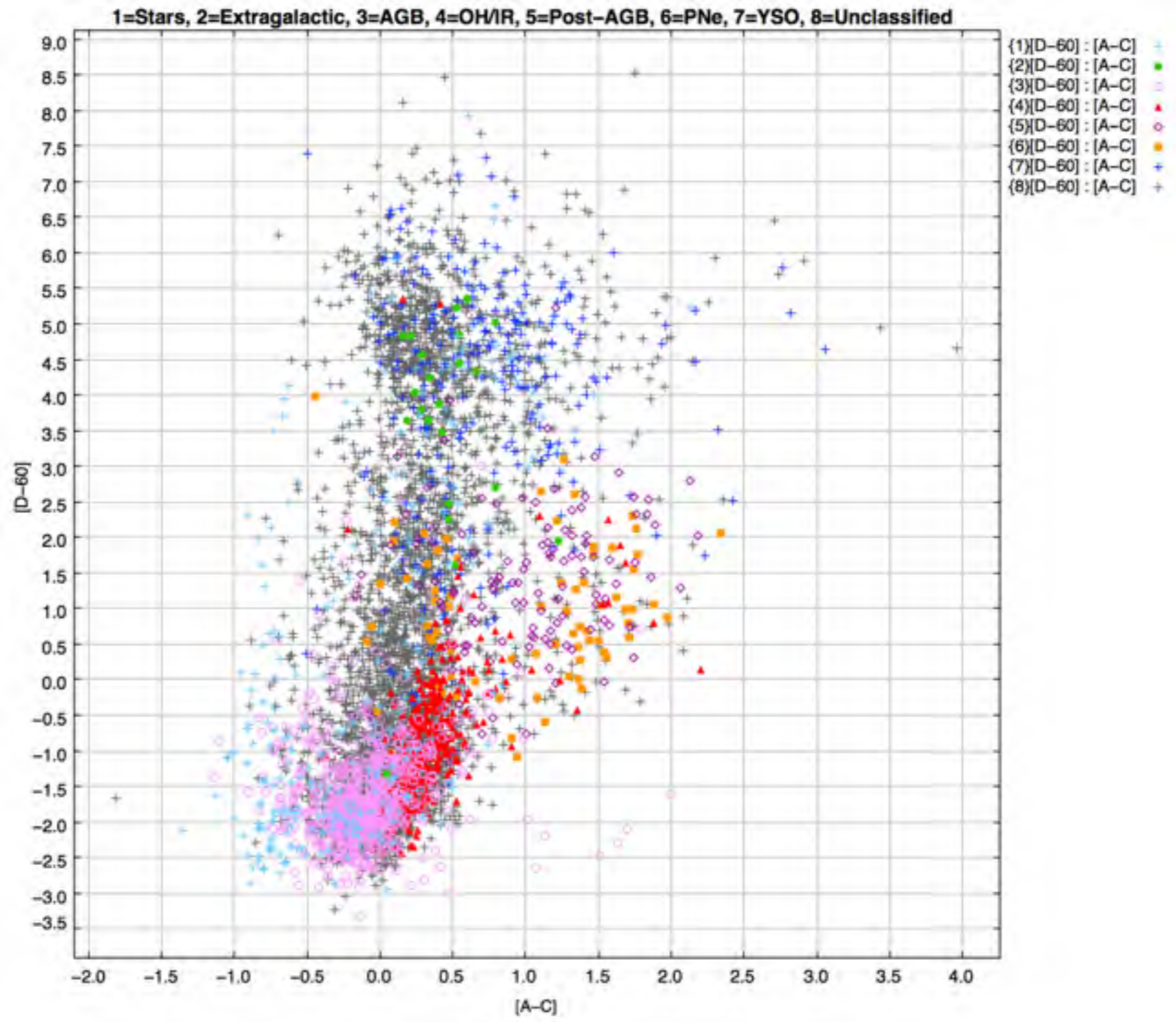


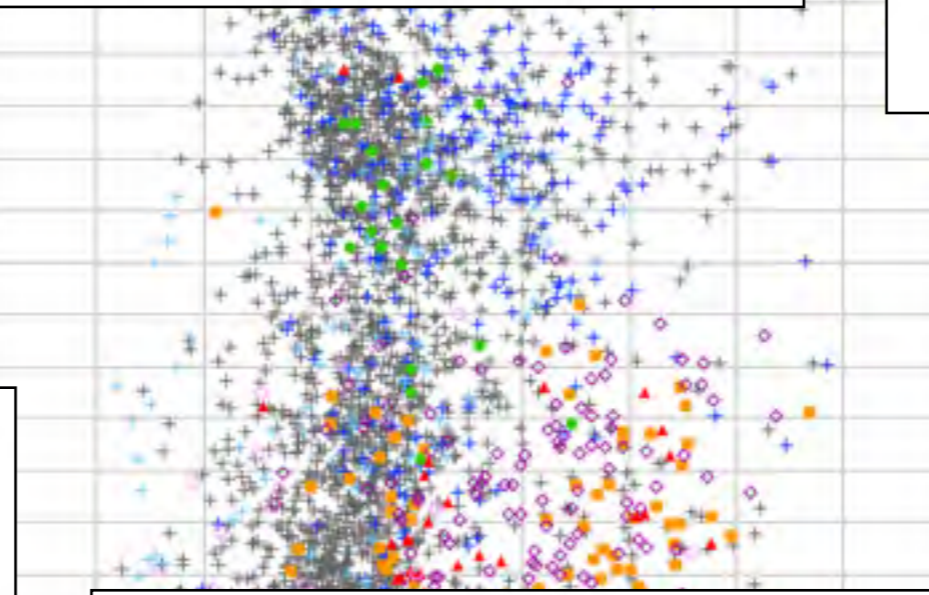
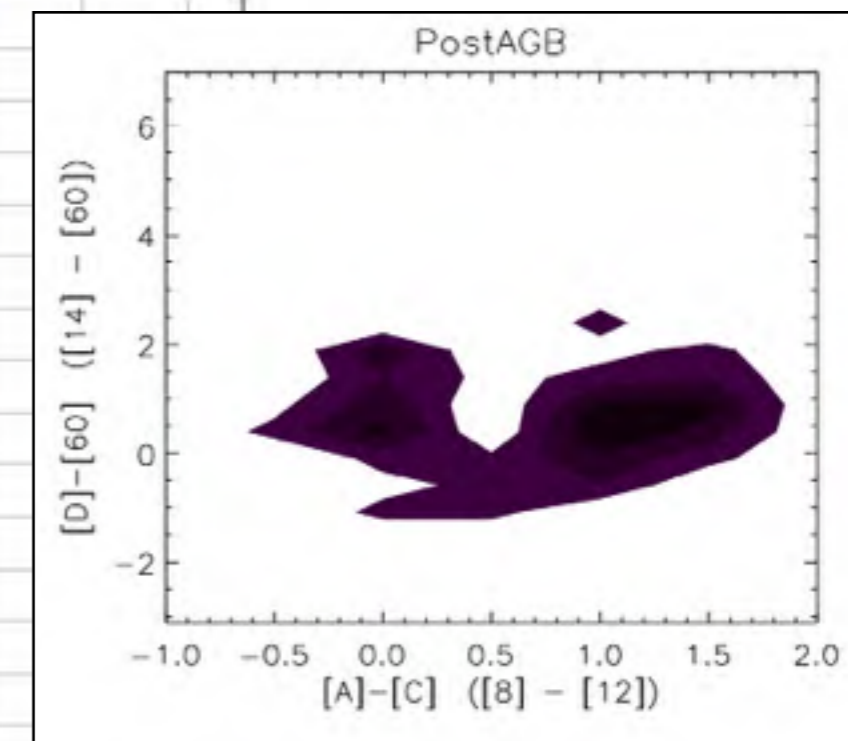
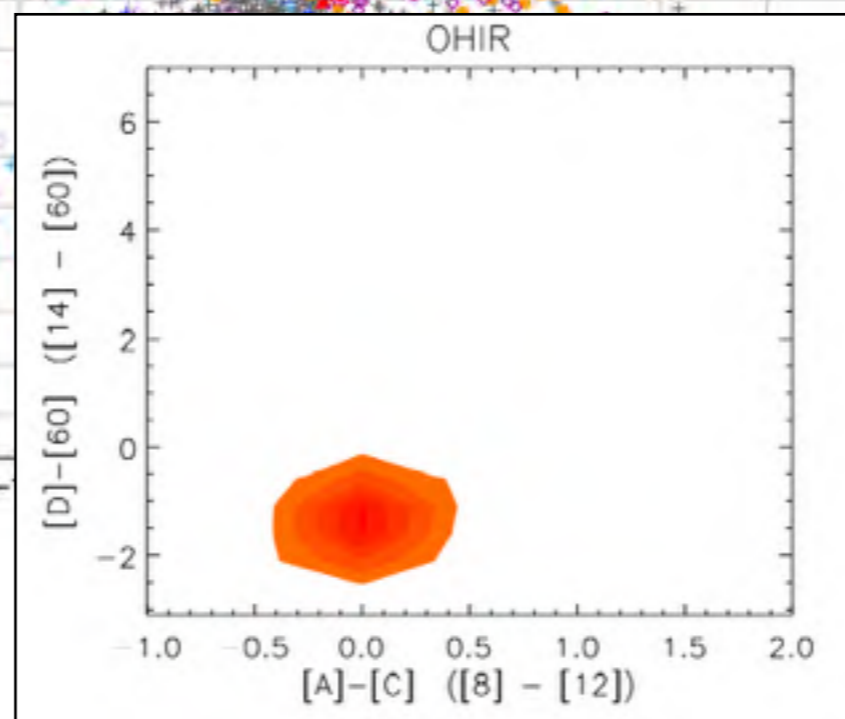
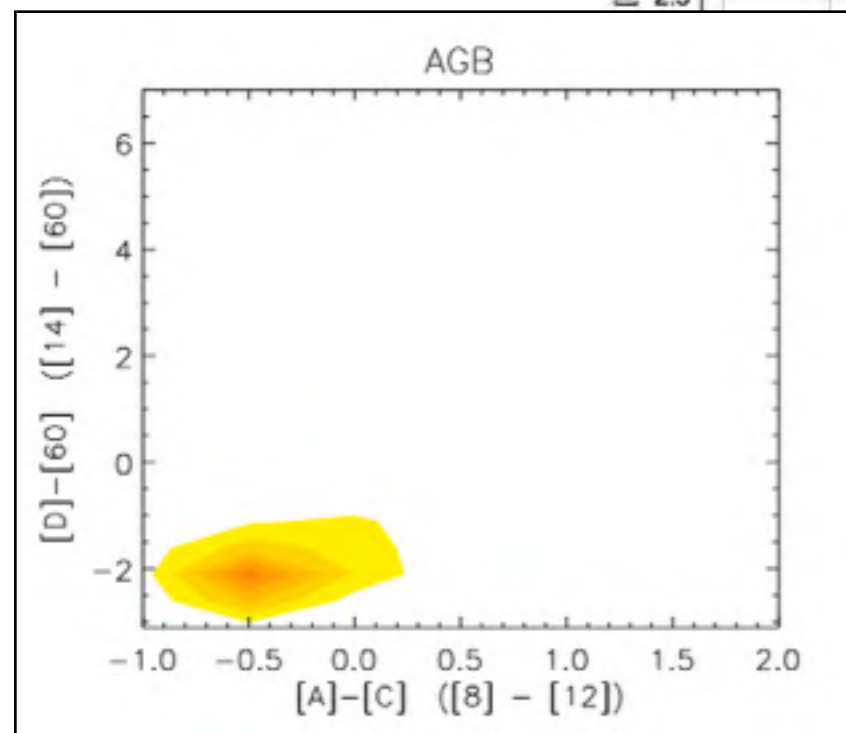
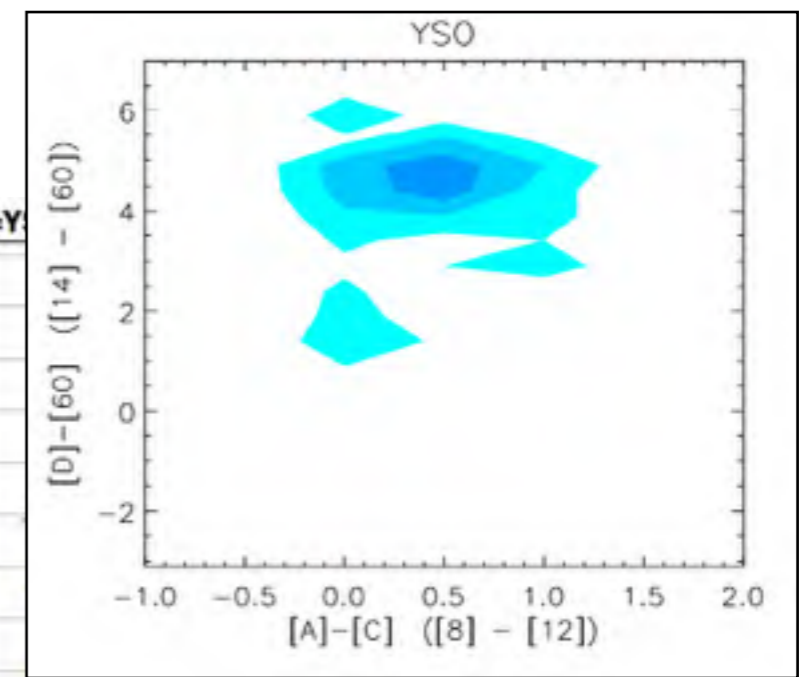
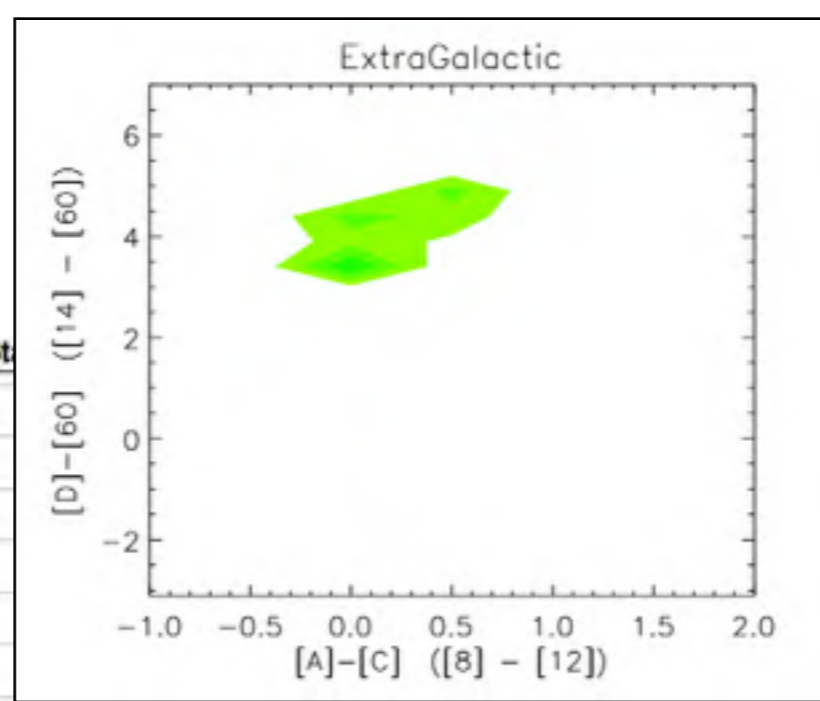
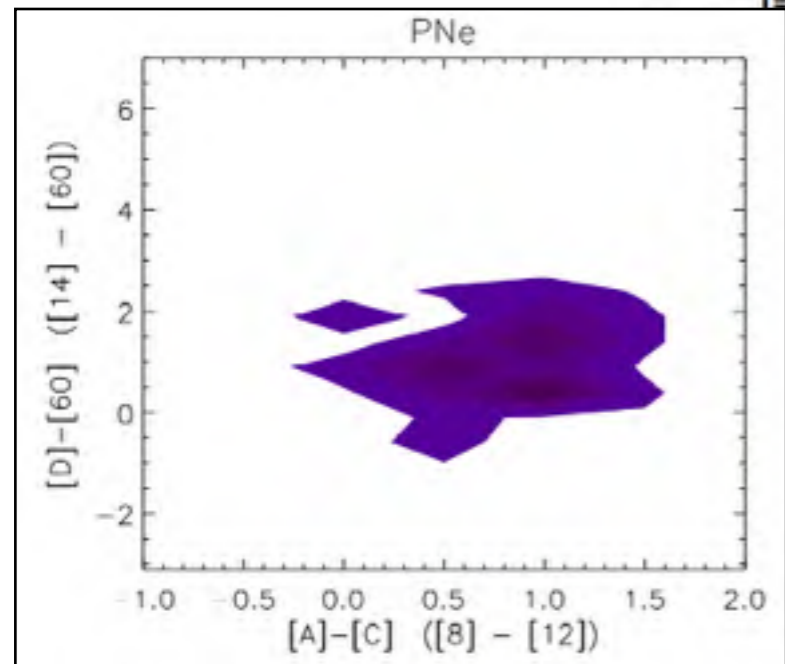
And go further..

Some examples: 1.- Back in 2004-2005 the AVO



And go further..





Warning! self-promotion

✓ March 2007



Cool objects: From SED fitting to age estimation.

A. Bayo¹, D. Barrado y Navascués¹, M. Morales-Calderón¹, E. Solano^{1,2}, C. Rodrigo^{1,2}, R. Gutiérrez^{1,2}, F. Allard³

¹Laboratorio de Astrofísica Espacial y Física Fundamental (LAEFF-INTA), P.O. 50727, E-28080 Madrid, Spain

²Spanish Virtual Observatory, Spain

³Centre de Recherche Astronomique de Lyon (CRAL), Ecole Normale Supérieure de Lyon, 69364, Lyon, France



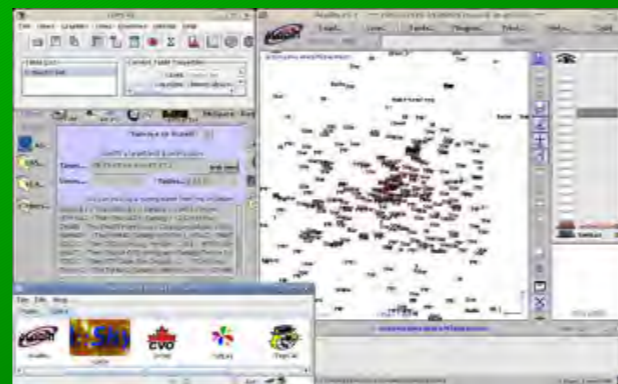
Abstract

One of the typical tools to estimate physical parameters of almost any kind of astronomical object is to perform a fitting of synthetic spectra or photometry extracted from theoretical models to observational data. This process usually involves working with multiwavelength data, which is one of the cornerstones of the VO philosophy. From this kind of studies, when combining with theoretical isochrones one can even estimate ranges of ages. We present the results from a code designed to perform χ^2 tests following two different methodologies to fit observational data: using grids of models (on their synthetic photometry), and combinations of blackbodies (including modified blackbodies). In particular, we use the models by the Lyon group. Some steps in this process can already be done in a VO environment, and the rest are in the process of development. We must note that this kind of surveys in star forming regions, clusters, etc. produce a huge amount of data, very tedious to analyse using the traditional methodology. Therefore this is an ideal example of the VO capabilities.

Starting point:
Your own data (photometry or spectra)

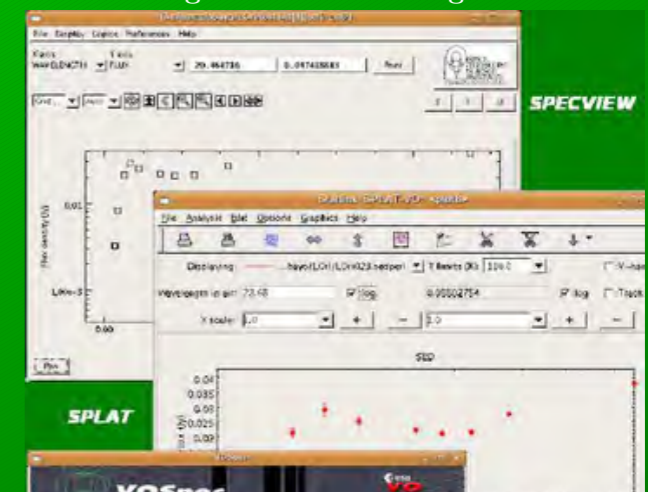
Name	ID	RA	Dec	RA	Dec	RA	Dec
L09001	10_228	0_003	10_255	0_004	10_214	0_009	10_206
L09002	9_915	0_003	10_042	0_003	9_913	0_009	9_88
L09003	10_262	0_003	10_218	0_004	10_239	0_01	10_171
L09004	10_267	0_003	10_248	0_004	10_195	0_009	10_127
L09005	10_204	0_003	10_231	0_004	10_218	0_009	10_158
L09006	10_454	0_003	10_454	0_004	10_396	0_011	10_323
L09007	10_699	0_004	10_626	0_004	10_615	0_012	10_492
L09008	10_498	0_003	10_695	0_004	10_44	0_011	10_296

Searching “non-spectroscopic” data:



Photometric catalogues, radial velocities measurements

Building the multiwavelength SEDs



Warning! self-promotion

Starting point:
Your own data (photometry or spectra)

Name	I1	e11	I2	e12	I3	e13	I4	e14
1 LOri001	10,228	0,003	10,255	0,004	10,234	0,009	10,206	0,01
2 LOri002	9,915	0,003	10,042	0,003	9,93	0,009	9,88	0,008
3 LOri003	10,262	0,003	10,318	0,004	10,289	0,01	10,171	0,01
4 LOri004	10,267	0,003	10,049	0,004	10,155	0,009	10,171	0,009
5 LOri005	10,204	0,003	10,321	0,004	10,218	0,009	10,158	0,009
6 LOri006	10,454	0,003	10,454	0,004	10,309	0,011	10,329	0,01
7 LOri007	10,680	0,004	10,676	0,004	10,615	0,012	10,492	0,011
8 LOri008	10,488	0,003	10,495	0,004	10,44	0,011	10,256	0,012
9 LOri009	10,894	0,004	10,873	0,005	10,788	0,012	10,743	0,014
10 LOri010	10,916	0,004	10,953	0,005	10,732	0,012	10,829	0,015
11 LOri011	10,378	0,003	10,521	0,004	10,444	0,011	10,306	0,011
12 LOri012	10,619	0,003	10,758	0,005	10,627	0,012	10,543	0,012
13 LOri013	10,511	0,003	10,48	0,004	10,467	0,011	10,344	0,012
14 LOri014	10,902	0,004	10,904	0,005	10,839	0,014	10,797	0,014
15 LOri015	10,898	0,004	10,886	0,005	10,824	0,012	10,882	0,015
16 LOri016	10,827	0,004	10,817	0,005	10,338	0,011	10,7	0,014
17 LOri017	11,185	0,005	11,206	0,006	11,175	0,017	11,072	0,019
18 LOri018	10,804	0,004	10,788	0,005	10,722	0,012	10,636	0,014
19 LOri019	10,82	0,004	10,805	0,005	10,767	0,013	10,788	0,018
20 LOri020	10,670	0,003	10,669	0,004	10,375	0,012	10,485	0,012
21 LOri021	11,120	0,004	11,107	0,005	11,081	0,016	11,065	0,019
22 LOri022	11,01	0,004	10,995	0,005	10,895	0,014	10,863	0,014
23 LOri023	11,07	0,004	11,114	0,005	11,072	0,015	10,929	0,018

Photometric data in four bands.

Searching “non-spectroscopic” data:

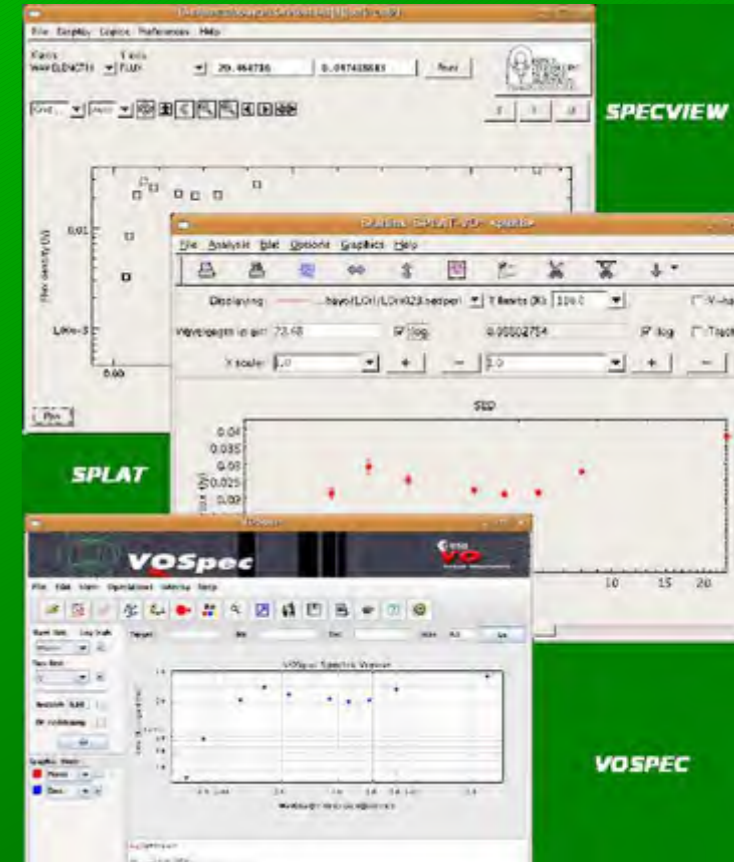


Photometric catalogues, radial velocities measurements, Simbad classification, ...

Searching spectroscopic data:
via batch mode query to VOSED.

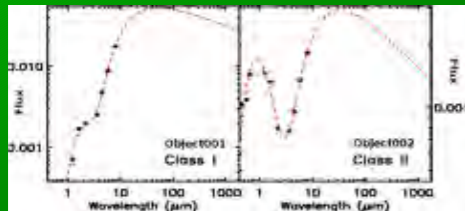
```
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
http://sdc.laeff.inta.es/vosed/jsp/form_search.jsp
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
http://sdc.laeff.inta.es/vosed/jsp/res_search.jsp?obj_id=&ra=83.446596&de=9.9273633
&rad=0.01&ssap_services=all&src.uvbybeta=0&src.2mass=0&src.hip=0&teo.dalessio=on&submit
=Submit+Query
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
http://sdc.laeff.inta.es/vosed/jsp/res_search.jsp?submitGetData=Retrieve+Marked+Data
&filas.ssap=all&filas.stromgren=0&filas.2mass=0 -O object1.zip
.....
```

Building the multiwavelength SEDs



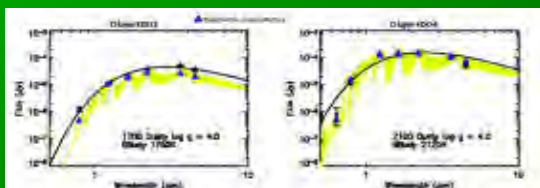
Warning! self-promotion

Blackbody fittings (combinations, modified by different β)



Under development

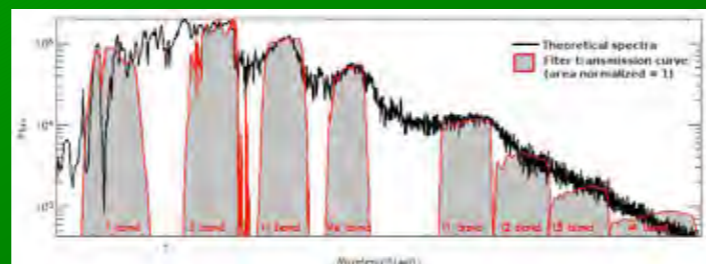
Synthetic photometry fittings



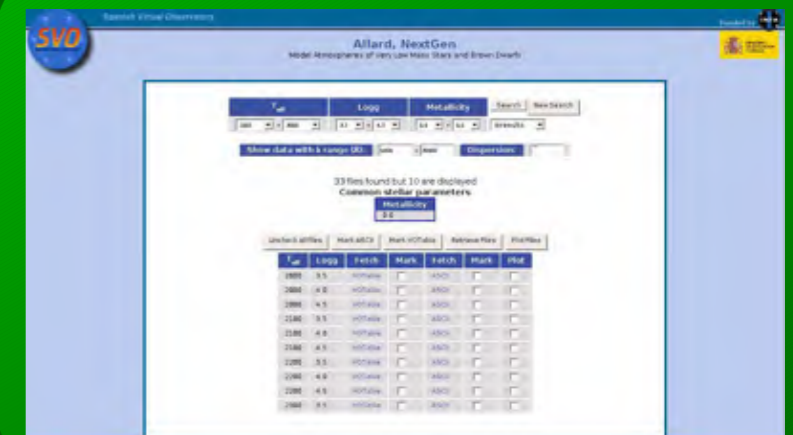
Filter selection.



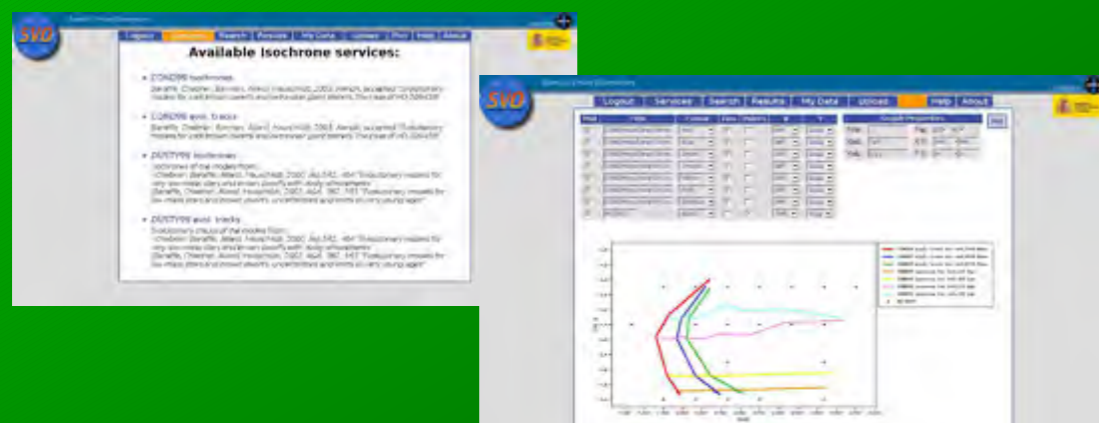
Filter+Synthetic spectra = Synthetic photometry.



Obtaining synthetic spectra.



Comparison with theoretical isochrones and evolutionary tracks.



Estimation of physical parameters.

$$\log g = 4.44 + \log M(M_{\odot}) - 2 \log R(R_{\odot})$$

$$d(\text{pc}) = 2.26 \times 10^{-8} R_{*}(R_{\odot}) \sqrt{\left(\frac{F_{\text{Model}}}{F_{\text{Obs}}}\right)}$$

$$F_{\text{Obs}} = \left(\frac{MG}{gd}\right)^2 \sigma T_{\text{eff}}^4$$

And VOSA came to life!



Spanish Virtual Observatory - Theoretical models

Funded by

VOSA

Sessions | Upload files | Coordinates | VO Phot. | Model Fit | HR Diag. | Save Results | Help | Logout

Upload your own data file (max size=500Kb)
It must correspond to the required data format.
Please, include a description for your file, it is required

File to upload: Browse...

Description:

File type: Fluxes Magnitudes

Uploaded files

Date	Filename	Descrip	Action
10/06 11:45:00	Schem_input_final_all_errors_corrected.asci	All errors revised	Show Retrieve Delete

L Ori001

Position: (83.446583, 9.9273611) Distance: 400. pc A_v : 0.36209598

Filter	CFHT_R	CFHT_I	2MASS_J	2MASS_H	2MASS_Ks	IRAC_1	IRAC_2	IRAC_3	IRAC_4
λ_{med}	6582	8228	12518	16504	21539	35034	45110	57593	79504
Flux:	1.447193e-14	1.345174e-14	1.048089e-14	7.563327e-15	3.081005e-15	5.502778e-16	2.128456e-16	6.040135e-17	2.543987e-17
ΔF :	5.786771e-17	5.380696e-17	9.223010e-17	6.655728e-17	2.571244e-17	6.803353e-19	3.405533e-19	3.113689e-19	1.017595e-19

L Ori002

Spanish Virtual Observatory - Theoretical models

Funded by

VOSA

Sessions | Upload files | Coordinates | VO Phot. | Model Fit | HR Diag. | Save Results | Help | Logout

Theoretical spectra
 Delgado
 Coelho
 NaviGen
 conq00
 dualy00
 Kinoc
 Samaniez
 Filters
 TSAP
 Photometry fit
 Isochrones

VO photometry

Object	2MASS All-Sky Point Source Catalog					Tycho-2 Catalogue				Stromgren uvby-beta Catalogue (Hauck+ 1997)														
	Label	RA	DEC	Save	Δ	RA	DEC	H	J	Ks	Save	Δ	RA	DEC	B	V	Save	Δ	RA	DEC	u	v	b	y
L Ori001	83:28:47	9:55:38	<input checked="" type="checkbox"/>	0.31	83:28:48	9:55:38	10.895±0.022	11.297±0.022	10.428±0.021															
L Ori002	84:02:35	10:08:54	<input checked="" type="checkbox"/>	0.16	84:02:35	10:08:54	10.329±0.023	11.230±0.024	10.088±0.019															
L Ori003	83:58:51	9:58:31	<input checked="" type="checkbox"/>	0.35	83:58:51	9:58:30	10.725±0.022	11.416±0.023	10.524±0.023															
L Ori004	83:58:53	9:45:50	<input checked="" type="checkbox"/>	0.46	83:58:53	9:45:49	10.780±0.023	11.399±0.022	10.548±0.021															
L Ori005	83:28:24	9:43:08	<input checked="" type="checkbox"/>	0.14	83:28:24	9:43:08	10.549±0.022	11.378±0.022	10.354±0.023															

And VOSA came to life!



Spanish Virtual Observatory - Theoretical models

SVO

Funded by **INTA** and **MINISTERIO DE CIENCIA E INNOVACIÓN**

VOSA

Sessions | Upload files | Coordinates | VO Phot. | Model Fit | HR Diag. | Save Results | Help | Logout

Upload your own data file (max size=500Kb)
It must correspond to the required data format.
Please, include a description for your file, it is required

File to upload: Browse...

Description:

File type: Fluxes Magnitudes

Uploaded files

Date	Filename	Descrip	Action
10/06 11:45:00	Schemo_input_final_all_errors_corrected.ascii	All errors revised	Show Retrieve Delete

L Ori001

Position: (83.446583, 9.9273611) Distance: 400. pc A_v : 0.36209598

Filter	CFHT_R	CFHT_I	2MASS_J	2MASS_H	2MASS_Ks	IRAC_H	IRAC_I2	IRAC_I3	IRAC_I4
λ_{med}	6582	8228	12518	16504	21539	35634	45110	57593	79504
Flux:	1.447193e-14	1.345174e-14	1.048089e-14	7.563327e-15	3.081005e-15	5.502778e-16	2.128456e-16	6.040135e-17	2.543987e-17
ΔF :	5.788771e-17	5.380696e-17	9.223010e-17	6.655728e-17	2.571244e-17	6.803353e-19	3.405533e-19	3.113689e-19	1.017595e-19

L Ori002

Spanish Virtual Observatory - Theoretical models

SVO

Funded by **INTA** and **MINISTERIO DE CIENCIA E INNOVACIÓN**

VOSA

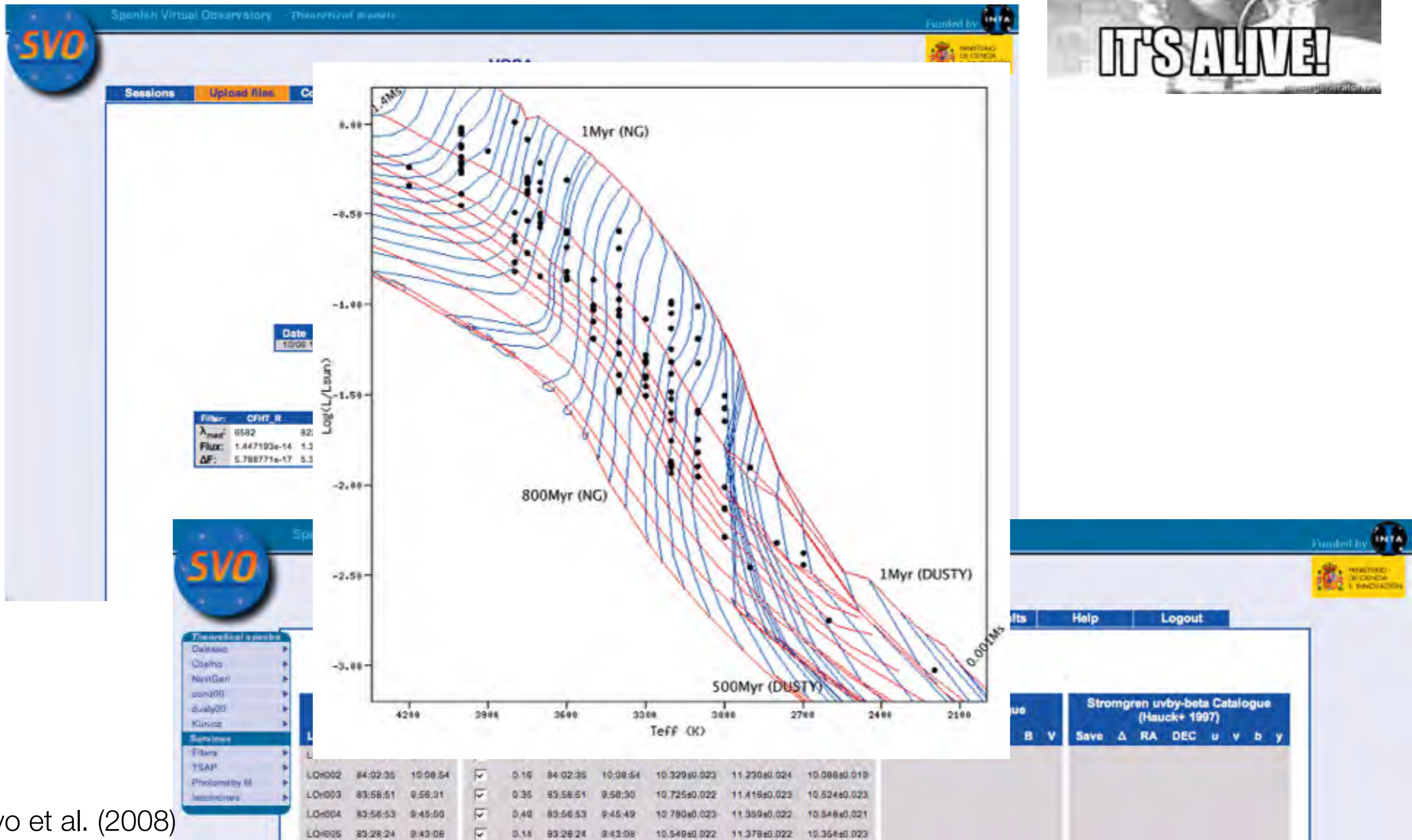
Sessions | Upload files | Coordinates | **VO Phot.** | Model Fit | HR Diag. | Save Results | Help | Logout

Theoretical spectra
 Delgado
 Coelho
 NaviGen
 conq00
 dualy00
 Kinoci
 Samaniego

VO photometry

Object	2MASS All-Sky Point Source Catalog					Tycho-2 Catalogue				Stromgren uvby-beta Catalogue (Hauck+ 1997)														
	Label	RA	DEC	Save	Δ	RA	DEC	H	J	Ks	Save	Δ	RA	DEC	B	V	Save	Δ	RA	DEC	u	v	b	y
L Ori001	83:28:47	9:55:38	<input checked="" type="checkbox"/>	0.31	83:28:48	9:55:38	10.895±0.022	11.297±0.022	10.428±0.021															
L Ori002	84:02:35	10:08:54	<input checked="" type="checkbox"/>	0.16	84:02:35	10:08:54	10.329±0.023	11.230±0.024	10.088±0.019															
L Ori003	83:58:51	9:58:31	<input checked="" type="checkbox"/>	0.35	83:58:51	9:58:30	10.725±0.022	11.416±0.023	10.524±0.023															
L Ori004	83:58:53	9:45:50	<input checked="" type="checkbox"/>	0.46	83:58:53	9:45:49	10.780±0.023	11.359±0.022	10.548±0.021															
L Ori005	83:28:24	9:43:08	<input checked="" type="checkbox"/>	0.14	83:28:24	9:43:08	10.548±0.022	11.378±0.022	10.354±0.023															

And VOSA came to life!

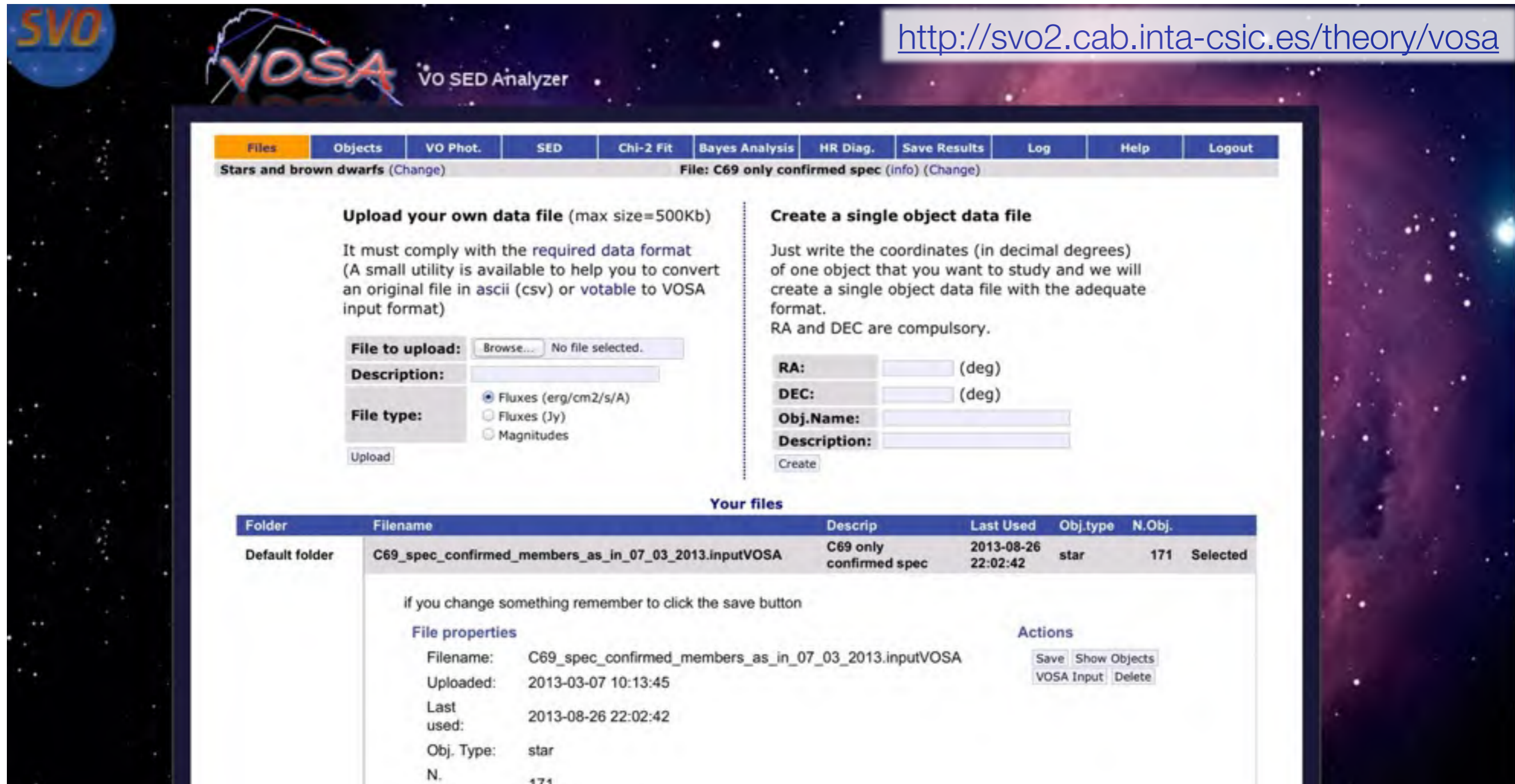


Bayo et al. (2008)

And there was room for improvement

- “Limited to” / “conceived for” stars and brown dwarfs, what about older sources? and more massive? and ~~science-fiction~~ uhmm extragalactic studies?
- Reflected in the available collections of models: Kurucz, NextGen, COND, DUSTY and not many more
- Brute force fitting but no study of the relevance of the individual parameters to the fit
- No A_V estimation
- Not design to work with a single object (input format)
- Variety of catalogs offered but you can always do better and also look for more than photometry
- No Isochrone interpolation, make it even more VO!
- Anything else in the wish-list?

VOSA 2: the new generation



The screenshot displays the VOSA 2 web interface. At the top left is the SVO logo, and next to it is the VOSA VO SED Analyzer logo. A navigation bar contains tabs for Files, Objects, VO Phot., SED, Chi-2 Fit, Bayes Analysis, HR Diag., Save Results, Log, Help, and Logout. Below the navigation bar, the current session is identified as 'Stars and brown dwarfs (Change)' and the file as 'File: C69 only confirmed spec (info) (Change)'. The interface is split into two main sections: 'Upload your own data file (max size=500Kb)' and 'Create a single object data file'. The upload section includes a 'File to upload' field with a 'Browse...' button, a 'Description' field, and radio buttons for 'File type' (Fluxes (erg/cm2/s/A), Fluxes (Jy), Magnitudes). The 'Create a single object data file' section includes input fields for 'RA: (deg)', 'DEC: (deg)', 'Obj.Name:', and 'Description:', along with a 'Create' button. Below these sections is a table titled 'Your files' with columns for Folder, Filename, Descrip, Last Used, Obj.type, and N.Obj. The table shows one file: 'C69_spec_confirmed_members_as_in_07_03_2013.inputVOSA' with a description of 'C69 only confirmed spec', last used on '2013-08-26 22:02:42', object type 'star', and 171 objects. Below the table, there is a note 'if you change something remember to click the save button', 'File properties' (Filename, Uploaded, Last used, Obj. Type, N.), and 'Actions' (Save, Show Objects, VOSA Input, Delete).

<http://svo2.cab.inta-csic.es/theory/vosa>

Upload your own data file (max size=500Kb)
It must comply with the required data format (A small utility is available to help you to convert an original file in ascii (csv) or votable to VOSA input format)

File to upload: No file selected.

Description:

File type:

- Fluxes (erg/cm2/s/A)
- Fluxes (Jy)
- Magnitudes

Create a single object data file
Just write the coordinates (in decimal degrees) of one object that you want to study and we will create a single object data file with the adequate format.
RA and DEC are compulsory.

RA: (deg)

DEC: (deg)

Obj.Name:

Description:

Your files

Folder	Filename	Descrip	Last Used	Obj.type	N.Obj.
Default folder	C69_spec_confirmed_members_as_in_07_03_2013.inputVOSA	C69 only confirmed spec	2013-08-26 22:02:42	star	171 Selected

if you change something remember to click the save button

File properties

Filename: C69_spec_confirmed_members_as_in_07_03_2013.inputVOSA

Uploaded: 2013-03-07 10:13:45

Last used: 2013-08-26 22:02:42

Obj. Type: star

N.: 171

Actions

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>

Object coordinates

This option allows you to query Sesame VO service to search for object coordinates using the object name. Take a look to the corresponding Help Section and Credits Page for more information.

Search for Obj. Coordinates
 Mark all: User
 Unmark all: User

Object	Final		User Data		Sesame	
	RA (deg)	DEC (deg)	RA (deg)	DEC (deg)	RA (deg)	DEC (deg)
C69-IRAC-001	84.2339859	9.5229902	84.2339859	9.5229902	??	??
C69-IRAC-002	84.230545	9.7799978	84.230545	9.7799978	??	??
C69-IRAC-003	83.962204	9.6491137	83.962204	9.6491137	??	??
C69-IRAC-004	83.8685303	10.0409756	83.8685303	10.0409756	??	??
C69-IRAC-005	83.8555679	9.9132547	83.8555679	9.9132547	??	??
C69-IRAC-006	83.7191086	9.9305677	83.7191086	9.9305677	??	??
C69-IRAC-007	83.516304	9.8700848	83.516304	9.8700848	??	??
C69-Sub-004	83.79483333333334	9.935138888888888	83.79483333333334	9.935138888888888	??	??
C69-Sub-005	83.78791666666666	9.910027777777776	83.78791666666666	9.910027777777776	??	??
C69-X-E-104	83.98154	9.869463	83.98154	9.869463	??	??
C69XE-009	83.829475	9.9151335	83.829475	9.9151335	??	??
C69XE-040	84.209405	9.9066	84.209405	9.9066	??	??
C69XE-064	83.842427	9.8995644	83.842427	9.8995644	??	??
C69XE-073	84.444426	9.7574574	84.444426	9.7574574	??	??

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>

VOSA VO SED Analyzer

Files Objects **VO Phot.** SED Chi-2 Fit Bayes Analysis HR Diag. Save Results Log Help Logout

Stars and brown dwarfs (Change) File: RA:---, DEC:--- (info) (Change)

VO photometry

This option allows you to increase the wavelength coverage of the SEDs of your objects adding photometry from VO catalogues. Take a look to the corresponding Help Section and Credits Page for more information.

First select the VO services that you want to use

Mark All Unmark All
Query selected services

Infrared

- 2MASS All-Sky Point Source Catalog**
2MASS has uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with signal-to-noise ratio (SNR) greater than 1. More Info.
Filters: 2MASS/2MASS.J 2MASS/2MASS.H
 2MASS/2MASS.Ks
Search radius: 5 arcsec
Show magnitude limits
- DENIS Catalogue**
This catalogue is the latest incremental release of the DENIS project. It consists of a set of 355,220,325 point sources detected by the DENIS survey in 3662 strips (covering each 30 degrees in declination and 12 arcmin in right ascension). More Info.
Filters: DENIS/DENIS.1
Search radius: 5 arcsec
Show magnitude limits
- IRAS Catalog of Point Sources, Version 2.0**
This is a catalog of some 250,000 well-confirmed infrared point sources observed by the Infrared Astronomical Satellite, i.e., sources with angular extents less than approximately 0.5, 0.5, 1.0, and 2.0 arcmin in the in-scan direction at 12, 25, 60, and 1. More Info.
- MSX6C Infrared Point Source Catalog**
Version 2.3 of the Midcourse Space Experiment (MSX) Point Source Catalog (PSC), which supersedes the version (1.2) that was released in 1999 (Cat. V/107), contains over 100,000 more sources than the previous version. More Info.

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

2MASS has uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with signal-to-noise ratio (SNR) greater than 1. More Info.

Filters: 2MASS/2MASS.J 2MASS/2MASS.H
 2MASS/2MASS.Ks
Search radius: 5 arcsec
Show magnitude limits

IRAS Catalog of Point Sources, Version 2.0

This is a catalog of some 250,000 well-confirmed infrared point sources observed by the Infrared Astronomical Satellite, i.e., sources with angular extents less than approximately 0.5, 0.5, 1.0, and 2.0 arcmin in the in-scan direction at 12, 25, 60, and 1. More Info.

Filters: IRAS/IRAS.12mu IRAS/IRAS.25mu
 IRAS/IRAS.60mu IRAS/IRAS.100mu

Search radius: 5 arcsec
Show magnitude limits

AKARI/IRC mid-IR all-sky Survey (ISAS/JAXA, 2010)

The AKARI/IRC Point Source Catalogue Version 1.0 provides positions and fluxes for 870,973 sources observed with the InfraRed Camera (IRC). More Info.

Filters: AKARI/IRC.S9W AKARI/IRC.L18W

Search radius: 5 arcsec
Show magnitude limits

C2D Spitzer and Ancillary Data

C2D Fall '07 Full CLOUDS Catalog (CHA_II, LUP, OPH, PER, SER).

Filters: Spitzer/IRAC.I1 Spitzer/IRAC.I2
 Spitzer/IRAC.I3 Spitzer/IRAC.I4
 Spitzer/MIPS.24mu Spitzer/MIPS.70mu

Search radius: 5 arcsec
Show magnitude limits

This catalogue is the latest incremental release of the DENIS project. It consists of a set of 355,220,325 point sources detected by the DENIS survey and 12 arcmin. More Info.

Filters: DENIS/DENIS.I
Search radius: 5 arcsec
Show magnitude limits

MSX6C Infrared Point Source Catalog

Version 2.3 of the Midcourse Space Experiment (MSX) Point Source Catalog (PSC), which supersedes the version (1.2) that was released in 1999 (Cat. V/107), contains over 100,000 more sources than the previous version.. More Info.

Filters: MSX/MSX.A MSX/MSX.C
 MSX/MSX.D MSX/MSX.E

Search radius: 5 arcsec
Show magnitude limits

AKARI/FIS All-Sky Survey Point Source Catalogues (ISAS/JAXA, 2010)

The AKARI/FIS All-Sky Survey Bright Source Catalog Version 1.0 provides positions and fluxes for 427071 point sources in the 4 far-infrared wavelengths centered at 65, 90, 140 and 160µm. More Info.

Filters: AKARI/FIS.N60 AKARI/FIS.WIDE-S
 AKARI/FIS.WIDE-L AKARI/FIS.N160

Search radius: 5 arcsec
Show magnitude limits

GLIMPSE Source Catalog (I + II + 3D)

The Galactic Legacy Infrared Midplane Survey Extraordinaire (GLIMPSE), is a survey of Galactic Plane central parts made with the Infrared Array Camera (IRAC) aboard the Spitzer Space Telescope (SST).. More Info.

Filters: Spitzer/IRAC.I1 Spitzer/IRAC.I2
 Spitzer/IRAC.I3 Spitzer/IRAC.I4

Search radius: 5 arcsec
Show magnitude limits

<http://svo2.cab.inta-csic.es/theory/vosa>

VOSA 2: the new generation

Spitzer Legacy Science Program (Legacy Fields) Release, October 2008 v2.1.

Filters: Spitzer/IRAC.I1 Spitzer/IRAC.I2
 Spitzer/IRAC.I3 Spitzer/IRAC.I4
 Spitzer/MIPS.24mu Spitzer/MIPS.70mu

Search radius: 5 arcsec
Show magnitude limits

UKIDSS Galactic Clusters Survey DR7

UKIDSS Galactic Clusters Survey DR7. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.

Filters: UKIRT/UKIDSS.Z UKIRT/UKIDSS.Y
 UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K

Search radius: 5 arcsec
Show magnitude limits

UKIDSS Ultra Deep Survey DR5

UKIDSS Ultra Deep Survey DR5. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.

Filters: UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K

Search radius: 5 arcsec
Show magnitude limits

WISE

WISE All-Sky Data Release (Cutri+ 2012). More Info.

Filters: WISE/WISE.W1 WISE/WISE.W2
 WISE/WISE.W3 WISE/WISE.W4

Search radius: 5 arcsec
Show magnitude limits

Optical

Tycho-2 Catalogue

The Tycho-2 Catalogue is an astrometric reference catalogue containing positions and proper motions as well as two-colour photometric data for the 2.5 million brightest stars in the sky. More Info.

UKIDSS Large Area Survey DR7. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.

Filters: UKIRT/UKIDSS.Z UKIRT/UKIDSS.Y
 UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K

Search radius: 5 arcsec
Show magnitude limits

UKIDSS Galactic Plane Survey DR6

UKIDSS Galactic Plane Survey DR6. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.

Filters: UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K

Search radius: 5 arcsec
Show magnitude limits

UKIDSS Deep Extragalactic Survey DR7

UKIDSS Deep Extragalactic Survey DR7. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.

Filters: UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K

Search radius: 5 arcsec
Show magnitude limits

CMC-14

The full CMC-14 catalog (around 95.85million source in the region -30 to +50°). More Info.

Filters: SLOAN/SDSS.r
Search radius: 5 arcsec

<http://svo2.cab.inta-csic.es/theory/vosa>

VOSA 2: the new generation

This catalogue is an updated version of the one published in 1990 (Hauck and Mermilliod, 1990) and contains data for more than 63,300 stars in the Galaxy and Magellanic Clouds. [More Info.](#)

Filters: Generic/Stromgren.u Generic/Stromgren.v
 Generic/Stromgren.b Generic/Stromgren.y

Search radius: 5 arcsec
Show magnitude limits

SDSS Catalogue, Release 8

The SDSS Photometric Catalog, Release 8. Only Class=6 (Star) objects will be selected. [More Info.](#)

Filters: SLOAN/SDSS.u SLOAN/SDSS.g
 SLOAN/SDSS.r SLOAN/SDSS.i
 SLOAN/SDSS.z

Search radius: 5 arcsec
Show magnitude limits

1991)

The present catalogue supersedes an earlier edition of Nicolet (1978). It is a collection of stars measured by VOSA. <http://svo2.cab.inta-csic.es/theory/vosa>

Filters: Generic/Johnson.U Generic/Johnson.B
 Generic/Johnson.V

Search radius: 5 arcsec
Show magnitude limits

IPHAS Catalogue

IPHAS Initial data release.. [More Info.](#)

Filters: INT/IPHAS.gR INT/IPHAS.Ha
 INT/IPHAS.gI

Search radius: 5 arcsec
Show magnitude limits

Ultraviolet

Galaxy Evolution Explorer [GALEX]

The Galaxy Evolution Explorer (GALEX), a NASA Small Explorer mission, is performing the first all-sky, deep imaging and spectroscopic ultraviolet surveys in space. The prime goal of GALEX is to study star formation in galaxies and its evolution with time.. [More Info.](#)

Filters: GALEX/GALEX.FUV GALEX/GALEX.NUV

Search radius: 5 arcsec
Show magnitude limits

IUE HPDP photometry

A catalogue of around 400 objects with ultraviolet photometry extracted from IUE spectra.

Filters: IUE/IUE.1250-1300 IUE/IUE.1450-1500
 IUE/IUE.1675-1725 IUE/IUE.2150-2200
 IUE/IUE.2395-2445 IUE/IUE.2900-3000

Search radius: 5 arcsec
Show magnitude limits

[Query selected services](#)

Acknowledging VOSA in publications:

Please include the following in any published material that makes use of VOSA:

This publication makes use of VOSA, developed under the Spanish Virtual Observatory project supported from the Spanish MICINN through grant AyA2008-02156.

VOSA 2: the new generation

SVO **VOSA** VO SED Analyzer

<http://svo2.cab.inta-csic.es/theory/vosa>

Files | Objects | VO Phot. | **SED** | Chi-2 Fit | Bayes Analysis | HR Diag. | Save Results | Log | Help | Logout

Stars and brown dwarfs (Change) | File: C69 only confirmed spec (info) (Change)

Object data

C69-IRAC-001 | Next >

C69-IRAC-001
 Position: (84.2339859,9.5229902) Distance: 400 pc A_V : 0.
 Data for this object:

Filter	Final SED			User data			VO data						
	λ_{med}	Flux	ΔF	Flux	ΔF	NoFit	Uplim	Delete	Flux	ΔF	NoFit	Uplim	Delete
SLOAN/SDSS.u	3594.93	1.815e-17	1.205e-17	---	---				1.815e-17	1.205e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SLOAN/SDSS.g	4640.42	1.471e-16	3.252e-18	---	---				1.471e-16	3.252e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SLOAN/SDSS.r	6122.33	2.945e-16	2.441e-18	---	---				2.945e-16	2.441e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CFHT/CFHT.R	6515.87	1.878e-15	0.000e+00	1.878e-15	0.000e+00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
SLOAN/SDSS.i	7439.49	9.242e-16	3.405e-18	---	---				9.242e-16	3.405e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CFHT/CFHT.I	8090.45	3.363e-15	0.000e+00	3.363e-15	0.000e+00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
SLOAN/SDSS.z	8897.06	1.534e-15	7.066e-18	---	---				1.534e-15	7.066e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2MASS/2MASS.J	12350.00	4.079e-15	9.769e-17	4.079e-15	9.769e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
2MASS/2MASS.H	16620.00	2.791e-15	5.913e-17	2.791e-15	5.913e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
2MASS/2MASS.Ks	21590.00	1.292e-15	2.737e-17	1.292e-15	2.737e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
WISE/WISE.W1	33526.00	3.022e-16	6.401e-18	---	---				3.022e-16	6.401e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spitzer/IRAC.I1	35075.11	3.411e-16	9.424e-19	3.411e-16	9.424e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
Spitzer/IRAC.I2	44365.78	1.648e-16	4.553e-19	1.648e-16	4.553e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
WISE/WISE.W2	46028.00	1.221e-16	2.361e-18	---	---				1.221e-16	2.361e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spitzer/IRAC.I3	56281.02	8.775e-17	5.657e-19	8.775e-17	5.657e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
Spitzer/IRAC.I4	75891.59	4.529e-17	1.669e-19	4.529e-17	1.669e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
WISE/WISE.W3	115608.00	2.959e-17	7.086e-19	---	---				2.959e-17	7.086e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WISE/WISE.W4	220883.00	1.099e-17	9.311e-19	---	---				1.099e-17	9.311e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spitzer/MIPS.24mu	232096.04	6.045e-18	1.058e-19	6.045e-18	1.058e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

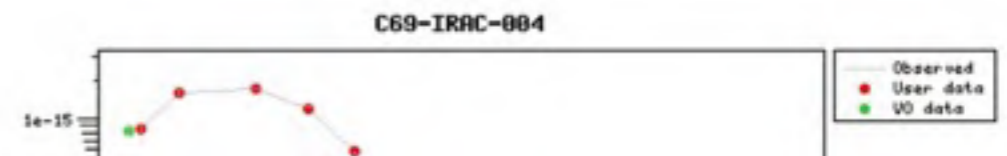
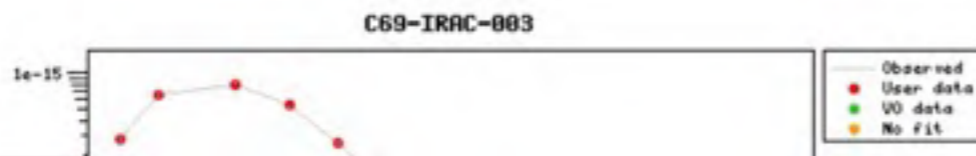
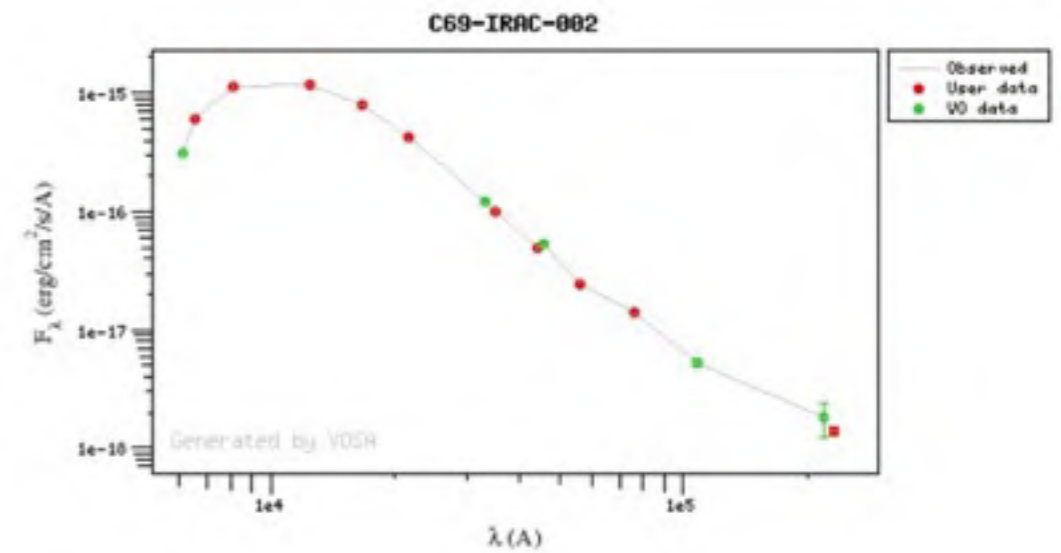
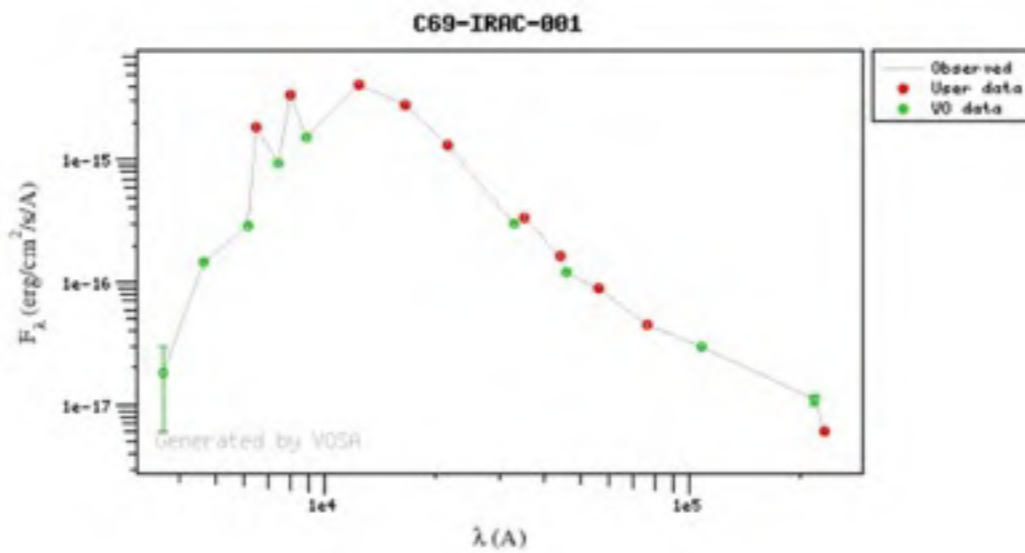
VOSA 2: the new generation



Files Objects VO Phot. **SED** Chi-2 Fit Bayes Analysis HR Diag. Save Results Log Help Logout
Stars and brown dwarfs (Change) File: C69 only confirmed spec (info) (Change)

Object data

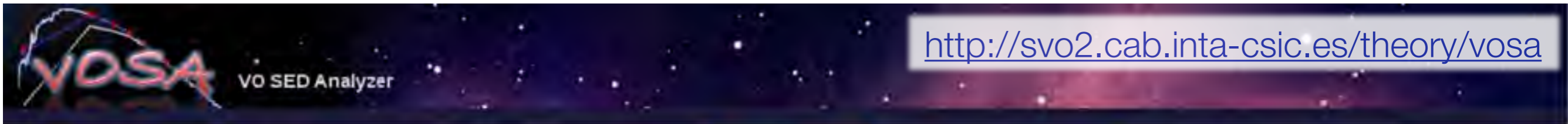
- C69-IRAC-001
- C69-IRAC-002
- C69-IRAC-003
- C69-IRAC-004
- C69-IRAC-005
- C69-IRAC-006
- C69-IRAC-007
- C69-Sub-004
- C69-Sub-005
- C69-X-E-104
- C69XE-009
- C69XE-040
- C69XE-064
- C69XE-072
- DM003
- DM005
- DM006
- DM007
- DM008
- DM009
- DM010
- DM013
- DM014
- DM015
- DM016



~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation



Files	Objects	VO Phot.	SED	ChI-2 fit	Bayes Analysis	HR Diag.	Save Results	Log							
Stars and brown dwarfs (Change)				File: C69 only confirmed spec (info) (Change)											
				Model fit+ Template fit											
				Model fit+											
				Show graphs Delete this fit											
Object	RA	DEC	D (pc)	Model	T_{eff}	logg	Meta.	more	χ^2	M_d	F_{tot}	ΔF_{tot}	$F_{\text{obs}}/F_{\text{tot}}$	$L_{\text{bol}}/L_{\text{sun}}$	$\Delta L_{\text{bol}}/L_s$
C69-IRAC-001	84.2339859	9.5229902	400.000	BT-Settl	3000	3.5	0	alpha:0	2.988e+2	5.344e-21	3.927e-11	6.435e-12	0.66	1.958e-1	8.105e-2
C69-IRAC-002	84.230545	9.7799978	400.000	BT-Settl	3300	3.5	0	alpha:0	3.507e+1	2.703e-21	1.798e-11	2.563e-13	0.44	8.968e-2	2.370e-2
C69-IRAC-003	83.962204	9.6491137	400.000	BT-Settl	3300	3.5	0	alpha:0	5.799e+0	1.719e-21	1.135e-11	1.574e-13	0.43	5.658e-2	1.493e-2
C69-IRAC-004	83.8685303	10.0409756	400.000	BT-Settl	3200	4	0	alpha:-0.2	1.040e+1	4.467e-21	2.658e-11	3.129e-13	0.44	1.325e-1	3.470e-2
C69-IRAC-005	83.8555679	9.9132547	0.000								Not enough points to make a fit				
C69-IRAC-006	83.7191086	9.9305677	400.000	BT-Settl	3000	4	0	alpha:-0.2	2.375e+1	4.670e-21	2.255e-11	1.724e-13	0.29	1.125e-1	2.898e-2
C69-IRAC-007	83.516304	9.8700848	400.000	BT-Settl	2800	4	0	alpha:-0.2	5.962e+1	9.047e-21	3.227e-11	5.043e-13	0.40	1.609e-1	4.274e-2
C69-Sub-004	83.79483333333334	9.935138888888888	0.000								Not enough points to make a fit				
C69-Sub-005	83.78791666666666	9.910027777777776	0.000								Not enough points to make a fit				
C69-X-E-104	83.98154	9.869463	400.000	BT-Settl	3200	4	0	alpha:-0.2	8.021e+2	3.374e-21	1.989e-11	1.284e-13	0.54	9.916e-2	2.543e-2
C69XE-009	83.829475	9.9151335	400.000	Kurucz	4750	3.50	0.00	--	2.416e+1	2.689e-20	7.898e-10	6.560e-12	0.22	3.938e+0	1.017e+0
C69XE-040	84.209405	9.9066	400.000	BT-Settl	3200	3.5	0	alpha:0	2.022e+0	3.818e-21	2.280e-11	1.646e-12	0.50	1.137e-1	3.663e-2
C69XE-064	83.842427	9.8995644	400.000	BT-Settl	3400	4	0	alpha:-0.2	1.606e+2	3.423e-21	2.716e-11	2.798e-13	0.52	1.354e-1	3.526e-2
C69XE-072	84.114436	9.7571574	400.000	BT-Settl	3300	4	0	alpha:0	6.157e+0	2.879e-21	1.906e-11	3.055e-13	0.49	9.507e-2	2.529e-2
DM003	83.46541666666666	9.639305555555555	400.000	BT-Settl	3800	4	0	alpha:0	2.117e+1	1.066e-20	1.235e-10	1.555e-12	0.53	6.158e-1	1.617e-1
DM005	83.50833333333333	9.685055555555554	400.000	BT-Settl	4300	4.5	0	alpha:0	3.738e+0	1.138e-20	2.137e-10	5.557e-12	0.58	1.066e+0	2.941e-1
DM006	83.52058333333335	9.951055555555554	400.000	BT-Settl	3600	3.5	0	alpha:0	4.409e+1	5.183e-21	4.916e-11	5.277e-13	0.48	2.451e-1	6.391e-2
DM007	83.52304166666666	9.713	400.000	BT-Settl	4500	3.5	0	alpha:0	3.551e+1	1.309e-20	3.014e-10	6.597e-12	0.62	1.503e+0	4.086e-1
DM008	83.55704166666668	9.488833333333334	400.000	BT-Settl	4300	4.5	0	alpha:0	1.085e+1	8.370e-21	1.595e-10	4.719e-12	0.60	7.952e-1	2.223e-1
DM009	83.63670833333332	9.991916666666667	400.000	BT-Settl	4200	4.5	0	alpha:0	4.731e+0	6.241e-21	1.061e-10	1.572e-12	0.58	5.292e-1	1.401e-1

~200 regular users, cited in ~ 50 papers

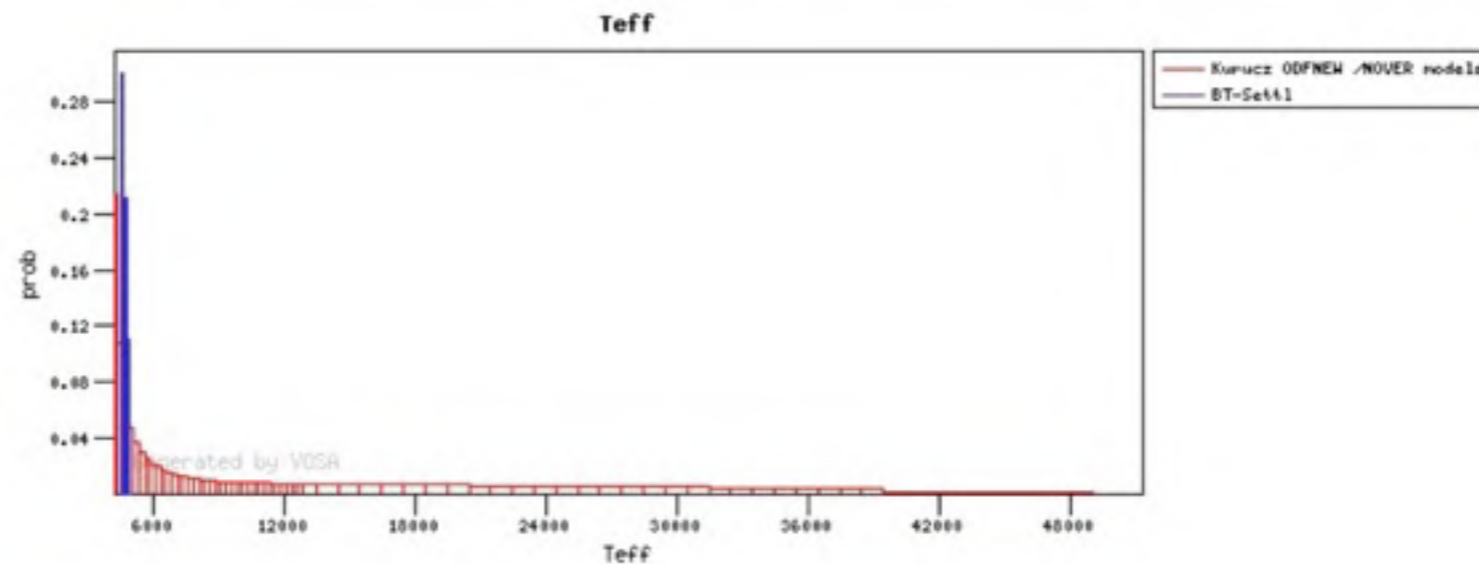
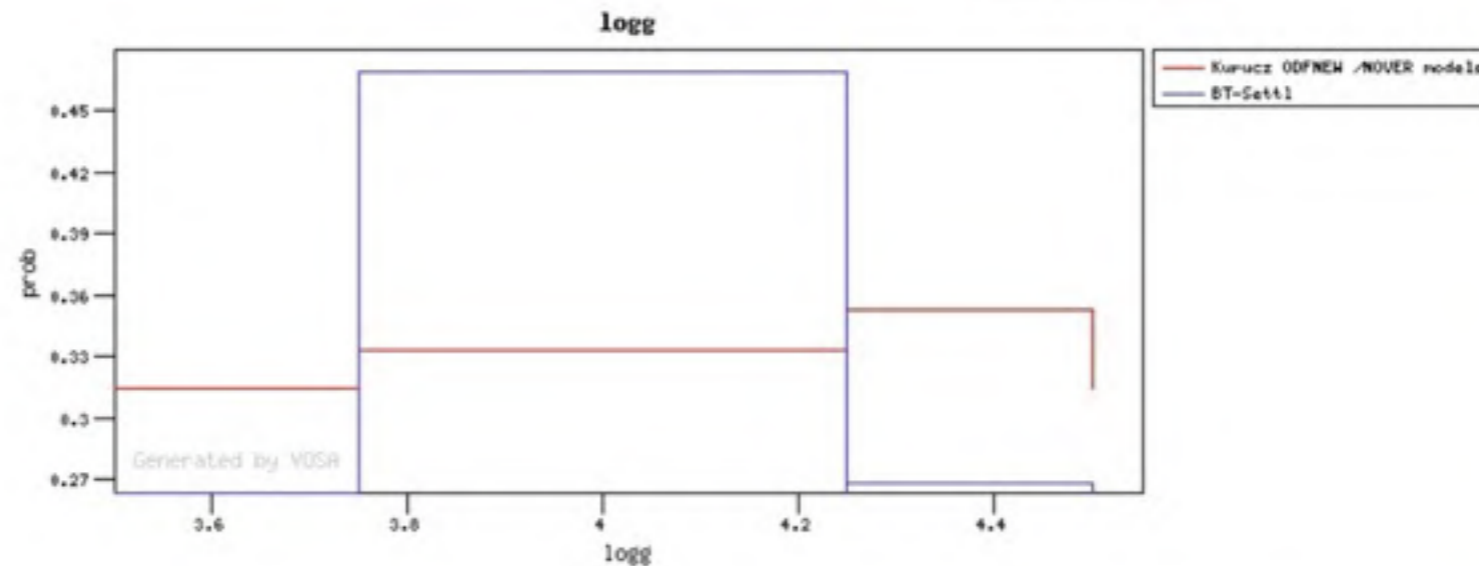
Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

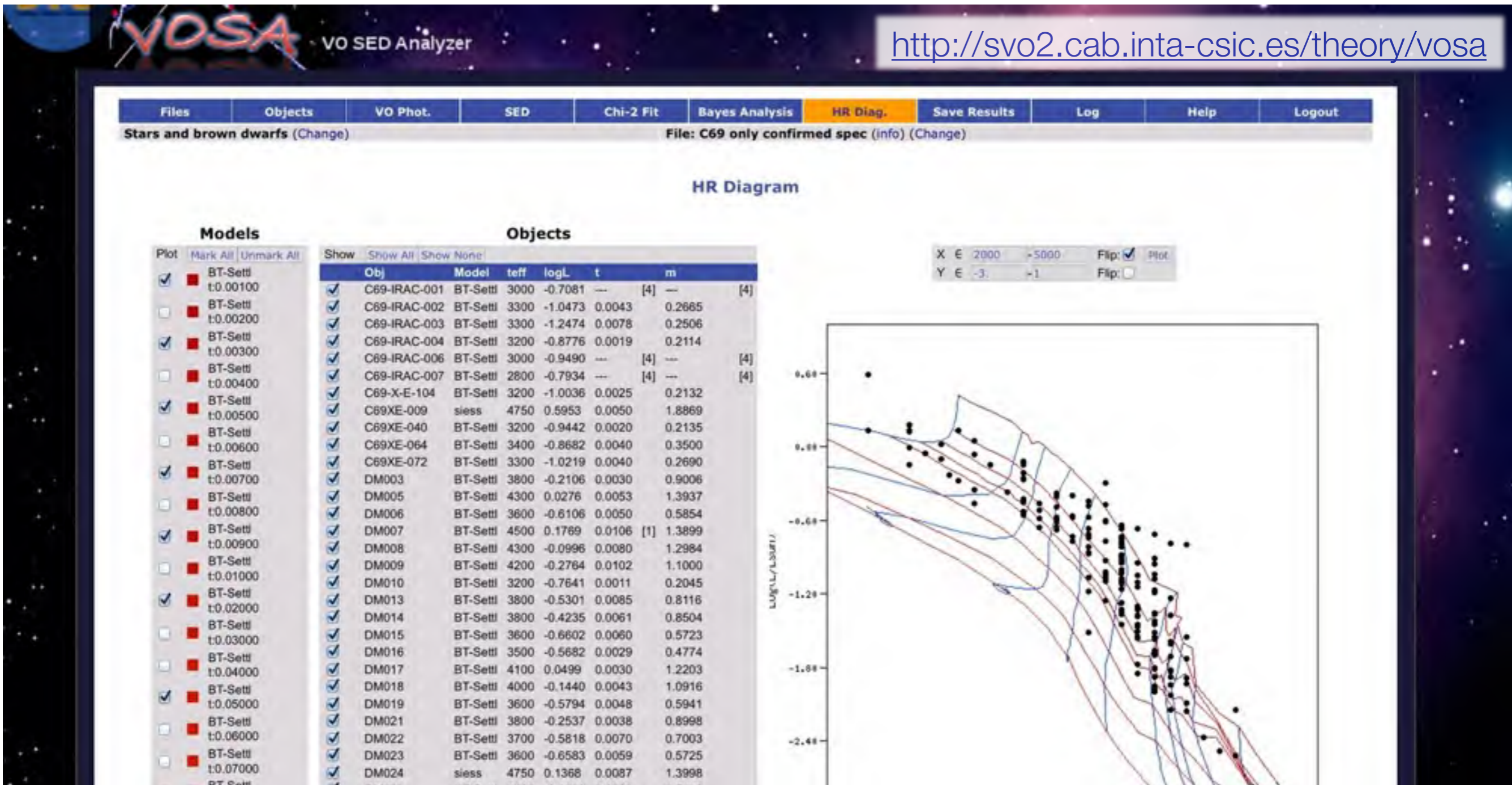
L Ori042
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-0.2	0.099350	0.	1.000000	3.5	0.263404	0	1.000000	4500	0.227847
0	0.795954			4	0.468714				
0.2	0.104697			4.5	0.267882			4700	0.149859
								4800	0.211416
								4900	0.110616

<http://svo2.cab.inta-csic.es/theory/vosa>



VOSA 2: the new generation



~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

Some examples: 2.-

Monthly Notices
of the
ROYAL ASTRONOMICAL SOCIETY

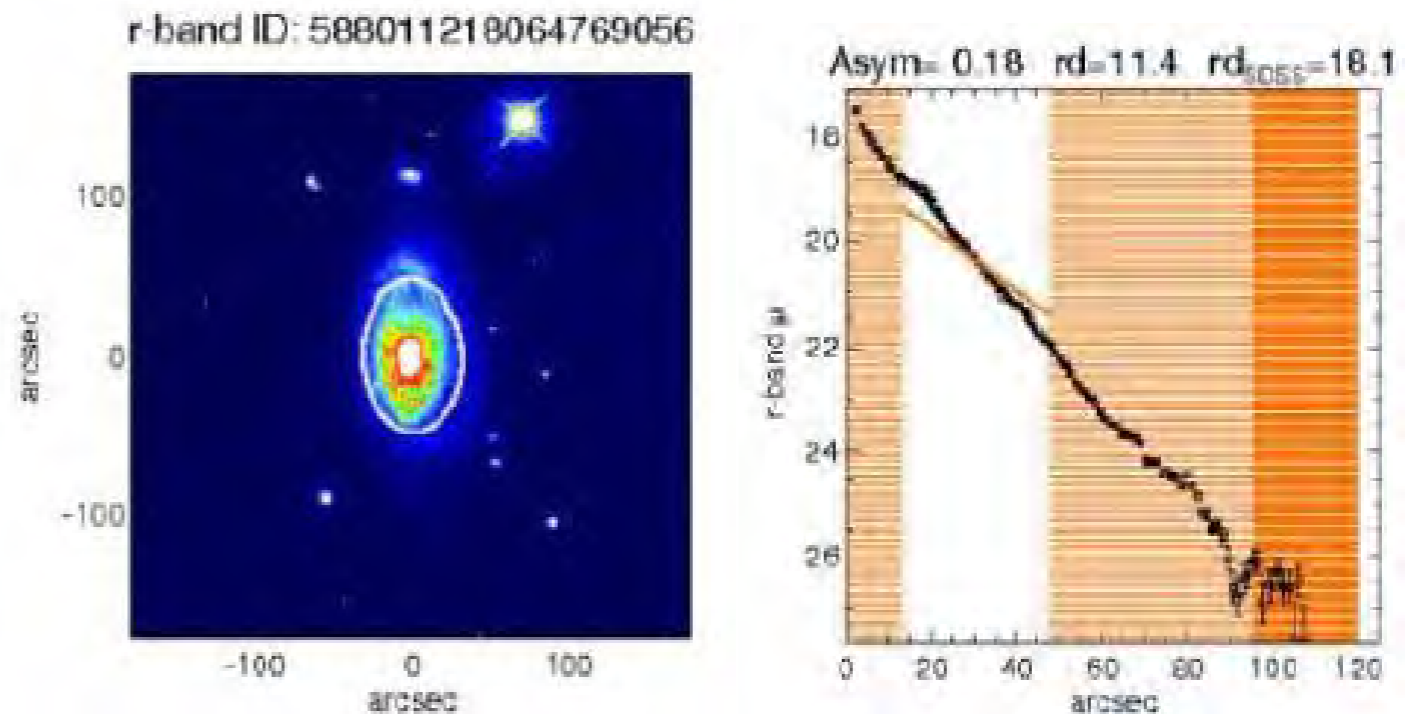
Mon. Not. R. Astron. Soc. **406**, 1595–1608 (2010) doi:10.1111/j.1365-29

Scalelength of disc galaxies

Kambiz Fathi,^{1,2*} Mark Allen,³ Thomas Boch,³ Evanthia Hatziminaoglou⁴
and Reynier F. Peletier⁵

- ✓ Scale-lengths for 30374 galaxies in all SDSS bands:
Unprecedented sample (at most few hundreds in previous studies).

- ✓ Scale-length:
Fundamental parameter in the
study of the morphology and
dynamic of galaxies



- ✓ Multi-wavelength study using SDSS:
Differences in scale-length as a function of lambda can be used to derive
information about the structure and contents of galactic disks

Some examples: 2.-

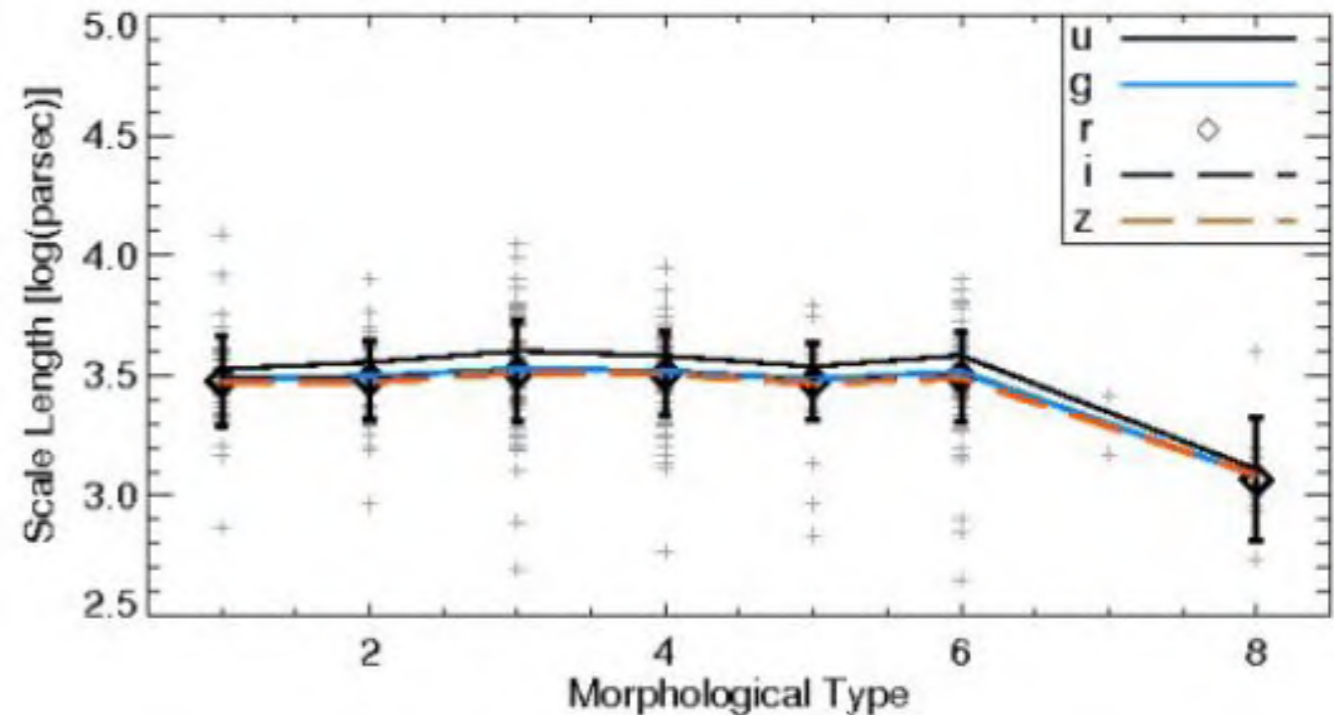
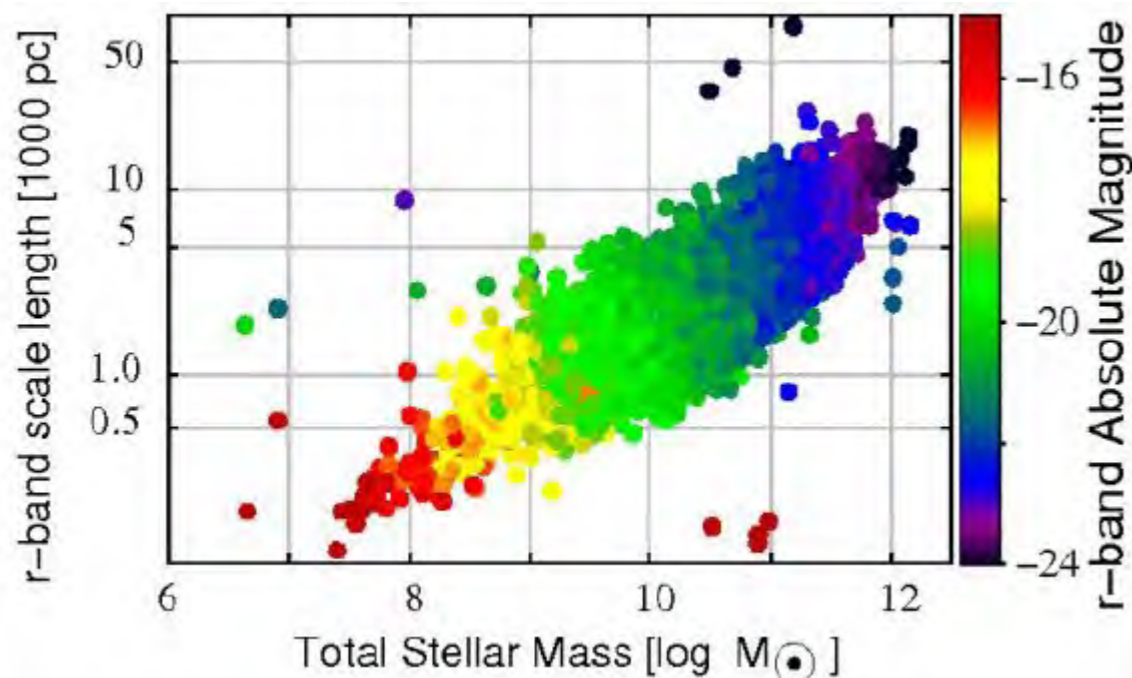
Monthly Notices
of the
ROYAL ASTRONOMICAL SOCIETY

Mon. Not. R. Astron. Soc. 406, 1595–1608 (2010) doi:10.1111/j.1365-29

Scalelength of disc galaxies

Kambiz Fathi,^{1,2*} Mark Allen,³ Thomas Boch,³ Evanthia Hatziminaoglou⁴
and Reynier F. Peletier⁵

- ✓ Filtering (SDSS catalogue): 95735 galaxies
- ✓ Galaxy, low extinction ($A_r < 1.0$), z available, $i < 70^\circ$ (reliable scale lengths), $24'' < \text{diam} < 80''$
- ✓ X-match (LEDA) to get Hubble classification: 56096 classified as spirals
- ✓ Estimation of scale length and asymmetry parameters
- ✓ **30374 reliable determinations**



Some examples: 3.- A product from “YOU”

- Data related:
 - CDS wonders vs pain of getting, for example, IOP tables

The image shows two software windows side-by-side. The left window is 'VizieR Catalogue Service' and the right is 'TOPCAT(33): Table Browser'.

VizieR Catalogue Service

Server: <http://vizier.u-strasbg.fr/>

Row Selection

Cone Selection

Object Name: Resolve

RA: degrees (02000)

Dec: degrees (02000)

Radius: degrees

All Rows

Maximum Row Count: 50000

Column Selection

Output Columns: all

Catalogue Selection

By Category | By Keyword | Surveys | Missions

Keywords: J/A+A/560/A76

Sub-Table Details Include Obsolete Tables

Search Catalogues Cancel Search

Name	Popularity	Density	Description
J/A+A/560/A76	1032	0	Catalog of stellar clusters in the inner Galaxy (J

OK

TOPCAT(33): Table Browser

Table Browser for 33: J_A+A_560_A76_clusters

recno	ID	Name	Cat	GLON
1	1	BH 131	(01),13	300.116
2	2	[MCM2005b] 32	09	300.131
3	3	BH 132	01	300.263
4	4	VVV CL013	14	300.343
5	5	[FSR2007] 1616	11	300.474
6	6	[MCM2005b] 33	09	300.507
7	7	Ruprecht 105	01	300.885
8	8	G3CC 5	17	300.913
9	9	[DBS2003] 77	05	300.966
10	10	VVV CL015	14	300.967
11	11	VVV CL016	14	300.984
12	12	[DBS2003] 78	05	301.118
13	13	VVV CL017	14,17	301.137
14	14	[FSR2007] 1622	11	301.416
15	15	G3CC 6	17	301.643
16	16	NGC 4609	01	301.895
17	17	G3CC 7	17	301.947
18	18	Hogg 15	01	302.047
19	19	VVV CL018	14	302.158
20	20	[MCM2005b] 34	09	302.433
21	21	[FSR2007] 1630	11	302.612
22	22	[DBS2003] 79	05	302.64
23	23	[DBS2003] 80	05	302.806
24	24	Teutsch 109	02	303.652
25	25	G3CC 8	17	303.927
26	26	G3CC 9	17	304.002
27	27	VVV CL019	14	304.805
28	28	[MCM2005b] 35	09	304.845
29	29	VVV CL020	14	304.87
30	30	G3CC 10	17	304.887
31	31	[DBS2003] 82	05	304.928
32	32	[DBS2003] 131	05,17	305.259
33	33	[DBS2003] 130	05	305.269
34	34	VVV CL021	14	305.277
35	35	[DBS2003] 132	05	305.321
36	36	Danks 1	01,17	305.338
37	37	VVV CL022	14	305.362
38	38	[MCM2005b] 36	09	305.383
39	39	Danks 2	01,17	305.392
40	40	VVV CL023	14	305.438

Some examples: 3.- A product from “YOU”

- Data related:
- CDS wonders vs pain of getting, for example, IOP tables

O4370+2559 (A, B)	2	4.3	\sim K3-M1	C	A \gg B 20, 21	
O4385+2550 (A, B)	2	18.9	M0	C	A \gg B 22, 2	
CoKu Tau/3 (A, B)	2	2.05	M1	C	A > B 1	
CX Tau (A, B)	2	0.32	M3	W	A \sim B 1	
DD Tau (A, B)	2	0.56	M3+M3	C	A \sim B 1	
DF Tau (A, B)	2	0.09	M0.5+M3	C	A \sim B 1	
DH Tau 2	15	M2+M2	C	DH > DI 7, 8		
DK Tau (A, B)	2	2.30	K9+M1	C	A > B 1, 7	
DQ Tau (A, B)	2	SB	K5	C	A \sim B 12	
F04192+2647 (A, B)	2	23.3	\ldots \ldots	A > B 23		
F04297+2246 (A, B)	2	6.6	\ldots \ldots	A > B 23		
FM Tau 2	37.3	M2	C	FM < V773 7, 8		
FO Tau (A, B)	2	0.15	M2+M2	C	A \sim B 1	
FQ Tau (A, B)	2	0.76	M3+M3.5	C	A \sim B 1, 17	
FS Tau (Aa, Ab, B)	3	0.23 (Aa, Ab), 20	(A-B) M1+M4 (Aa, Ab)	C	Aa > Ab 1, 24	
FV Tau (A, B)	2	0.72	K5+K6	C	A \sim B, FV > FV/c 1	
FX Tau (A, B)	2	0.89	M1+M4	C+W	A > B 1, 6	
FZ Tau 2	16.9	M0+K5	C	FZ > FY 7, 8		
GG Tau (A, B)	4	10.3	\ldots C	A \gg B 1		
GG Tau (Aa, Ab)	2	0.25	K7+M0.5	C	Aa \gtrsim Ab 1	
GG Tau (Ba, Bb)	2	1.48	M5.5+M7.5	C	Ba > Bb 1	
GH Tau (A, B)	2	0.31	M1.5+M2	C	A \sim B 1	
GI Tau 2	12.9	K6	C	GI \sim GK 5, 6		
GK Tau (A, B)	2	2.5	K7	C	A \gg B 5, 6	
GN Tau (A, B)	2	0.33	M2.5	C	A \sim B 1, 26	
Haro 6-37 (Aa, Ab, B)	3	2.62(A, B), 0.33 (Aa, Ab)	K7+M1	C	Aa > Ab, A > B 1, 11	
HK Tau (A, B)	2	2.34	M1+M2	C	A \gg B 1, 7	
HN Tau (A, B)	2	3.11	K5+M4	C	A \gg B 1	
HP Tau (A, B)	2	0.017	K2	C	A > B 7, 8, 15	
IS Tau (A, B)	2	0.22	K7+M4.5	C+W	A > B 1	
IT Tau (A, B)	2	2.39	K3+M4	C	A \gtrsim B 1, 6	
RW Aur (A, B, C)	3	1.42 (A-B), 0.12 (B-C)	K1+K5 (A, B)	C	A > B \gg C 1, 10	
T Tau (N, Sa, Sb)	3	0.70 (N-S), 0.1 (Sa-Sb)	K0	C	N \sim Sa \sim Sb 1, 3	
UX Tau (A, B, C)	4	5.86 (A-B), 2.63 (A-C)	K5+M2+M5	C+W+W	A > B, A \gg C 1	
UX Tau (Ba, Bb)	2	0.138	M2	W	Ba > Bb 11	
UY Aur (A, B)	2	0.88	M0+M2.5	C	A \gtrsim B 1, 17	
UZ Tau (A, Ba, Bb)	4	SB (A), 3.54(A-Ba), 0.37 (Ba-Bb)	M1+M2+M2	C	A > B, Ba \sim Bb 1, 13	
V710 Tau (A, B)	2	3.17	M0.5+M2	C+W	A \sim B 1	
V773 Tau (AB, C, D)	4	SB (AB), 0.12 (AB-C), 0.24 (AB-D)	K2+M0 (AB, C)	W+C	D > C > AB 1, 4	
V807 Tau (A, Ba, Bb)	3	0.30 (A-B), 0.04 (Ba-Bb)	K7+M3	C+W	A > B, Ba \sim Bb 25, 1	
V892 Tau (Aa, Ab, B)	3	0.06, 4.10	B9+M2	W	Aa \sim Ab, A \gg B 16, 19	
V955 Tau (A, B)	2	0.33	K5+M1	C	A > B 1	
VY Tau (A, B)	2	0.66	M0	W	A > B 1	
XZ Tau (A, B)	2	0.30	M3+M1.5	C	B > A 1	
ZZ Tau IRS	2	35	M4.5	C	ZZ IRS > ZZ 2	
ZZ Tau (A, B)	2	0.04	M3	C	A \gtrsim B 9	

TOPCAT(33): Table Browser

Table for 33: J_A+A_560_A76_clusters

ID	Name	Cat	GLON
1	BH 131	(01),13	300.116
2	[MCM2005b] 32	09	300.131
3	BH 132	01	300.263
4	VVV CL013	14	300.343
5	[FSR2007] 1616	11	300.474
6	[MCM2005b] 33	09	300.507
7	Ruprecht 105	01	300.885
8	G3CC 5	17	300.913
9	[DBS2003] 77	05	300.966
10	VVV CL015	14	300.967
11	VVV CL016	14	300.984
12	[DBS2003] 78	05	301.118
13	VVV CL017	14,17	301.137
14	[FSR2007] 1622	11	301.416
15	G3CC 6	17	301.643
16	NGC 4609	01	301.895
17	G3CC 7	17	301.947
18	Hogg 15	01	302.047
19	VVV CL018	14	302.158
20	[MCM2005b] 34	09	302.433
21	[FSR2007] 1630	11	302.612
22	[DBS2003] 79	05	302.64
23	[DBS2003] 80	05	302.806
24	Teutsch 109	02	303.652
25	G3CC 8	17	303.927
26	G3CC 9	17	304.002
27	VVV CL019	14	304.805
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29	VVV CL020	14	304.87
30	G3CC 10	17	304.887
31	[DBS2003] 82	05	304.928
32	[DBS2003] 131	05,17	305.259
33	[DBS2003] 130	05	305.269
34	VVV CL021	14	305.277
35	[DBS2003] 132	05	305.321
36	Danks 1	01,17	305.338
37	VVV CL022	14	305.362
38	[MCM2005b] 36	09	305.383
39	Danks 2	01,17	305.392
40	VVV CL023	14	305.438

Some examples: 3.- A product from “YOU”

- Data related:
 - CDS wonders vs pain of getting, for example, IOP tables
 - The “sasmirala” atlas

Some examples: 3.- A product from “YOU”



Asmus et al 2014

TOPCAT(31): Table Browser

Table Browser for 31: TAP_1_sasmirala.objects

	name	raj2000	dej2000
1	3C 390.3	280.5375	79.77139
2	NGC 1275	49.95083	41.51167
3	NGC 6251	248.13333	82.53778
4	3C 305	222.33989	63.27055
5	NGC 5866	226.62292	55.76333
6	Mrk 266NE	204.57414	48.27806
7	Mrk 266SW	204.57213	48.27556
8	M51a	202.46958	47.19528
9	NGC 4258	184.73958	47.30389
10	Mrk 3	93.90167	71.0375
11	NGC 3147	154.22375	73.40083
12	4C +73.08	147.44108	73.23976
13	M81	148.88833	69.06528
14	UGC 5101	143.965	61.35306
15	NGC 3690E	172.14012	58.56294
16	NGC 3690W	172.12925	58.56131
17	NGC 3998	179.48375	55.45361
18	NGC 3982	179.11708	55.12528
19	NGC 3718	173.14542	53.06806
20	IRAS 08572+3915	135.10583	39.065
21	PKS 2158-380	330.32125	-37.77333
22	NGC 7130	327.08125	-34.95111
23	NGC 7172	330.50792	-31.86972
24	IC 1459	344.29417	-36.46222
25	NGC 7496	347.44708	-43.42806
26	NGC 7552	349.045	-42.58472
27	NGC 7582	349.59792	-42.37056
28	NGC 7590	349.72833	-42.23917
29	NGC 7314	338.9425	-26.05056
30	PKS 2354-35	359.25292	-34.75917
31	ESO 602-25	337.85625	-19.03444
32	MR 2251-178	343.52417	-17.58194
33	Mrk 915	339.19375	-12.54528
34	3C 445	335.95625	-2.10361
35	Mrk 926	346.18125	-8.68583
36	NGC 7592W	349.59084	-4.41574
37	ESO 297-18	24.655	-40.01139

Description

PKS 2158-380/MCG-6-48-13 is a radio-loud lenticular galaxy at a redshift of $z = 0.0334$ ($D = 149$ Mpc) with a Sy 2 nucleus [veron-cetty_catalogue_2010] and was first studied in detail by [fosbury_very_1982]. HST observations revealed three compact but resolved sources in the nucleus instead of one central source (total extent = 1arcsec = 0.7 kpc; PA= 90; [boyce_faint_1996, zirbel_ultraviolet_1998]). In addition, water maser emission was detected in this object [kondratko_discovery_2006]. No Spitzer data are available for PKS 2158-380, which was imaged with VISIR in the SIC filter in 2006 [van_der_wolk_dust_2010]. A compact MIR nucleus is weakly detected in the image. The low S/N prevents a quantitative analyses of the source morphology but the latter seems different than that seen in HST, as only one source was detected. Our nuclear photometry is consistent with the value in [van_der_wolk_dust_2010].

[boyce_faint_1996] P. J. Boyce, M. J. Disney, F. Macchetto, A. Boksenberg, J. C. Blades, and C. D. Mackay. *Faint object camera observations of complex nuclear structure in PKS 2158-380*. *A&A*, 305 pp, 715, January 1996.

[fosbury_very_1982] R. A. E. Fosbury, A. Boksenberg, M. A. J. Snijders, I. J. Danziger, M. J. Disney, W. M. Goss, M. V. Penston, W. Wamsteker, K. J. Wellington, and A. S. Wilson. *Very extended ionized gas in radio galaxies. I - a radio, optical and ultraviolet study of PKS 2158-380*. *MNRAS*, 201 pp, 991-1008, December 1982.

[kondratko_discovery_2006] P. T. Kondratko, L. J. Greenhill, J. M. Moran, J. E. J. Lovell, T. B. H. Kuiper, D. L. Jauncey, L. B. Cameron, J. F. Gómez, C. García-Miró, E. Moll, I. de Gregorio-Monsalvo, and E. Jiménez-Bailón. *Discovery of water maser emission in eight AGNs with 70 m antennas of NASA's deep space network*. *ApJ*, 638 pp, 100-105, February 2006.

[van_der_wolk_dust_2010] G. van der Wolk, P. D. Barthel, R. F. Peletier, and J. W. Pei. *Dust ton in radio galaxies*. *A&A*, 511 pp, 64, February 2010.

[veron-cetty_catalogue_2010] M.-P. Véron-Cetty and P. Véron. *A catalogue of quasars and active nuclei: 13th edition*. *A&A*, 518 pp, 10, July 2010.

[zirbel_ultraviolet_1998] Esther L. Zirbel and Stefi A. Baum. *The ultraviolet continuum emission of radio galaxies. I. description of sources from the hubble space telescope archives*. *ApJ*, 114 pp, 177, February 1998.

Images

URL: <http://dc.zah.uni-heidelberg.de/sasmirala/q/prod/qp/PKS%202158-380>

Some examples: 4.-

A&A 525, A29 (2011)
DOI: [10.1051/0004-6361/201015223](https://doi.org/10.1051/0004-6361/201015223)
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**Astronomy
&
Astrophysics**

Identification of blue high proper motion objects in the Tycho-2 and 2MASS catalogues using Virtual Observatory tools

F. M. Jiménez-Esteban^{1,2,3}, J. A. Caballero⁴, and E. Solano^{1,2}

- ✓ Bright objects with blue colors and high proper motions are rare on the sky
The “usual suspects”: Nearby white dwarfs, hot subdwarfs, runaway stars or early type stars in nearby young moving groups

Important in many fields

- ✓ WDs are used as spectrophotometric standards
- ✓ Early-type stars in young moving groups are fundamental to understand the evolution of star-forming regions (closer → studies in greater detail)

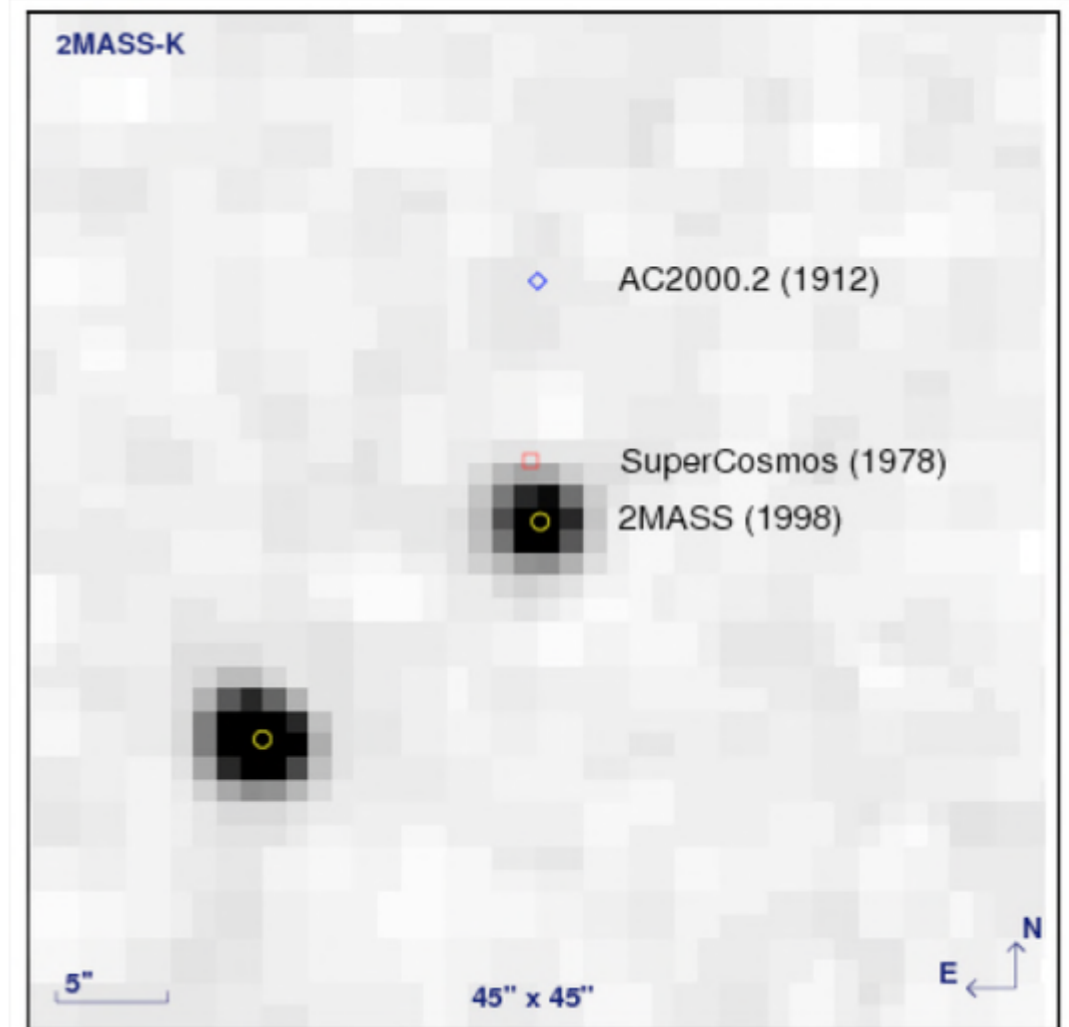
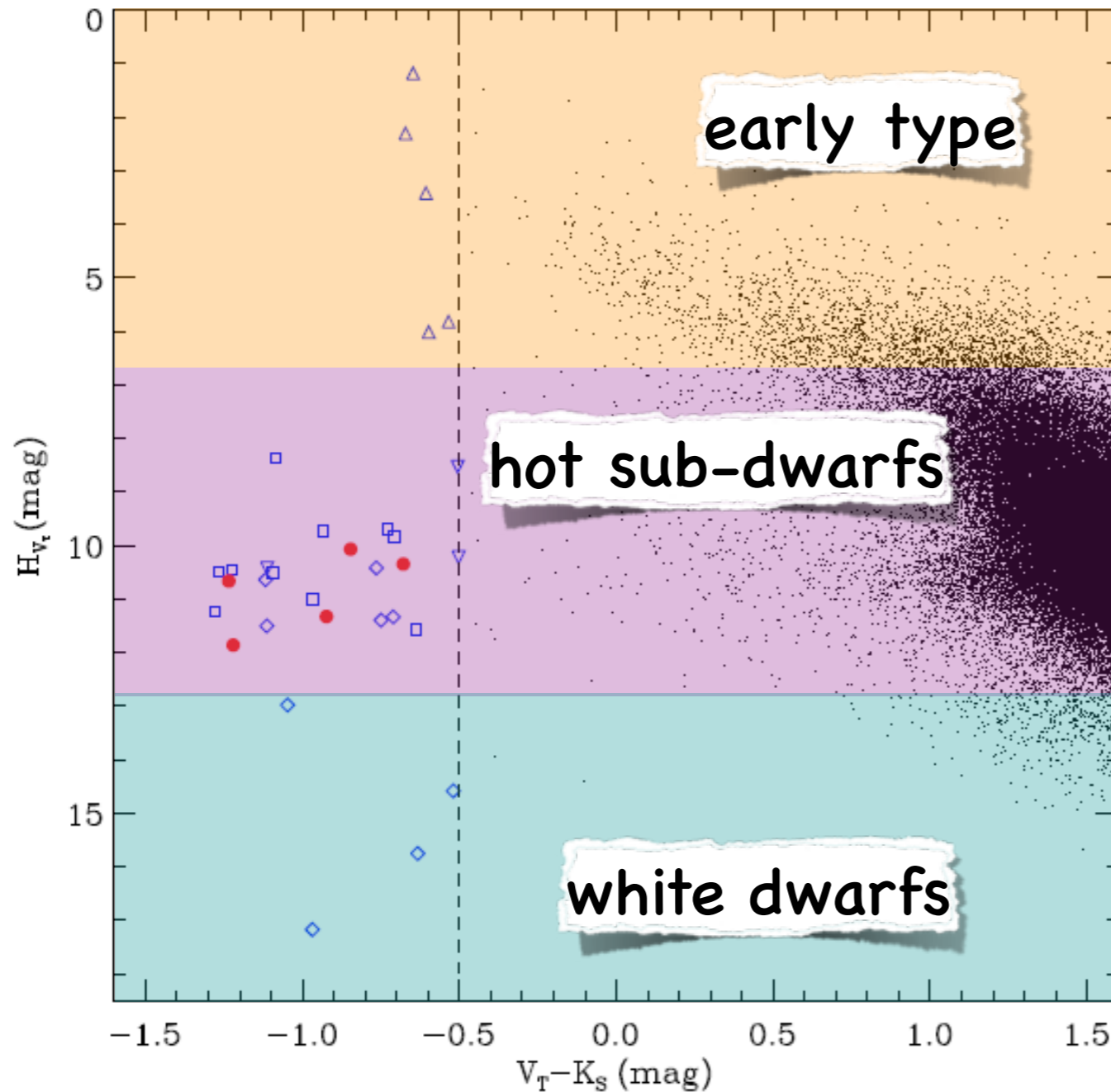
Some examples: 4.-

Reduced ppm diagram

A&A 525, A29 (2011)
DOI: 10.1051/0004-6361/201015223
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Identification of blue high proper motion objects in the Tycho-2 and 2MASS catalogues using Virtual Observatory tools

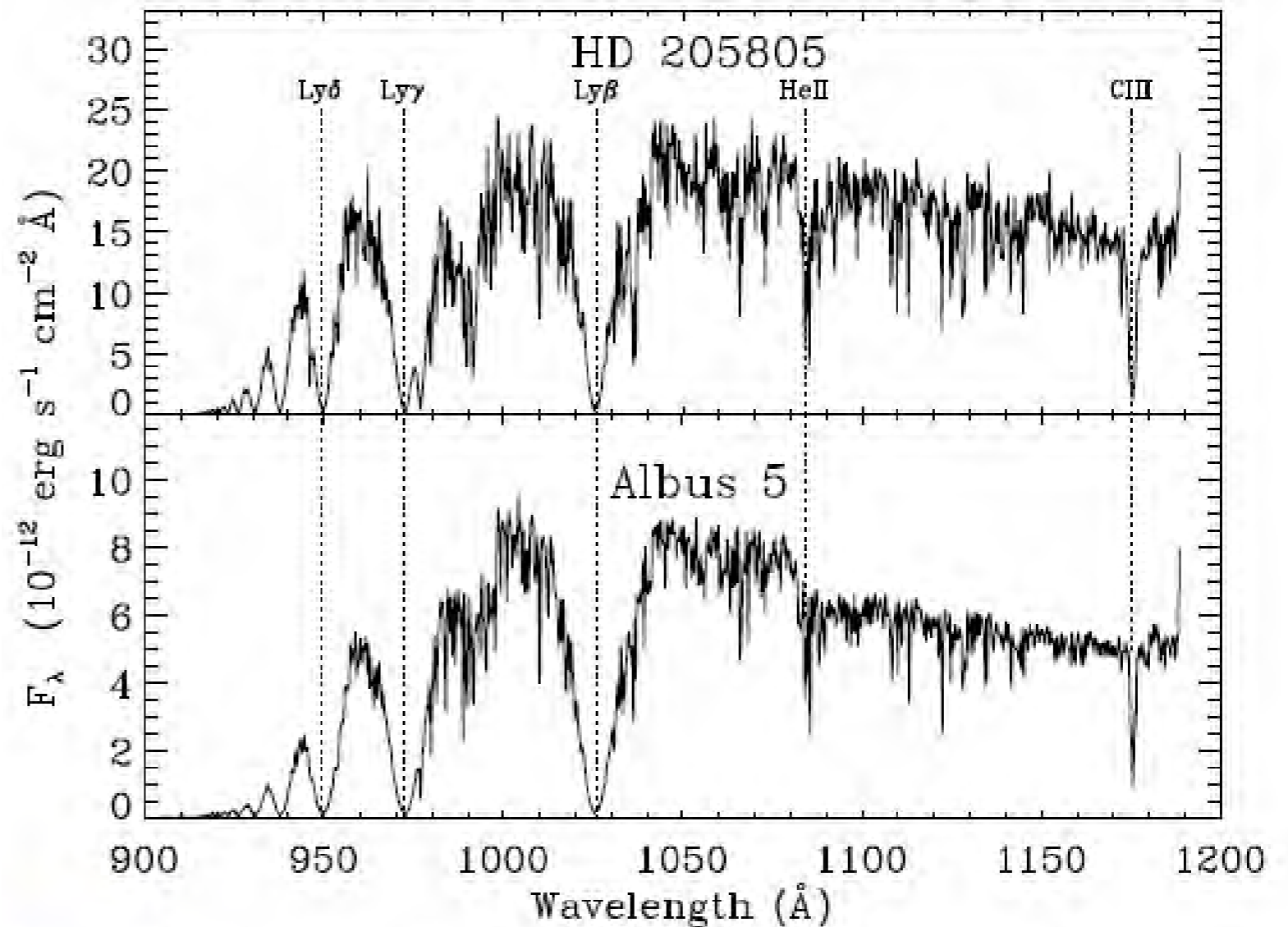
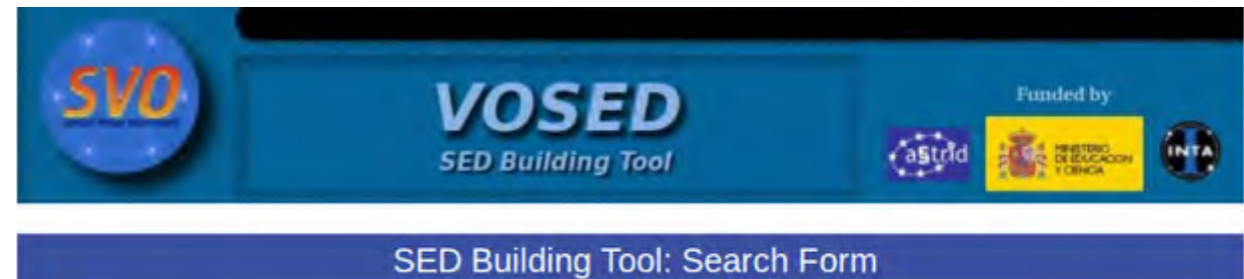
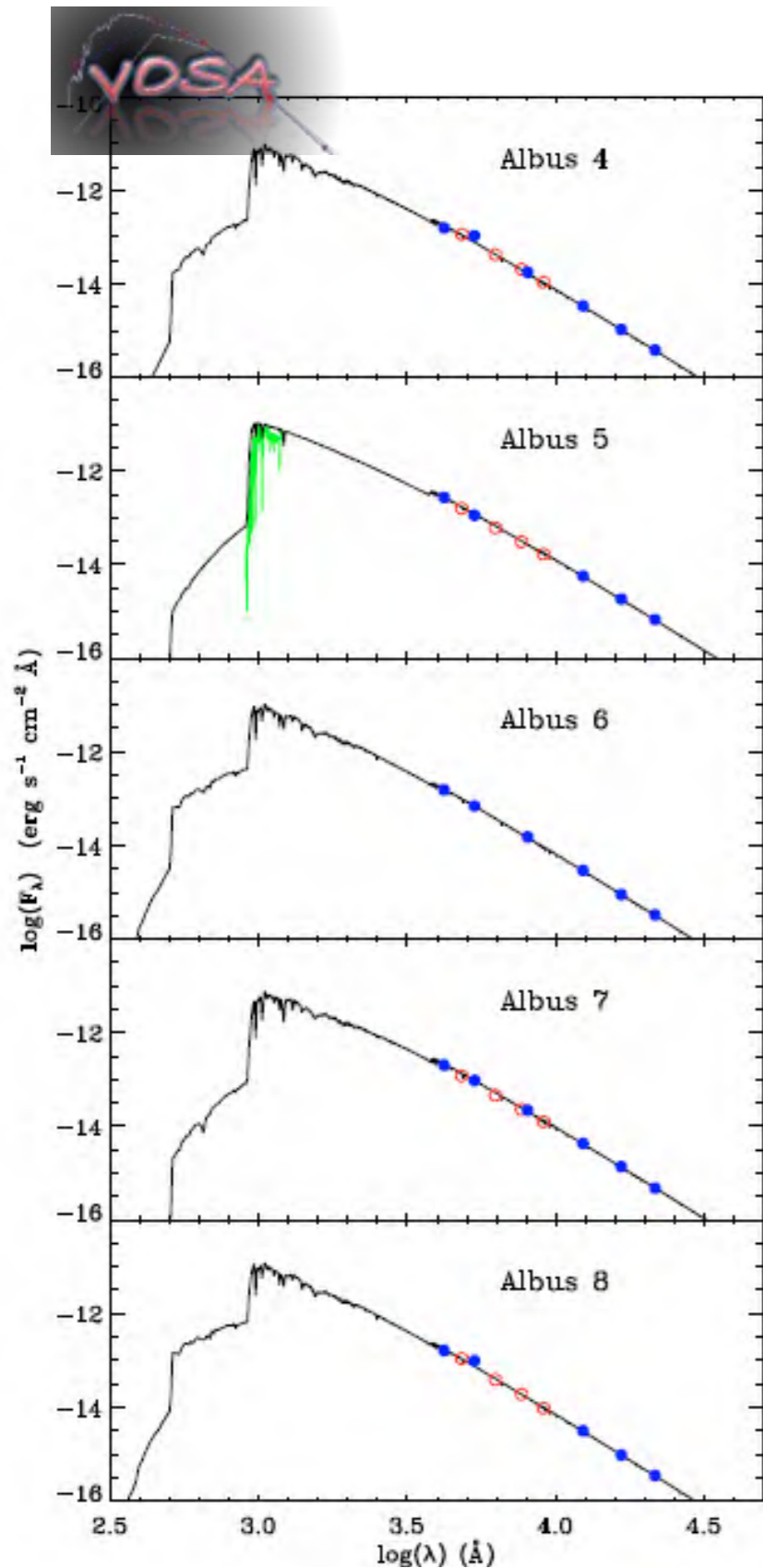
F. M. Jiménez-Esteban^{1,2,3}, J. A. Caballero⁴, and E. Solano^{1,2}



Some examples: 4.-

Identification of blue high proper motion objects in the Tycho-2 and 2MASS catalogues using Virtual Observatory tools

F. M. Jiménez-Esteban^{1,2,3}, J. A. Caballero⁴, and E. Solano^{1,2}



Some examples: 5.- The DUNES prep. work



DUNES: DUST around NEARBY Stars A Herschel Key Programme

You are not logged in.

Navigation

- Home
- The Proposal
- Consortium Members
- Announcements
- Documents
- Public Outreach
- Links
- Contact

User Login

Username: *

Password: *

Log in

Cold Disks around Nearby Stars. A Search for Edgeworth-Kuiper Belt Analogues

Debris counter, belt around prevalence

We have were of integrat belt an broad r and A-t to 2 sc

Our su giant j eviden

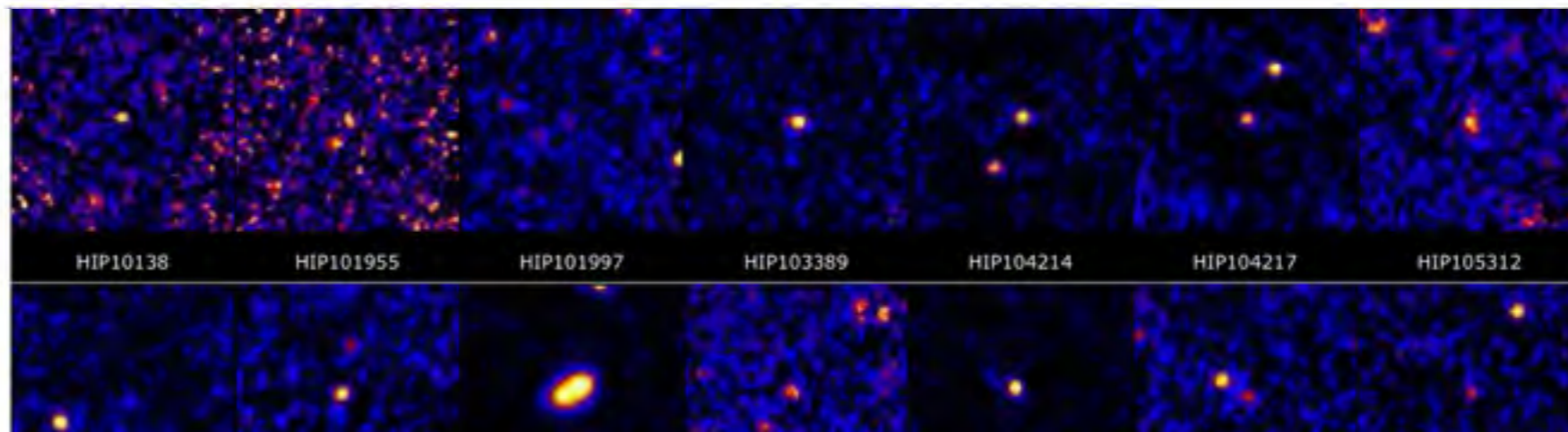
systems formation in disks around young stars.

- ✓ System. survey for faint, cold debris disks (EKB)
- ✓ Around 133 (up to 250) stars. Volume-limited sample (distances 25 pc)
- ✓ Detecting extremely faint excesses requires a very detailed knowledge of the photospheric level → fundamental parameters

ir system's orth-Kuiper ated to the

nd 160 μm egy was to orth-Kuiper nd spans a some M- s from 0.2

presence of nd unique /planetary



Some examples: 5.- The DUNES prep. work

Tell me everything about my targets

The screenshot displays the Aladin software interface. At the top, a menu bar includes 'File', 'Edit', 'Image', 'Catalog', 'Overlay', 'Tool', 'View', 'Interop', and 'Help'. Below the menu is a toolbar with icons for location, frame, and ICRS. A 'Server list' window is open, showing a list of servers with checkboxes and question marks. A 'Server selector' dialog is also open, featuring a 'VO discovery tool' section with a red dashed circle around the 'all VO' button. The dialog includes fields for 'Target (ICRS, name)' and 'Radius' (set to 14'), and checkboxes for 'Images', 'Catalogs', and 'Spectra'. A 'SUBMIT' button is highlighted in green. The 'Server list' window lists 19 servers, all with checked boxes and question marks. The 'Server selector' dialog has a 'Stop it' button and 'Reset' and 'Close' buttons at the bottom.

Server list

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

Select all Unselect all Filter: Go Reset

Image servers

- The Aladin image server (CDS/Strasbourg) - DSS/MA...
- The UKIRT Infrared Deep Sky Survey
- SDSS DR7 images
- Multimission Archive at STScI (MAST)
- Hubble Legacy Archive Footprint Data (HLA)
- Canadian Astronomical Data Center (CADC)
- Hubble press release images
- VO-Paris Southern Atlas (VOPSAT)
- Generic SIA query
- The XMM-Newton Science Archive InterOperability Sys...
- The ISO Data Archive InterOperability System
- The Integral Science Data Archive InterOperability Syst...
- SkyView Virtual Observatory
- SuperCOSMOS Sky Surveys SSS SIAP Cutout Service
- UKIDSS DR1 SIAP Service
- UKIDSS DR2 SIAP Service
- The Extended IRAS Galaxy Atlas
- Spitzer First Look Survey (FLS) -- NOAO ELAIS N1 -- R
- Spitzer First Look Survey (FLS) -- NOAO Extragalactic -- R

Server selector

Others Allsky File all VO Watch FoV... SExtractor

VO discovery tool ?

Target (ICRS, name) Grab co...

Radius 14'

Servers Images Catalogs Spectra Detailed list...

Press it to stop the processing => Stop it

Reset Clear SUBMIT Close ?

Aladin

Bienvenue on Aladin, your professional sky atlas.

grid wink north multiview match

(c) 2012 UDS/CNRS - by CDS - Distributed under GNU GPL v3

Some examples: 5.- The DUNES prep. work



VO Discovery Tool

Developed in the framework of the DUNES and GASPS projects, this Virtual Observatory tool allows accessing, visualizing, filtering and retrieving relevant information already available in astronomical archives and services.

List of object names (one line each)

List of object coordinates (one line each)

Format allowed:

350.123456 -17.33333

20 54 05.689 37 01 17.38

10:12:45.3 -45:17:50

Radius:

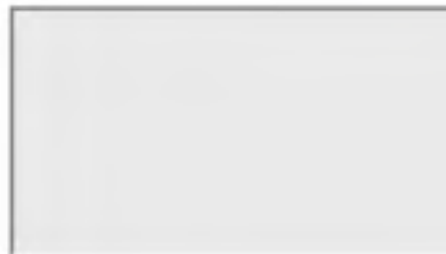
arcmin
 arcsec

Some examples: 5.- The DUNES prep. work



VO Discovery Tool

Developed in the framework of the DUNES and GASPS projects, this Virtual Observatory tool allows accessing, visualizing, filtering and retrieving relevant information already available in astronomical archives and services.



Filters:

▶ Exclude CCDM sources:

- CCDM astrometric binaries.
- CCDM sources with known orbit.
- CCDM sources with rho < arcsec.
- All CCDM sources.

▶ Exclude stars in SB9

▶ Exclude stars in Catalogue of Eclipsing Binaries (Malkov+,2006)

▶ Exclude stars in WDS

Services:

▶ Photometric Data

uvby β Strömngren photometry Hauck - Mermilliod

Radius:

arcmin
 arcsec

JHK photometry 2MASS

Radius:

arcmin
 arcsec

IRAS photometry Point Source Catalogue

Radius:

arcmin
 arcsec

Faint Source Catalogue

Radius:

arcmin
 arcsec

Tycho-2 photometry The Tycho-2 Catalogue of the 2.5 Million Brightest Stars

Radius:

arcmin
 arcsec

Some examples: 5.- The DUNES prep. work



VO Discovery Tool

Developed in the framework of the DUNES and GASPS projects, this Virtual Observatory tool is used for visualizing, filtering and retrieving relevant information already available in

VO Services

- Catalogs
- Images
- Spectra

Physical Parameters (search radius 30 arcsec)

Teff , logg , [Fe/H] , E(B-V)	Explore Vizier:	<input type="checkbox"/> Teff	<input type="checkbox"/> logg	<input type="checkbox"/> [M/H]	<input type="checkbox"/> E(B-V)
Vsini	<input type="checkbox"/> Gleboki (2000)	<input type="checkbox"/> Reiners - Schmitt (2003)	<input type="checkbox"/> Explore vizier		
Period	<input type="checkbox"/> Explore vizier				
Spec. Type	<input type="checkbox"/> Explore vizier				
Age	<input type="checkbox"/> Explore vizier				
Radial Velocity	<input type="checkbox"/> Explore vizier				
Proper Motion	<input type="checkbox"/> Hipparcos	<input type="checkbox"/> Tycho-2	<input type="checkbox"/> Explore vizier		
Space Velocity	<input type="checkbox"/> Explore vizier				
Parallax	<input type="checkbox"/> Hipparcos	<input type="checkbox"/> Explore vizier			

Filters:

- ▶ **Exclude CCDM sources:**
 - CCDM astrometric binaries.
 - CCDM sources with known orbit.
 - CCDM sources with rho < arcsec
 - All CCDM sources.
- ▶ **Exclude stars in SB9**
- ▶ **Exclude stars in Catalogue of Eclipsing Binaries**
- ▶ **Exclude stars in WDS**

Services:

▶ Photometric Data

uvbyβ Strömrgren photometry	<input type="checkbox"/> Häuck - Merzianou	Radius: <input type="text" value="10"/>	<input checked="" type="radio"/> arcsec
JHK photometry	<input type="checkbox"/> 2MASS	Radius: <input type="text" value="5"/>	<input type="radio"/> arcmin <input checked="" type="radio"/> arcsec
IRAS photometry	<input type="checkbox"/> Point Source Catalogue	Radius: <input type="text" value="20"/>	<input type="radio"/> arcmin <input checked="" type="radio"/> arcsec
	<input type="checkbox"/> Faint Source Catalogue	Radius: <input type="text" value="20"/>	<input type="radio"/> arcmin <input checked="" type="radio"/> arcsec
Tycho-2 photometry	<input type="checkbox"/> The Tycho-2 Catalogue of the 2.5 Million Brightest Stars	Radius: <input type="text" value="5"/>	<input type="radio"/> arcmin <input checked="" type="radio"/> arcsec

Some examples: 5.- The DUNES prep. work



Divi

DUNES: Results

Total results: 1

Mark	Images	OBJName	HIP	HD	_RAJ2000	_DEJ2000	CCDM	SB9	Malkov	WDS	Exo	Photometry	VO Services	Physical Parameters
<input checked="" type="checkbox"/>	View	HIP 171	171	224930	0.542318	27.082258	2			1		View	Catalogs Spectra Images	View

[Retrieve/Display Marked Data](#)

In [format](#) and notify me at this [e-mail](#) address: when they are available.

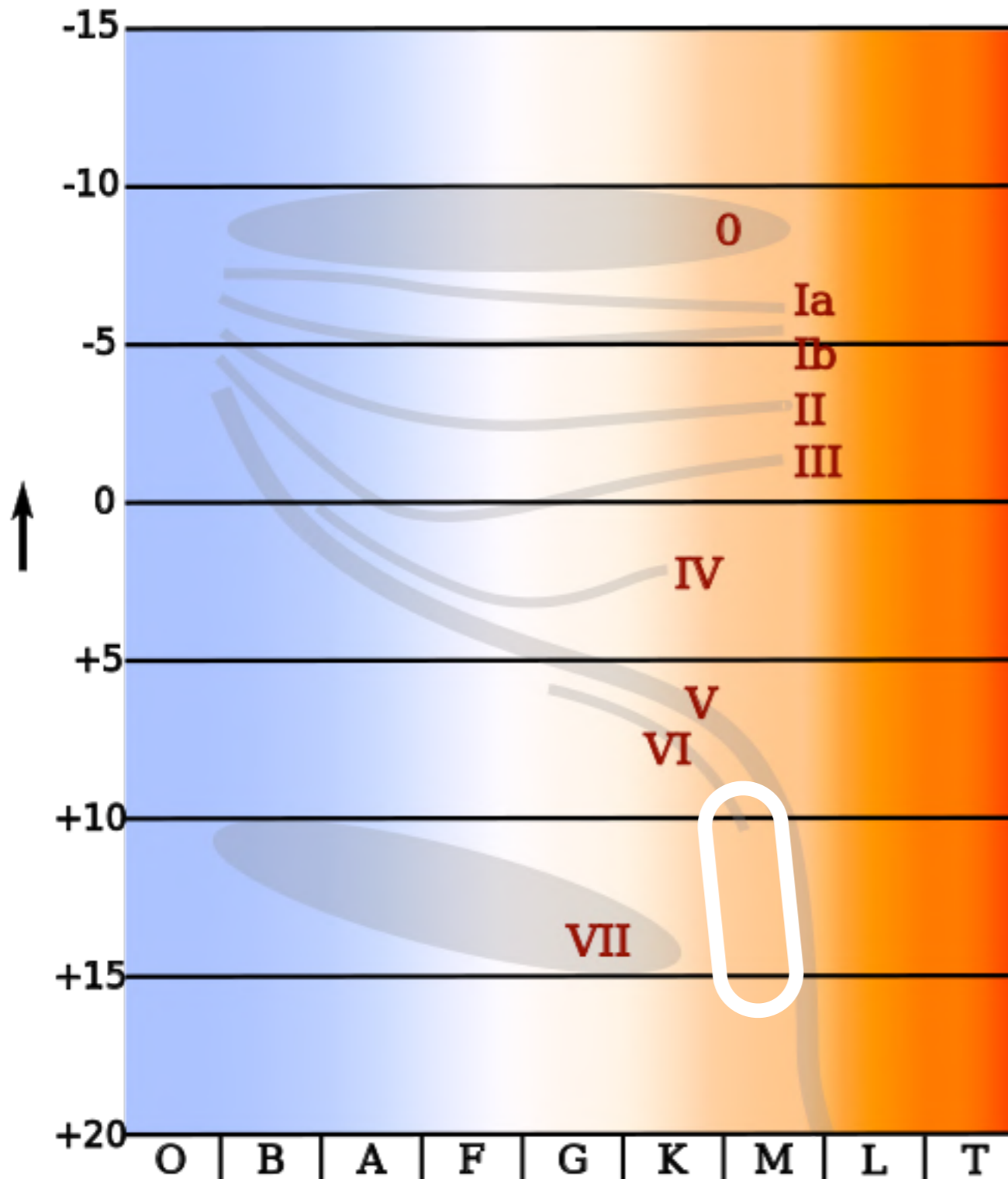
JHK photometry	<input type="checkbox"/> 2MASS	Radius: <input type="text" value="5"/>	<input checked="" type="radio"/> arcsec
	<input type="checkbox"/> Point Source Catalogue	Radius: <input type="text" value="20"/>	<input type="radio"/> arcmin
IRAS photometry	<input type="checkbox"/> Faint Source Catalogue	Radius: <input type="text" value="20"/>	<input checked="" type="radio"/> arcsec
			<input type="radio"/> arcmin
Tycho-2 photometry	<input type="checkbox"/> The Tycho-2 Catalogue of the 2.5 Million Brightest Stars	Radius: <input type="text" value="5"/>	<input checked="" type="radio"/> arcsec
			<input type="radio"/> arcmin

Some examples: 6.-

New ultracool subdwarfs identified in large-scale surveys using Virtual Observatory tools * **

Part I: UKIDSS LAS DR5 vs SDSS DR7

N. Lodieu^{1,2}, M. Espinoza Contreras¹, M. R. Zapatero Osorio³, E. Solano^{4,5}, M. Aberasturi^{4,5}, and E. L. Martin³



✓ Metal-poor dwarfs with spectral types later than M7

✓ Less lum. (act. hotter) than their solar met. counterparts

✓ Population II. Tracers of the galact. chem. history

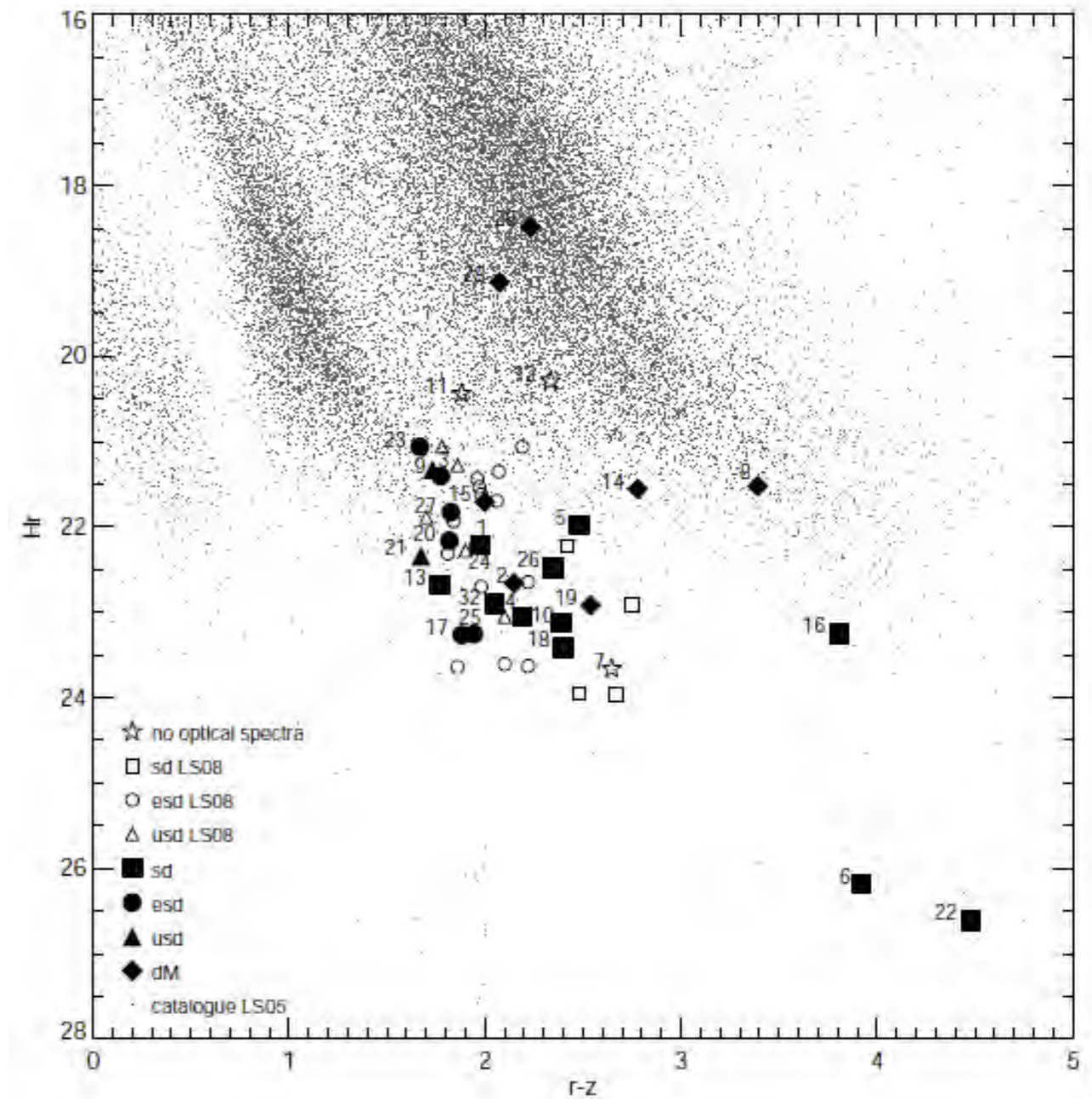
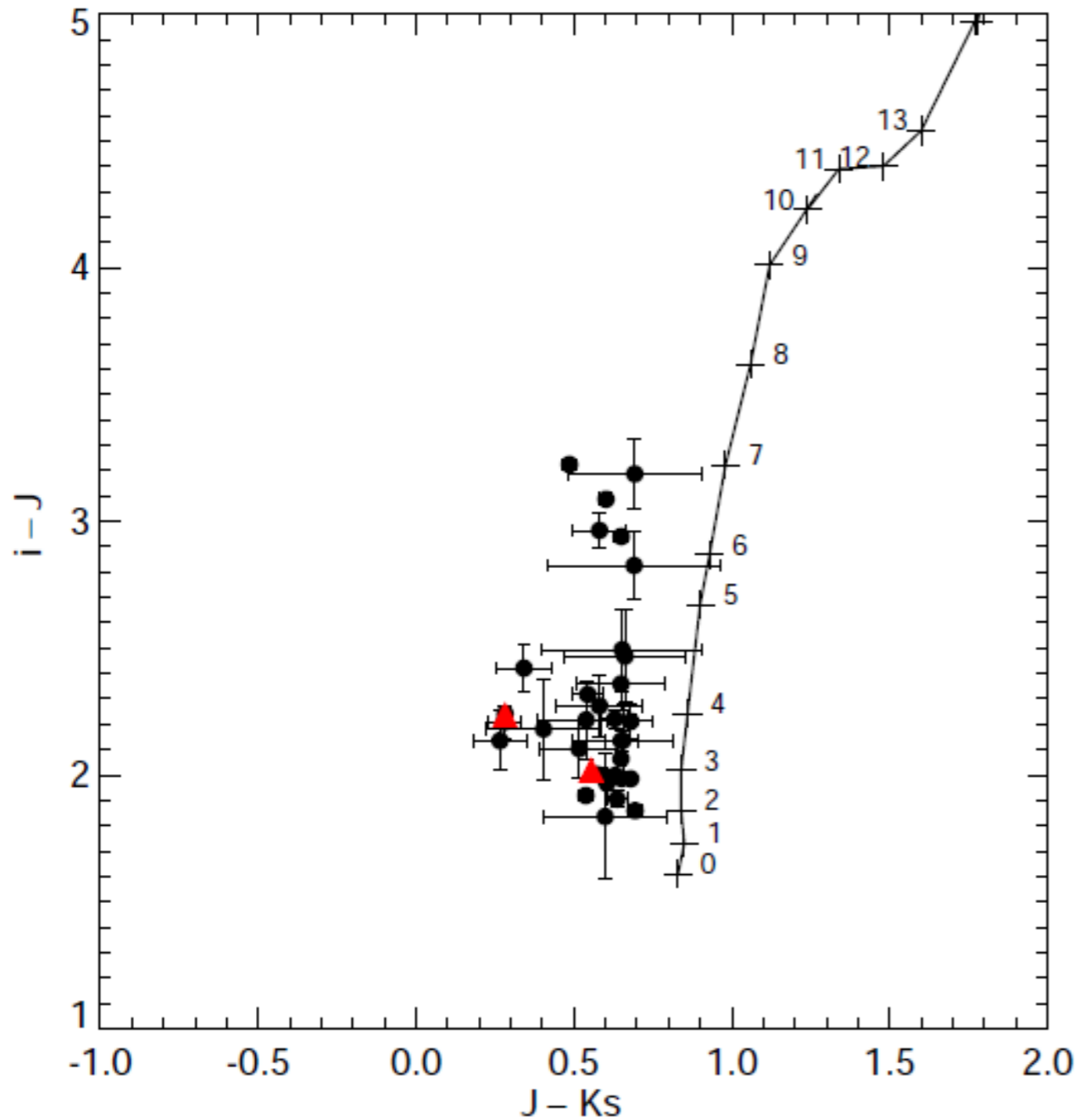
✓ Rare objects: around 50 in 2011

Some examples: 6.-

New ultracool subdwarfs identified in large-scale surveys using Virtual Observatory tools ★ ★★

Part I: UKIDSS LAS DR5 vs SDSS DR7

N. Lodieu^{1,2}, M. Espinoza Contreras¹, M. R. Zapatero Osorio³, E. Solano^{4,5}, M. Aberasturi^{4,5}, and E. L. Martín³

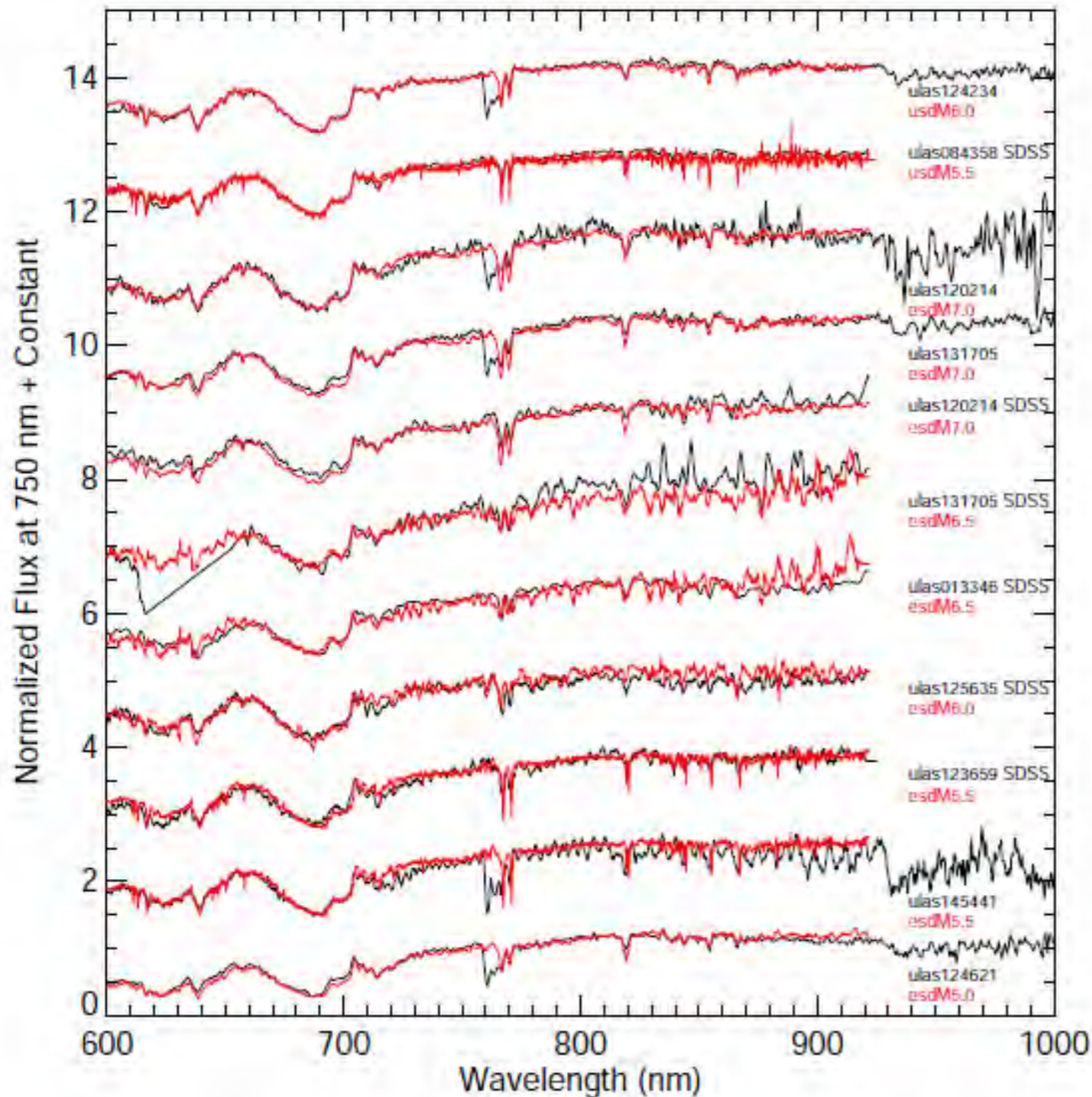


Some examples: 6.-

New ultracool dwarfs identified in large-scale surveys using Virtual Observatory tools * **

Part I: UKIDSS LAS DR5 vs SDSS DR7

N. Lodieu^{1,2}, M. Espinoza Contreras¹, M. R. Zapatero Osorio³, E. Solano^{4,5}, M. Aberasturi^{4,5}, and E. L. Martín³



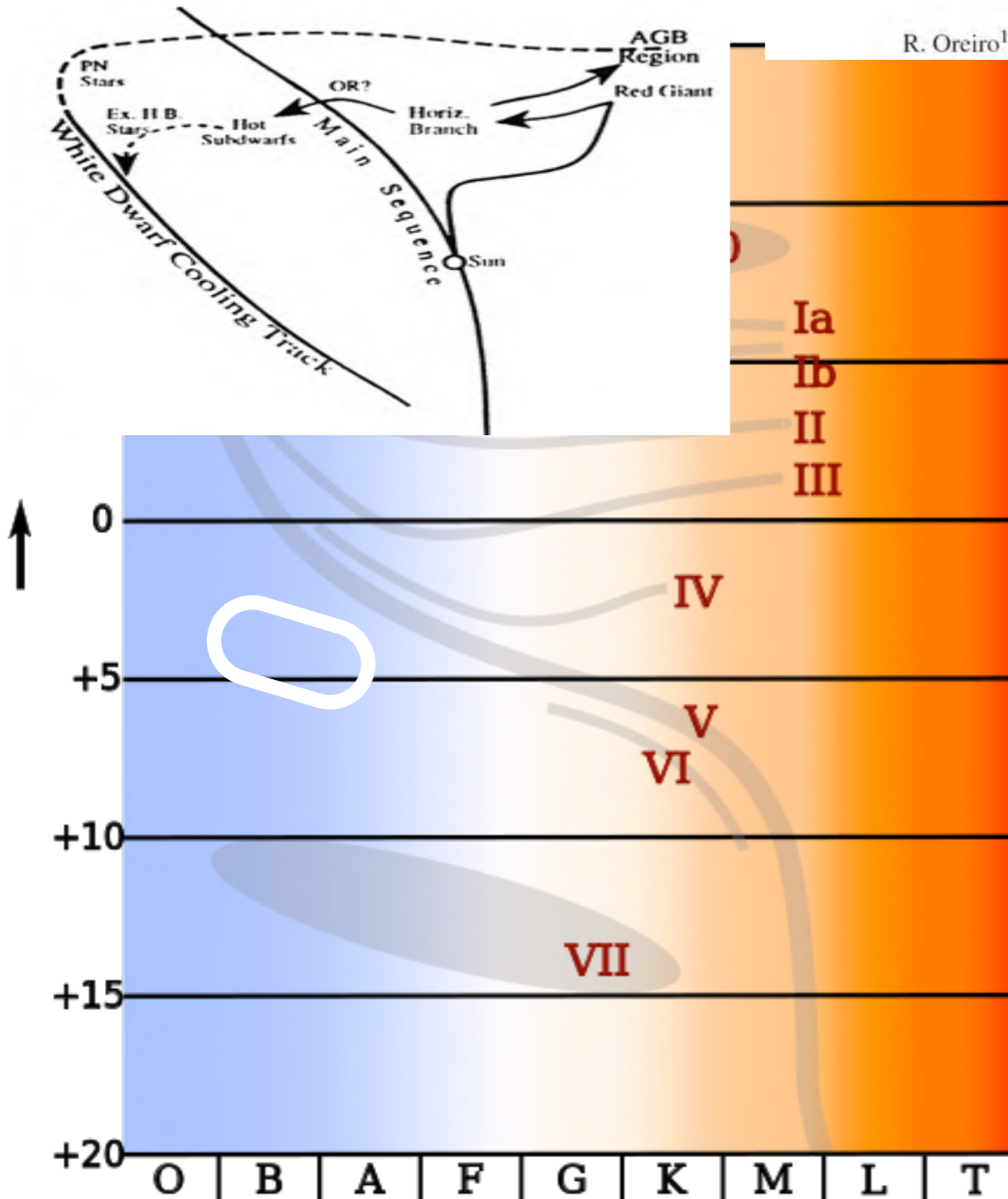
✓ 20 new spectroscopically confirmed UCSDs

✓ > 80% success rate after proper motion refinement

Some examples: 7.-

A search for new hot subdwarf stars by means of Virtual Observatory tools

R. Oreiro¹, C. Rodríguez-López^{2,3}, E. Solano⁴, A. Ulla³, R. Østensen⁵, and M. García-Torres⁶



✓ Uncertain origin

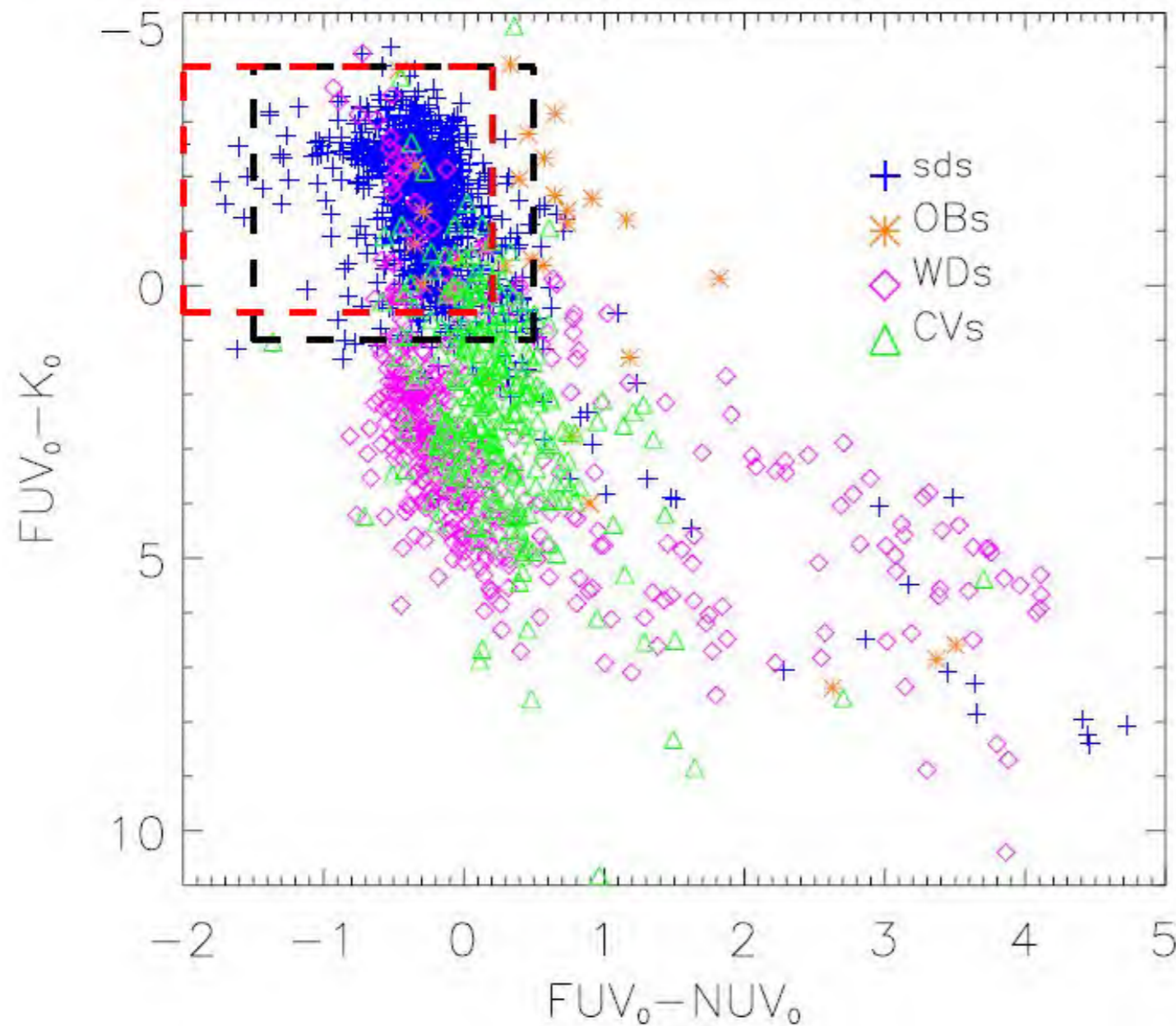
✓ Need of significant number of "bona-fide" hot sds. to perform statistical studies

✓ Problems to identify them: High degree of contamination (WDs, CVs, OBs,...)

Some examples: 7.-

A search for new hot subdwarf stars by means of Virtual Observatory tools

R. Oreiro¹, C. Rodríguez-López^{2,3}, E. Solano⁴, A. Ulla³, R. Østensen⁵, and M. García-Torres⁶



Looking for blue targets?

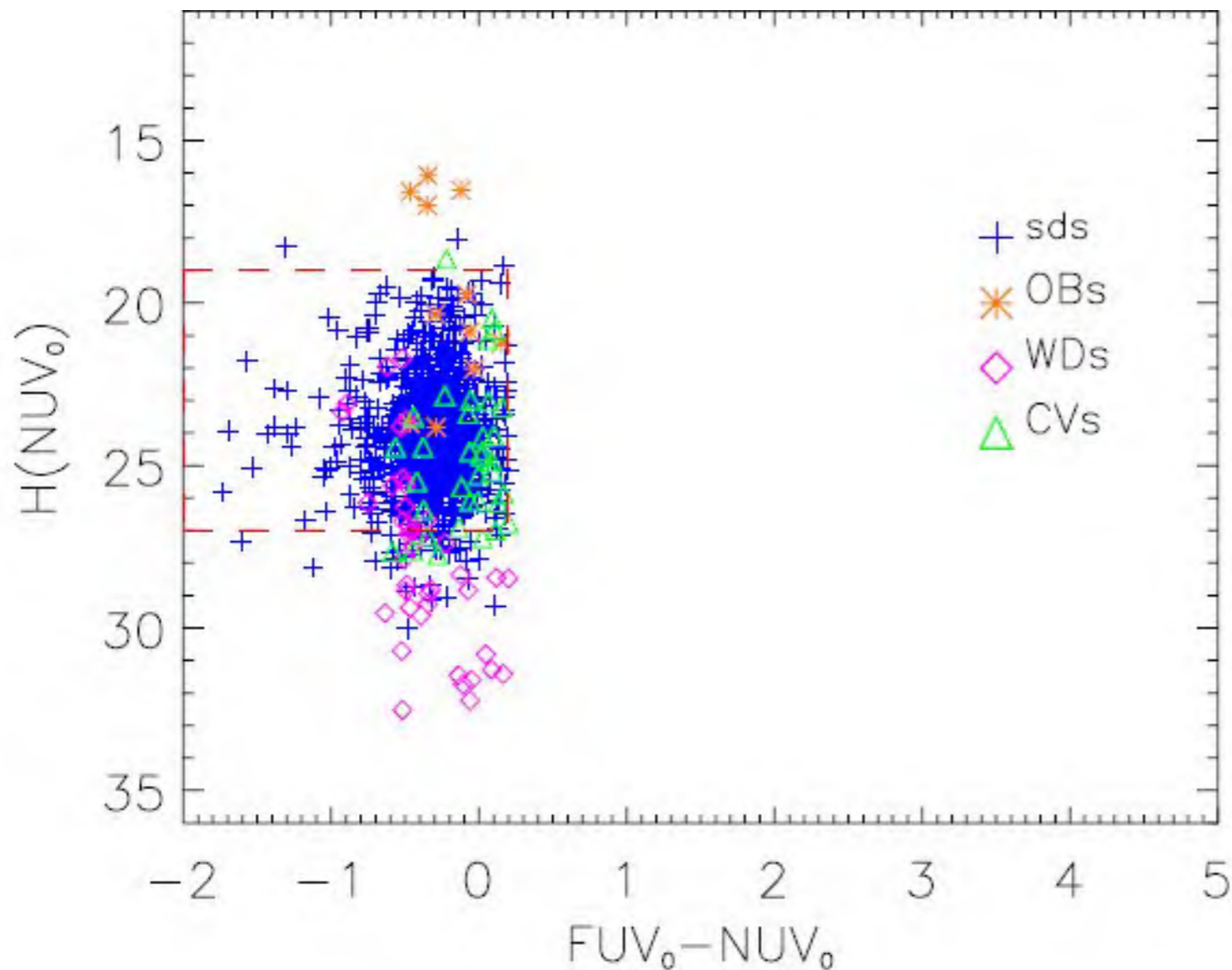
X-match: GALEX-2MASS

Some examples: 7.-

A search for new hot subdwarf stars by means of Virtual Observatory tools

R. Oreiro¹, C. Rodríguez-López^{2,3}, E. Solano⁴, A. Ulla³, R. Østensen⁵, and M. García-Torres⁶

Add SuperCosmos for ppm...

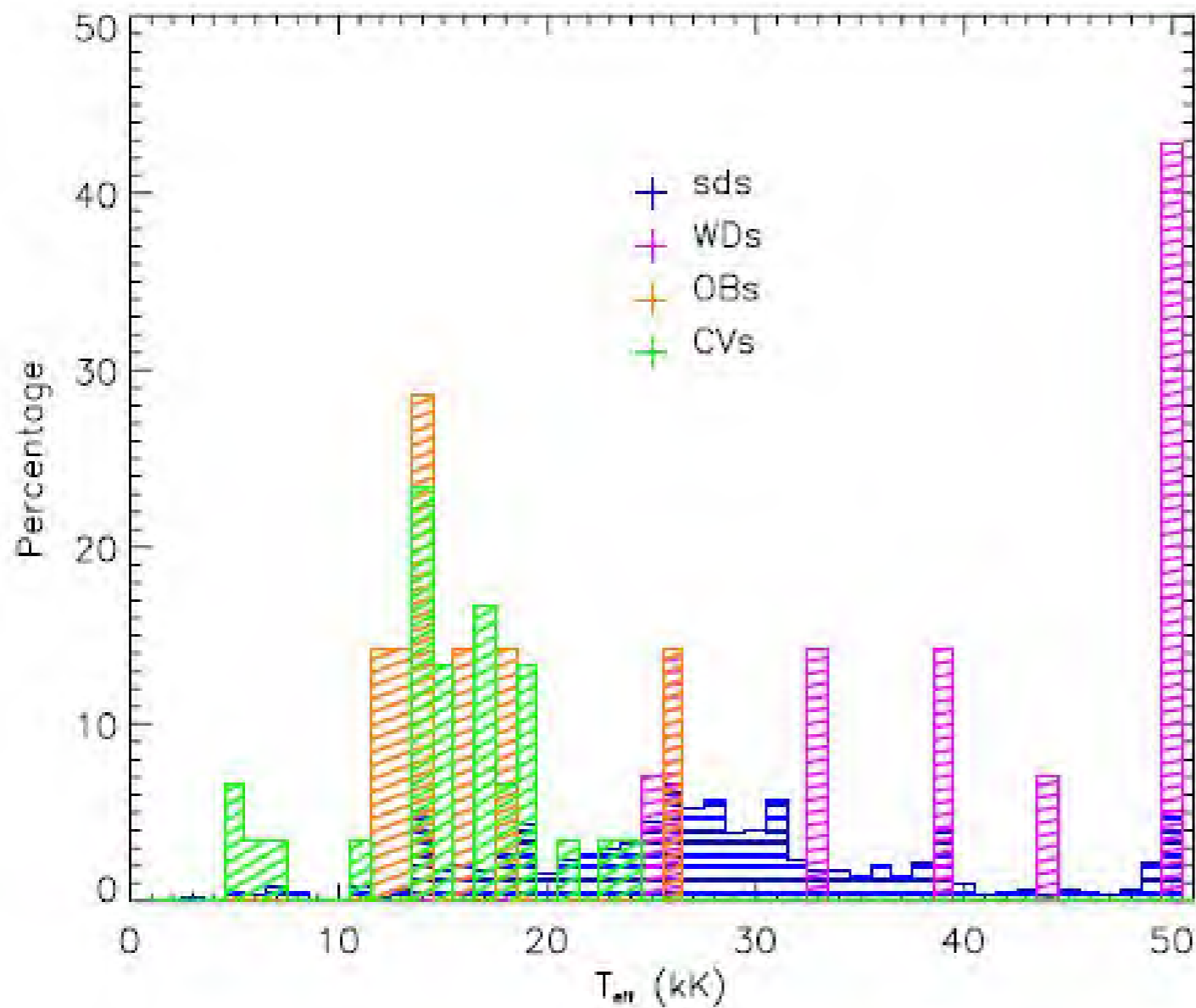


Remember the reduced ppm diagram?

Some examples: 7.-

A search for new hot subdwarf stars by means of Virtual Observatory tools

R. Oreiro¹, C. Rodríguez-López^{2,3}, E. Solano⁴, A. Ulla³, R. Østensen⁵, and M. García-Torres⁶

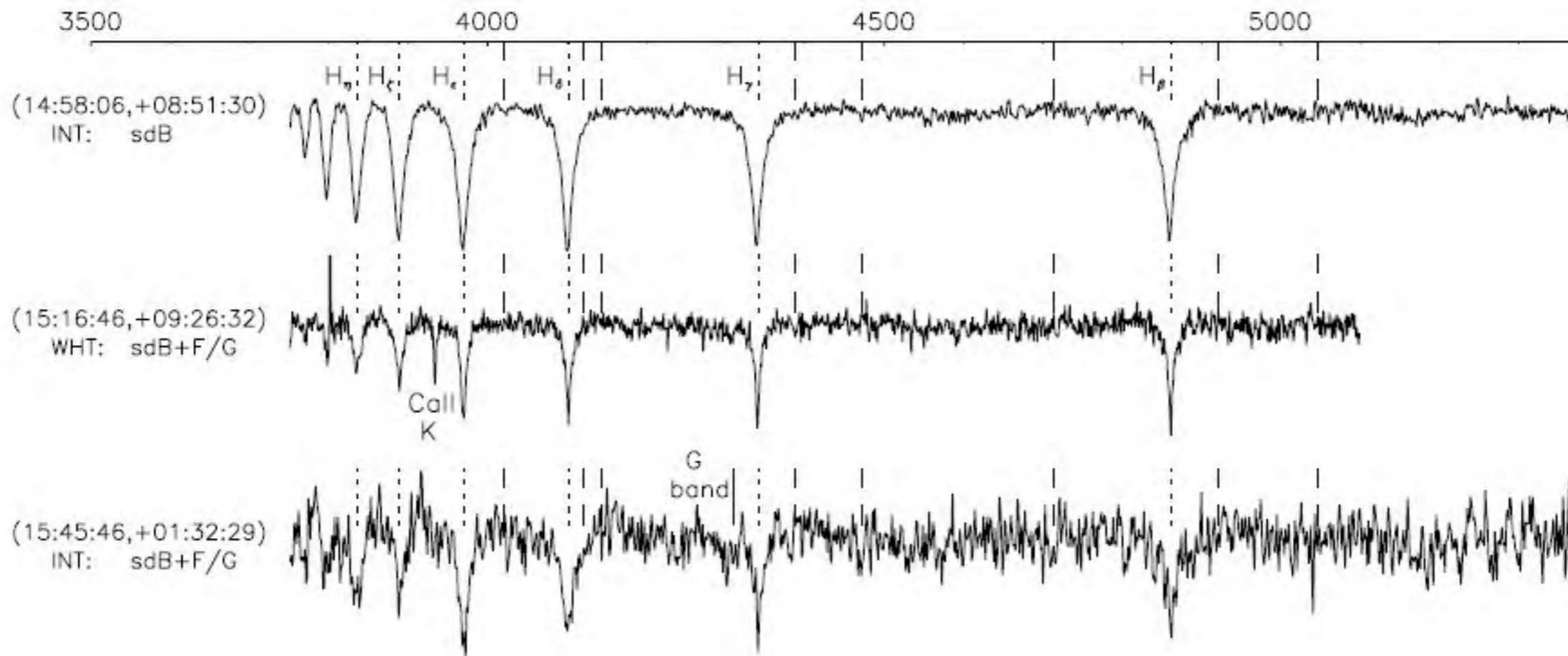


Filter temperature:
multi-wavelength
photometry → SED fit

Some examples: 7.-

A search for new hot subdwarf stars by means of Virtual Observatory tools

R. Oreiro¹, C. Rodríguez-López^{2,3}, E. Solano⁴, A. Ulla³, R. Østensen⁵, and M. García-Torres⁶



87% success rate!!

Thank you!...



... let's play in
the VO!

from Chirs talk fo the hands-on

- overplot 2MASS over an image, for example

Hands on: lets explore Trumpler 20

- Trumpler 20 is an old open cluster (OC) located toward the Galactic centre, at about 3 kpc from the Sun and ~ 7 kpc from the Galactic centre