

Introduction to the Virtual Observatory and the School

Ada Nebot

Observatoire Astronomique de Strasbourg,
Strasbourg, France

Astronomical data



HD	V [mag]	$B - V$ [mag]	$b - y$ [mag]	A_V [mag]	$v \sin i$ [km s ⁻¹]	T_{eff} [K]	$\log g(\text{phot})$ [dex]	M_V [mag]	$\log L_*/L_\odot$
319	5.93	0.141	0.079	0.004	60	8020(135)	3.74(8)	+1.27(19)	1.45(8)
6870	7.49	0.246	0.164	0.000	165	7330(102)	3.84(11)	+2.29(42)	1.02(17)
7908	7.29	0.272	0.192	0.000		7145(87)	4.10(12)	+2.60(18)	0.90(7)
11413	5.94	0.147	0.105	0.004	125	7925(124)	3.91(21)	+1.49(10)	1.35(4)
13755	7.84	0.318	0.181	0.000		7080(161)	3.26(10)	+0.93(10)	1.57(4)
15165	6.71	0.333	0.191	0.010	90	7010(167)	3.23(10)	+1.12(16)	1.50(6)
23392	8.26	0.020	0.014	0.094		9805(281)	4.35(9)	+1.43(30)	1.45(12)
24472	7.09	0.304	0.214	0.003		6945(131)	3.81(16)	+2.14(11)	1.09(5)
30422	6.19	0.190	0.101	0.014	135	7865(108)	4.00(20)	+2.35(1)	1.01(1)
31295	4.65	0.085	0.044	0.063	115	8920(177)	4.20(1)	+1.66(22)	1.32(9)
35242	6.35	0.122	0.068	0.042	90	8250(103)	3.90(14)	+1.75(22)	1.26(9)
36726	8.84	0.086	0.043	0.202		9515(223)	4.36(10)	+1.74(30)	1.32(12)
42503	7.46	0.176	0.130	0.084		7680(282)	3.10(10)	-0.03(4)	1.96(2)

of the star, such that it can fuel, through HeII-HeIII ionization, the observed pulsations in this type of stars. Using state-of-the-art
Wavelength [Å]

Astronomical data are diverse

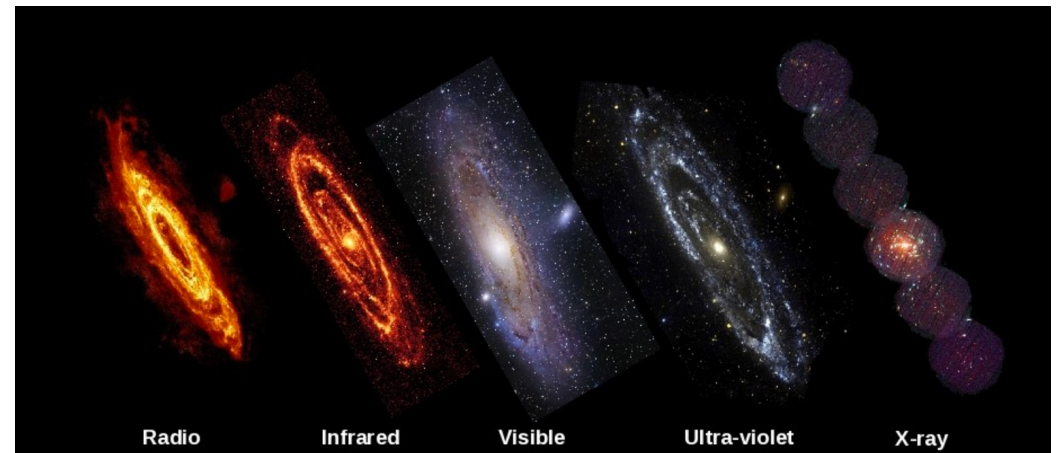
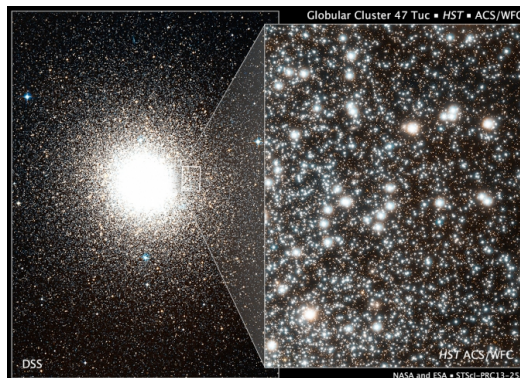
Astronomy today

More data at our disposal than at any other time in history:

- Survey telescopes
- Multi-wavelength studies

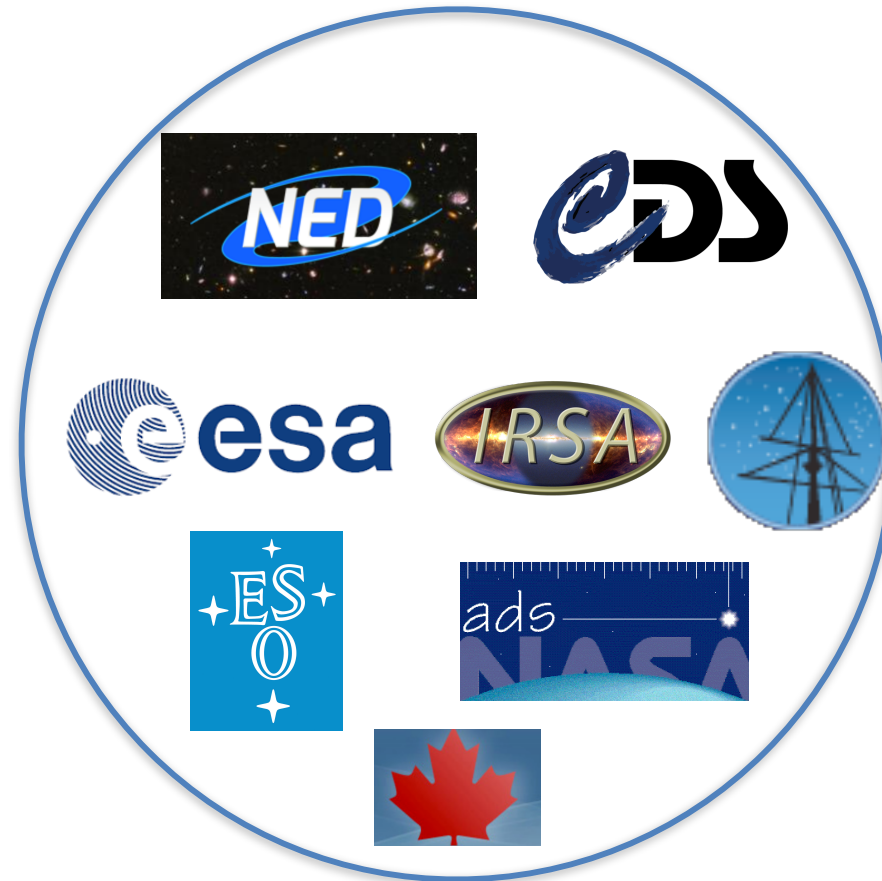


- Better detectors



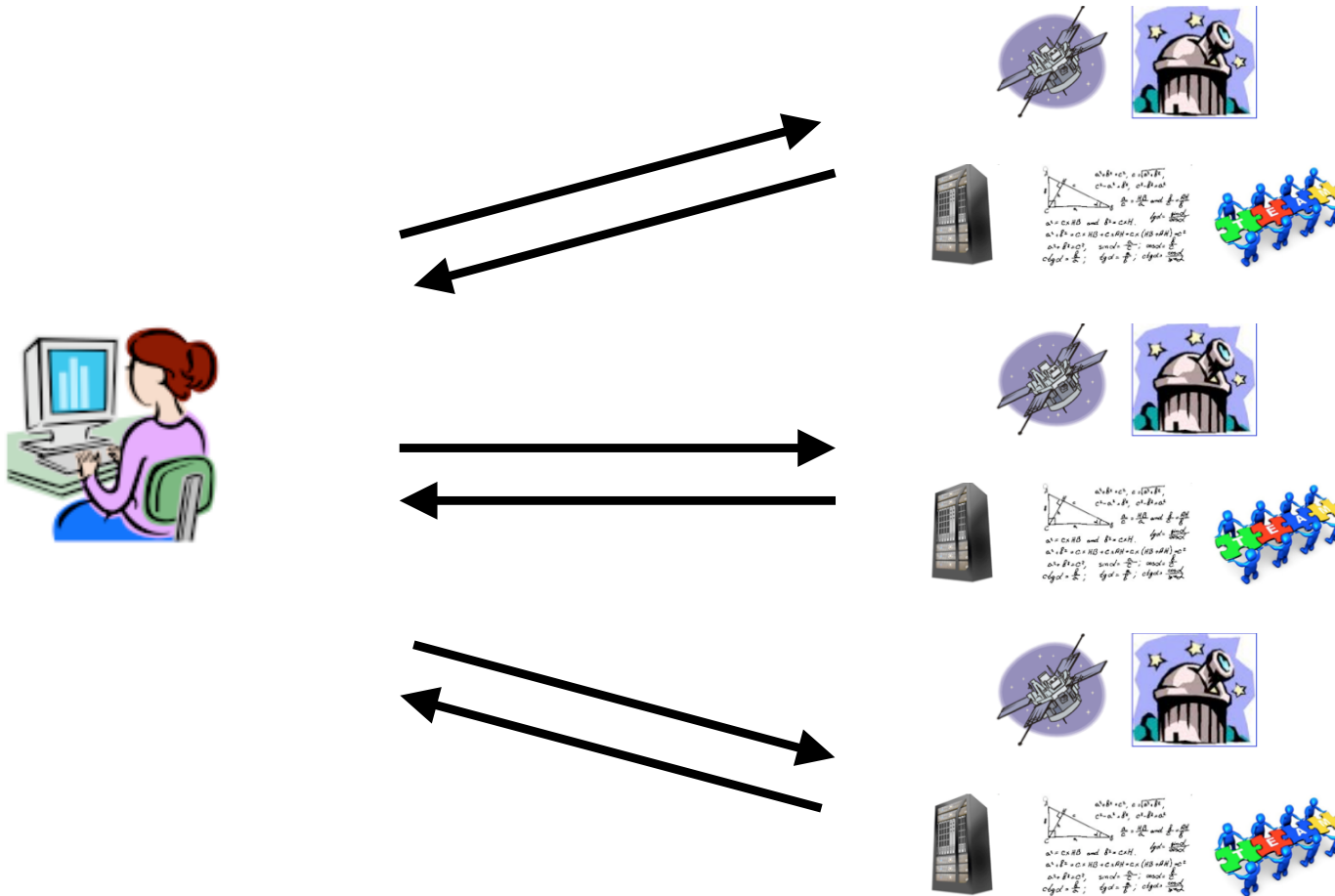
➔ Production of huge amounts of data.

Astronomical archives and data centers



Astronomical archives are heterogeneous

Accessing data



Different methods to access data on different astronomical archives

The Virtual Observatory

Astronomical data and archives are heterogeneous

homogenisation

definition of standards

“The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole.”

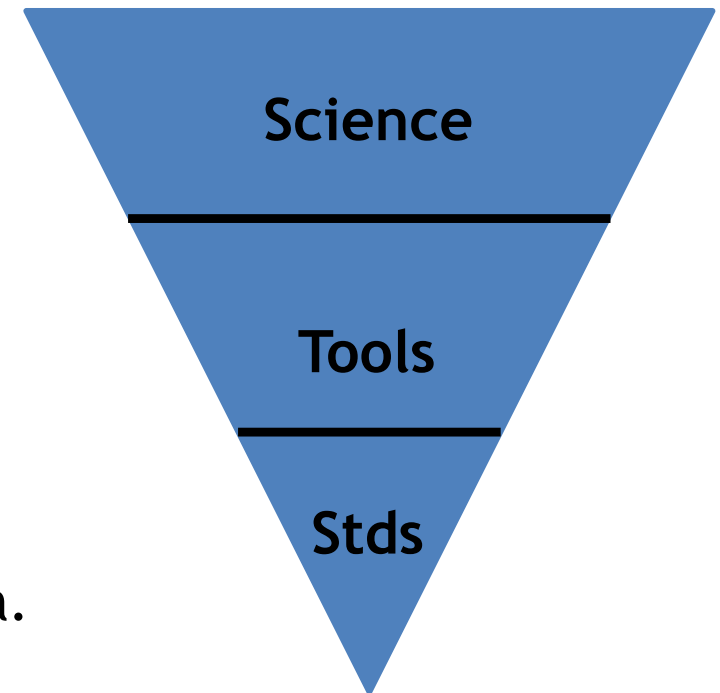
International Virtual Observatory Alliance

Goal: Easy and efficient access and analysis of the information hosted in astronomical archives.



The Virtual Observatory

- Allows astronomers to interrogate multiple data centres in a seamless and transparent way.
- Provides new powerful analysis and visualisation tools within that system.
- Gives data centers a standard framework for publishing and delivering services using their data.



VO enabling science

- part of Astronomer's everyday tool kit
- being used in innovative ways
- 'VO' not well cited, but tools and services are!

Science with the VO

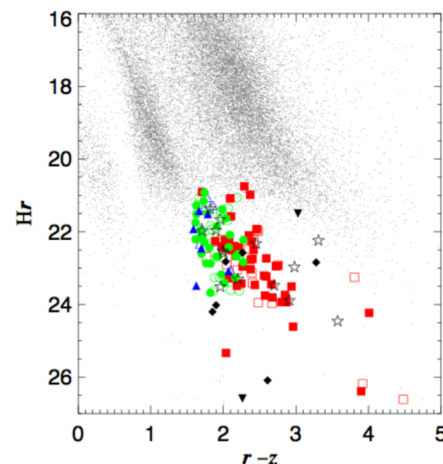
New ultracool subdwarfs identified in large-scale surveys using Virtual Observatory tools

II. SDSS DR7 vs UKIDSS LAS DR6, SDSS DR7 vs UKIDSS LAS DR8, SDSS DR9 vs UKIDSS LAS DR10, and SDSS DR7 vs 2MASS

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

ABSTRACT

Aims. We aim at developing an efficient method to search for late-type subdwarfs (metal-depleted dwarfs with spectral types $\geq M5$) to improve the current statistics. Our objectives are: improve our knowledge of metal-poor low-mass dwarfs, bridge the gap between the late-M and L types, determine their surface density, and understand the impact of metallicity on the stellar and substellar mass function.



- Cross-match
- Stilts
- Aladin
- Topcat

Science with the VO

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

E. Pérez-Fernández^{1,2★}, A. Ulla², E. Solano^{3,4}, R. Oreiro⁵ and C. Rodrigo^{3,4}

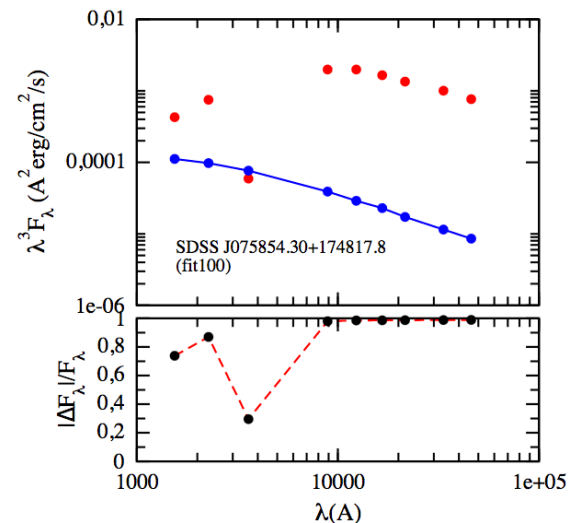
¹ IES de Beade, Consellería de Educación e O.U., Camiño de Outeiro 10, 36312 Vigo, Spain

² Departamento de Física Aplicada, Universidade de Vigo, Campus Lagoas-Marcosende, 36310 Vigo, Spain

³ Departamento de Astrofísica, Centro de Astrobiología (INTA-CSIC), PO Box 78, E-28691 Villanueva de la Cañada (Madrid)

⁴ Spanish Virtual Observatory

⁵ Instituto de Astrofísica de Andalucía (IAA-CSIC), Glorieta de la Astronomía, s/n, 18008 Granada.



• VOSA

Science with the VO



Mon. Not. R. Astron. Soc. **406**, 1595–1608 (2010)

doi:10.1111/j.1365-2966.2010.16812.x

Scalelength of disc galaxies

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

¹Stockholm Observatory, Department of Astronomy, Stockholm University, AlbaNova Center, 106 91 Stockholm, Sweden

²Oskar Klein Centre for Cosmoparticle Physics, Stockholm University, 106 91 Stockholm, Sweden

³Observatoire de Strasbourg, UMR 7550, Strasbourg 67000, France

⁴European Southern Observatory, Karl-Schwarzschild-Str. 2, 85748 Garching bei München, Germany

⁵Kapteyn Astronomical Institute, Postbus 800, 9700 AV Groningen, the Netherlands

ABSTRACT

We have derived disk scale lengths for 30374 non-interacting disk galaxies in all five SDSS bands. Virtual Observatory methods and tools were used to define, retrieve, and analyse the images for this unprecedentedly large sample classified as disk/spiral galaxies in the LEDA catalogue. Cross correlation of the SDSS sample with the LEDA

- Aladin
- Topcat

To keep in mind

- VO: Federation of data centres sharing data through a common set of standards.
- VO tools:
 - Not a “does-it-all” software
 - Different tools for different problems
 - VO science: A reality since 5-10 years ago.
- What is VO for?
 - For programmers, for data centres, for astronomers, for big data projects.
 - For educators, amateurs, general public.

Learning how

- Workshops and schools
- On-line training materials - EuroVO
- From your colleagues



The School

- Goal
 - Teach participants on how to efficiently use the VO tools for their own research.
 - Gather your feedback and requirements on VO tools and services.
- Methodology:
 - Tutorials based on real science cases.
 - Feedback form.

The School: participation

- 31 participants + 20 tutors
- Countries:
 - The VO partners
 - The ESFRI partners
 - External countries
- Scientific profile: Graduate / PhD, Postdoc , Senior



The School: groups

- Division into two groups:
 - Group 1: last name A – G Room 1
 - Group 2: last name H – Z Room 2


The School: tutors groups

- Group 1:
 - D. Baines
 - E. Chassande-Motin
 - G. Mantelet
 - F. Jimenez
 - V. Kulikovskiy
 - M. Molinaro
 - A. Nebot
 - S. Derriere
- Group 2:
 - C. Bot
 - G. Greco
 - H Heint
 - E. Solano
 - J. Lefaucneur
 - M. Ramella
 - F-X Pineau
 - M. Taylor


The School: the schedule

Day 1. Tuesday 15 November


- 10:15 - 10:45 Coffee break

- 10:45 - 12:30 Tutorial #1 (1h45m).
 - Title:  [The CDS tutorial](#)
 - VO-tools: Simbad, Vizier, Aladin
 - Tutor: S. Derriere + J. Sorce (group 1) / C. Bot + F.-X. Pineau (group 2)




- 12:30 - 14:00 LUNCH

- 14:00 - 15:45 Tutorial #2 (1h45m)
 - Title:  [Discovery of Brown Dwarfs mining the 2MASS and SDSS databases](#)
 - VO-tools: Aladin, Topcat
 - Tutor: F. Jiménez + M. Molinaro (group 1) / E. Solano + M. Ramella (group 2)




- 15:45 - 16:15 Coffee break

- 16:15 - 18:00 Tutorial #3 (1h45m)
 - Title:  [Determination of stellar physical parameters using VOSA](#)
 - VO-tools: VOSA
 - Tutor: F. Jiménez-Esteban + M. Molinaro (group 1) / E. Solano + M. Ramella (group 2)

Day 2. Wednesday 16 November

- 09:00 - 10:45 Tutorial #4 (group 1) / Tutorial #5 (group 2) (1h45m)
 - Tutorial #4
 - Title:  [Multi-instrument, multi-wavelength study of high energy sources with the virtual Observatory.](#)
 - VO-tools: Aladin, Topcat, Simbad
 - Tutor: A. Nebot + V. Kulikovskiy + D. Baines (group 1) /
 - Tutorial #5
 - Title:  [Exploring Gaia data with TOPCAT and STILTS](#)
 - See also:  [supporting materials](#)
 - VO-tools: TOPCAT, STILTS
 - Tutor: M. Taylor + F-X Pineau (group 2)
- 10:45 - 11:15 Coffee break
- 11:15 - 13:00 Tutorial #5 (group 1) / Tutorial #4 (group 2)
 - Tutorial #5
 - Tutor: M. Taylor + F-X Pineau (group 1)
 - Tutorial #4
 - Tutor: J. Lefaucheur + C. Bot + J Sorce (group 2)
- 13:00 - 14:30 LUNCH



- 14:30 - 15:45 Tutorial #6 (group 1) / Tutorial #6 (group 2) (2h)
 - Title: Accessing and cross matching of big data sets with ADQL  <http://docs.g-vo.org/adql/html/>
 - VO-tools: Topcat, ADQL, TAP
 - Tutor: M. Demleitner + G. Mantelet (group 1) / H. Heini + M. Taylor (group 2)
- 15:45 - 16:15 Coffee break
- 16:15 - 17:00 Tutorial #6 (group 1) / Tutorial #6 (group 2) (cont.)
- 17:00 - 17:30 Tutorial #7 (group 1 and 2)
 - Title:  [Handling gravitational-wave sky maps for EM-followUP observations](#)
 - VO-tools: Aladin beta version + Topcat
 - Tutor: E. Chassande-Motin + D. Baines (group 1) / G. Greco + C. Bot (group 2)
- 17:30 - 18:15 Treasure hunt
- 18:15 - 18:30 Organization of participants projects
- 20:00 - Social school dinner at Restaurant Au Pont Saint Martin (see  [map](#)), rue des Moulins.



Day 3. Thursday 17 November

- 09:00 - 10:45 Participants projects
- 10:45 - 11:15 Coffee break
- 11:15 - 13:00 Participants projects
- 13:00 - 14:30 LUNCH
- 14:30 - 15:45 Projects presentations
- 15:45 - 16:15 Feedback

Internet access

osiris
login : conf-asterics
passwd : Pan0Ram1X