Astronomy ESFRI & Research Infrastructure Cluster

ASTERICS - H2020 - 653477

Fourth ASTERICS DADI European School

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Abstract

The Fourth ASTERICS DADI European School was held in Strasbourg, 20-22 November 2018. The School gathered 43 people. The main objectives of the School were, on the one hand, to expose early-career European astronomers to the variety of VO tools and services available today so that they can efficiently use them for their own research, and, on the other hand, to gather feedback and requirements from the participants, taking advantage of this intense and diverse usage. During the School, VO experts introduced the tools making use of real life science cases and tutored hands-on exercises, which took a large fraction of the time. Participants also had the opportunity to develop their own science cases. The School included short introductory presentations about the ASTERICS project and the Virtual Observatory.
The meeting was a success, with a great atmosphere favouring a lot of exchanges and discussions.
This was the last School of a series of four conducted on a yearly basis by WP4 *Data Access, Discovery and Interoperability* (DADI) during the ASTERICS project.

I. COPYRIGHT NOTICE

II. DELIVERY SLIP

	Name	Partner / WP	Date
From	A. Nebot	UNISTRA/CNRS/WP4	11 December 2018
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Reviewed by	F. Genova	CNRS/WP4	1 February 2019
Approved by	R. van der Meer		15 February 2019

III. DOCUMENT LOG

Issue	Date	Comment	Author/Partner
1	11 December 2018	V01 sent for comments to WP4 leader (F. Genova)	A. Nebot / UNISTRA/CNRS
2	17 December 2018	Comments on V01	F. Genova / CNRS
3	17 December 2018	Revised V02 sent to WP4 leader	A. Nebot / UNISTRA/CNRS
4	21 December 2018	Revised version sent to WP4 leader	A. Nebot / UNISTRA/CNRS
5	1 February 2019	Final version sent to the Project Manager	F. Genova / CNRS
6	15 February 2019	Final version including suggestions for minor changes by Project Manager	F. Genova / CNRS

IV. APPLICATON AREA

This document is a formal deliverable for the GA of the project, applicable to all members of the ASTERICS project, beneficiaries and third parties, as well as its collaborating projects.

V. TERMINOLOGY

2MASS	2-Micron All Sky Survey
ADQL	IVOA Astronomical Data Query Language
AIDA	Astronomical Infrastructure for Data Access
Aladin	Sky atlas and discovery tool
ASTERICS	Astronomy ESFRI & Research Infrastructure Cluster
CDS	Centre de Données astronomiques de Strasbourg (Strasbourg astronomical Data Centre)
CLEOPATRA	Connecting Locations of ESFRI Observatories and Partners in Astronomy for Timing and Real-time Alerts
CNRS	Centre National de la Recherche Scientifique
CoSADIE	Collaborative and Sustainable Astronomical Data Infrastructure for Europe
CTA	Cherenkov Telescope Array
DADI	Data Access, Discovery and Interoperability (ASTERICS WP4)
EGO	European Gravitational Observatory
E-ELT	European Extremely Large Telescope
ESFRI	European Strategy Forum on Research Infrastructures
EST	European Solar Telescope
ET	Einstein Telescope
Euro-VO	European Virtual Observatory
FP7	7th Framework Programme for Research and Technological Development of the European Union
GA	Grant agreement

H2020	Horizon 2020, (8th) Framework Programme for Research and Innovation of the European Union
HESS	High Energy Stereoscopic System
HiPS	Hierarchical Progressive Survey
ICE	International Coordination Empowerment
INTA-CSIC	Centro de Astrobiología
IVOA	International Virtual Observatory Alliance
KM3NeT	Cubic Kilometre Neutrino Telescope
LOC	Local Organising Committee
ObAS	Observatoire Astronomique de Strasbourg (Strasbourg Astronomical Observatory)
PDF	Portable Document Format
SDSS	Sloan Digital Sky Survey
SIMBAD	Set of Identifications, Measurements and Bibliography for Astronomical Data
SKA	Square Kilometre Array
SME	Small and Medium Enterprise
STILTS	Starlink Tables Infrastructure Library Toolset
TOPCAT	Tool for Operations on Catalogues and Tables
UEDIN	University of Edinburgh
UHEI	Ruprecht-Karls-Universität Heidelberg
UNISTRA	Université de Strasbourg
VIRGO	Interferometer for detection of Gravitational Waves
VizieR	CDS database of astronomical catalogues and large surveys
VO	Virtual observatory, cf. IVOA
VOSA	Virtual Observatory SED Analyzer
WP4	Work package 4 of ASTERICS, i. e., DADI

A complete project glossary is provided at the following page:
http://www.asterics2020.eu/glossary/

VI. PROJECT SUMMARY

ASTERICS (Astronomy ESFRI & Research Infrastructure Cluster) aims to address the cross-cutting synergies and common challenges shared by the various Astronomy ESFRI facilities (SKA, CTA, KM3NeT & ELT). It brings together for the first time, the astronomy, astrophysics and particle astrophysics communities, in addition to other related research infrastructures.

The major objectives of ASTERICS are to support and accelerate the implementation of the ESFRI telescopes, to enhance their performance beyond the current state-of-the-art, and to see them interoperate as an integrated, multi-wavelength and multi-messenger facility. An important focal point is the management, processing and scientific exploitation of the huge datasets the ESFRI facilities will generate. ASTERICS will seek solutions to these problems outside of the traditional channels by directly engaging and collaborating with industry and specialised SMEs. The various ESFRI pathfinders and precursors will present the perfect proving ground for new methodologies and prototype systems.

In addition, ASTERICS will enable astronomers from across the member states to have broad access to the reduced data products of the ESFRI telescopes via a seamless interface to the Virtual Observatory framework. This will massively increase the scientific impact of the telescopes, and greatly encourage use (and re-use) of the data in new and novel ways, typically not foreseen in the original proposals. By demonstrating cross-facility synchronicity, and by harmonising various policy aspects, ASTERICS will realise a distributed and interoperable approach that ushers in a new multi-messenger era for astronomy.

Through an active dissemination programme, including direct engagement with all relevant stakeholders, and via the development of citizen scientist mass participation experiments, ASTERICS has the ambition to be a flagship for the scientific, industrial and societal impact ESFRI projects can deliver.

VII. EXECUTIVE SUMMARY

The Fourth ASTERICS DADI School (deliverable D4.12) held in the framework of Task 4.2 (“Support to the astronomical community”) was organized by CNRS on 20-22 November 2018 at the Observatoire Astronomique de Strasbourg in Strasbourg, France.

The School focused on PhD students and post-docs from European countries, including non-partner countries. The first day, after a brief welcome talk and a historical presentation of the Observatory of Strasbourg, the ASTERICS project and the Virtual Observatory were introduced. During the first and second days, hands-on sessions were carried out through six tutorials and a “Treasure hunt” activity, in order to make students familiar with the VO capabilities. The third day was dedicated to develop the scientific cases proposed by the

participants under the guidance of VO experts. Some of the students presented their cases during a plenary session, showing how VO tools and services helped in their research. Feedback and requirements to improve the VO tools and services were collected via an anonymous survey and presented in a final session.

The two goals of the School, expose early-career European astronomers to VO tools and services so that they can efficiently use them for their own research, and gather feedback and requirements from the participants, were successfully achieved.

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1. Introduction

The main goal of ASTERICS WP4 *Data Access, Discovery and Interoperability* (DADI) is to ensure that the ESFRI products are openly accessible via the Virtual Observatory framework to the whole European and also international communities. This supports new and novel approaches to data exploitation, and provides a natural repository where reduced, open data products (e.g. survey legacy data) can be reliably maintained and curated. As in many other key areas, training and educating the next generation of facility staff and users are essential in securing the success of this aspect of the ASTERICS programme.

The European Virtual Observatory (VO) initiative began to organize regular VO Schools during the VO-AIDA FP7 project (2008-2010). The goals of these schools were twofold: on the one hand, to expose early-career European astronomers to the variety of currently available VO tools and services so that they can use them efficiently for their own research and, on the other hand, to gather feedback and requirements from this intense and diverse usage. During

the School, VO experts guide the participants on the usage of the tools through a series of predefined real life science cases. Participants also have the opportunity to develop their own science cases.

The usefulness of these schools was immediately obvious, and they were continued by the two small Coordination Actions on which the European VO activities relied from 2010 to 2015: Euro-VO International Coordination Empowerment (EuroVO-ICE, 2010-2012) and Collaborative and Sustainable Astronomical Data Infrastructure for Europe (CoSADIE, 2012-2015). They have been scheduled on a yearly basis in ASTERICS DADI Work Package.

The Fourth (and last) ASTERICS DADI School, ASTERICS Deliverable D4.12, was organized by CNRS in the Observatoire Astronomique de Strasbourg, in Strasbourg, on 20-22 November 2018, using the three previous Schools as template. The School was opened to participants from all European countries, including non-partner countries and it mainly focused on young people at PhD or post-doctoral level. The preparation of the School is described in Section 2 of this document. The profile of the participants and the meeting programme are reported in Sections 3 and 4 while the analysis and conclusions are addressed in Sections 5 and 6. The participants' feedback and comments are given in Annex I, whereas pictures taken during the School are shown in Annex II.

2. Preparation of the School

The first announcement of the School was released on 29 June 2018 with the deadline for registration originally set to 28 September 2018 and later extended to the 8th October 2018. The School was widely advertised in the European astronomical community beyond ASTERICS through different channels: Spanish Astronomical Society, French Astronomical Society, German Astronomical Society, etc. and through participants in previous Schools.

A website (https://asterics2020.eu/dokuwiki/doku.php?id=open:wp4:school4) was set up to provide participants with all necessary information before and during the School: registration form, list of registered participants, programme, feedback form, information on venue and accommodation, as well as other links of interest. A twitter hashtag was created for the School: #VOSchool4 (https://twitter.com/hashtag/VOSchool4?src=hash).

The venue of the School was Observatoire Astronomique de Strasbourg[1] (ObAS). Plenary sessions were held in the ObAS amphitheatre, which is not well suited for working sessions. Since the suitable rooms at the ObAS can allocate about 25 people, we divided the

[1] https://astro.unistra.fr/

participants, students and tutors, into two groups and two rooms, for parallel hands-on sessions.

Since the ObAS is not far from Strasbourg city centre, participants were hosted at different hotels in the city, within a walking distance from the ObAS and with good tram connections.

For the registration of the participants we used Indico, which allowed us to easily manage registration, production of badges, students' projects and feedback form. The registration web site is at https://indico.astron.nl/conferenceDisplay.py?confId=175 (see Figure 1).

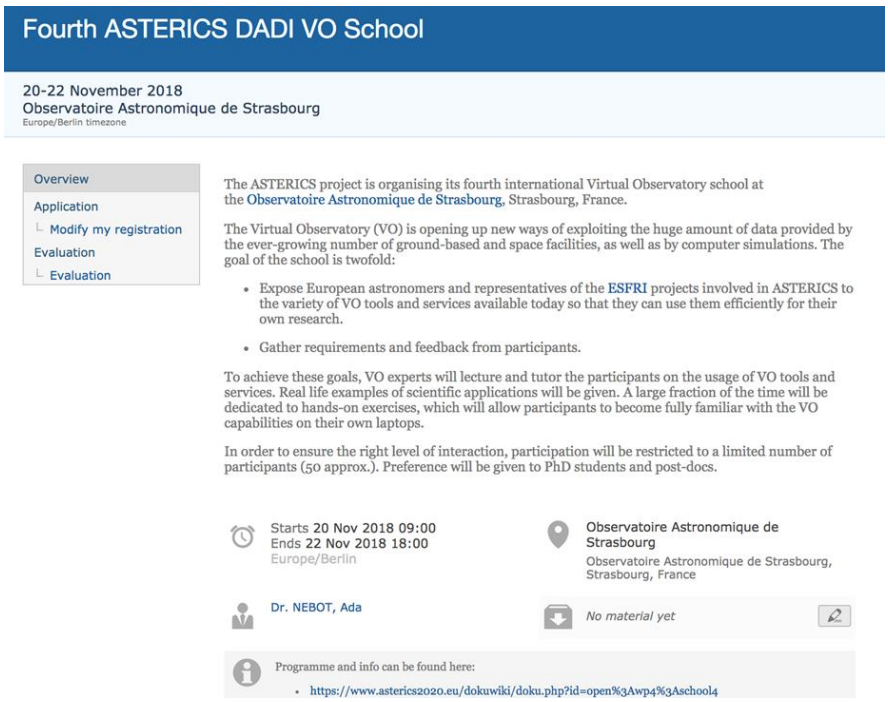


Figure 1. School registration website.

3. Participants

The School hosted 31 participants and 12 tutors. WP4 representatives from CNRS/CDS, EGO/VIRGO/ET, INTA, UEDIN (represented by Mark Taylor, University of Bristol) and UHEI were present at the School.

The School was aimed at targeting early-career scientists. As in previous Schools, a significant number of data stewards/librarians and software engineers with an astronomical background applied for participation in this School. This year, being the last VO School of the ASTERICS project, we decided to make an exception and considered those applicants with either a librarian or a technical profile showing a clear interest on the usage of VO tools and services and with a likely impact on their future career. The profile of the 31 participants: 2 MSc. and

14 PhD students, 9 post-docs, 1 senior, 3 librarians and 2 with a technical profile (4 of them from ObAS so with no travel cost for the project).

To take full advantage of the School, participants were encouraged to propose a scientific case related to their research and, if possible, a case in which their own data/images/spectra could be used.

PhD and MSc students were requested to provide a letter of recommendation from their supervisor to guarantee that the School fits well with their research interests. Flight and accommodation expenses were covered by the ASTERICS project for all the participants.

Although the School targets only people coming from European countries, we received some applications from countries outside Europe, reflecting a good distribution of the School announcement and the international nature of the ESFRI projects. After discussion with one of the applicants, who works in South Africa on SKA, one of the ESFRI projects, and with his tutor, we agreed that since he would be in Europe at the time of the School for a scientific collaboration he could participate to the School. See the chart pie in Figure 2 for the distribution of participants by country.

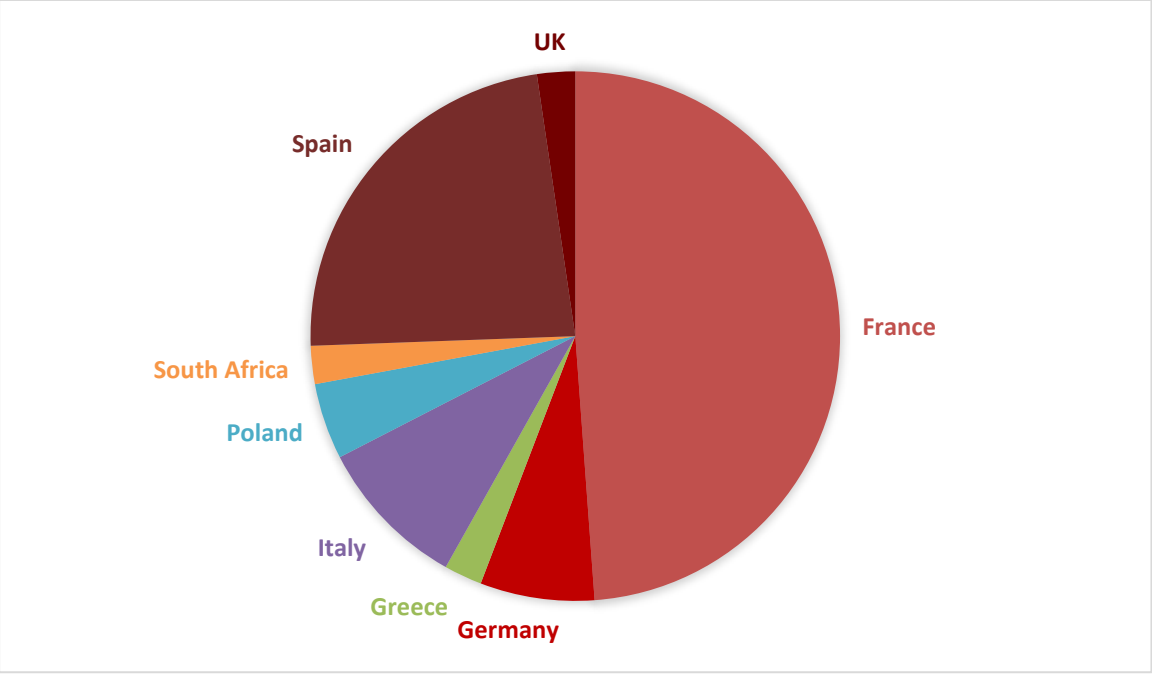


Figure 2: Chart pie showing the distribution of participants by country of origin. (43 participants, including tutors)

4. Programme of the School

The programme of the fourth ASTERICS VO-School was similar to the one of previous Schools. Of the three School days, two were dedicated to tutorials and the third was devoted to the participants' use cases. There were six tutorials selected by the tutors to be presented throughout the School. They are based on previously existing EURO-VO tutorials, and were updated to account for the latest advances in tool development and data releases of publicly available data. Feedback from participants in previous VO Schools helped to design useful, accessible, manageable nevertheless challenging tutorials. Due to spatial limitations, as explained, we ran tutorials in parallel sessions, with participants split into two groups. The two groups were located in two different rooms and for any given tutorial at least two tutors were present in each room ensuring a good tutor to student ratio. Everyday there was at least one session were all participants would be in the same room to ensure all participants would meet and share their experience.

The first day started with a brief welcome talk and a historical presentation of the Observatory of Strasbourg, followed by introductory presentations about the ASTERICS project, the Virtual Observatory and the School (a total of one hour), to ensure that all participants were well informed of the organizational background before the hands-on sessions started. The first two days were dedicated to hands-on sessions through six tutorials, tutorials 1 to 3 on the first day and 4 to 6 on the second day, and a "Treasure Hunt" activity. The third day was devoted to develop the participants' project using the knowledge they gained throughout the previous two days, under the guidance of tutors. Some participants presented their scientific use cases and how VO tools and services helped for their own project. Before the School finished, the results of an anonymous feedback survey regarding the quality of the tutorials and the School were presented to all. A set of activities were also organized during the School: a guided visit to the telescope of the Observatory and a Working Dinner. A group picture was also taken (Annex II).

A short description of each of the tutorials is given below. At the beginning of the School each participant was handed a folder with a printout of the programme, the printed version of the tutorials, ASTERICS fliers and information about Strasbourg.

The Tutorials

Tutorial 1: The CDS tutorial (1h45min)

In this tutorial, the reader is guided through the various VO tools and services provided by the CDS. It is designed to be accessible for those who had no previous contact with the VO and is thus a good entry point. The tutorial is starting at the CDS portal, going through SIMBAD and VizieR and finishing off with Aladin. An optional part explores some of the features that Python can provide today, through a Jupyter notebook.

Tutorial 2: Determination of stellar physical parameters using VOSA (1h45min)

This tutorial is dedicated to the VOSA service, which is an online tool to assemble and analyse spectral energy distributions of stars. Additionally, students are given an introduction to the physical background of the models used by VOSA.

Tutorial 3: Accessing and cross matching of big data sets with ADQL (2h)

An extensive beginner's guide to the Astronomical Data Query Language (ADQL) is provided by this tutorial. While it starts with the simplest possible queries, the tutorials also introduces more complex and astronomy-relevant queries towards the end.

Tutorial 4: Exploring Gaia with TOPCAT and STILTS (1h45min)

TOPCAT (graphical user interface) and STILTS (command line) are two versatile table manipulation tools designed for astronomers. This tutorial mostly introduces many useful functionalities of TOPCAT while stellar clusters in the Gaia catalogue are analysed. It finishes with an outlook on the scripting capabilities of STILTS. This tutorial evolved very much in content and form from previous versions shown during the first and second ASTERICS School. This evolution was in part triggered by the feedback gathered from participants of previous Schools.

Tutorial 5: Electromagnetic follow-up of gravitational waves (1h45min)

In this tutorial, participants use Aladin to analyse the spatial location of gravitational-wave events and plan electromagnetic follow-up observations. As a highlight, time was devoted to explore the spatial location of gravitational-wave events with the help of virtual reality (Google cardboard). This tutorial was proposed and tutored by one of the ESFRI/Research Infrastructure partners (EGO/VIRGO/ET).

Tutorial 6: Advanced usage of HiPS and MOCs (2h)

The final Tutorial of the School provided an advanced example of the usage of the new IVOA standards HiPS and MOC, which define sky tessellation. Participants built their own HiPS from a set of images and then proceeded to find all the sources found in a Gaia-WISE cross-match that are located within their HiPS and at low Galactic extinction.

All the tutorials were published on the EURO-VO tutorial webpage http://www.euro-vo.org/?q=science/scientific-tutorials. The tutorial list in the Repository of DADI Products (D4.8) was also updated:

https://www.asterics2020.eu/dokuwiki/doku.php?id=open:wp4:dadiproductrepository

The treasure hunt

In this game, five questions are to be answered by the participants within a given amount of time (8-10 min) and by using the knowledge gathered through the previous tutorials on VO tools and services. Participants were rewarded with points depending on speed and correctness of the answer. After each question the correct answer was discovered. While the tutorials were run in parallel sessions in different rooms, this activity was carried out with all the participants in the same room.

Participants' use cases

On the third day participants tackled their own science use cases with the tools and services they had learned about the previous three days. This format had proven to be very useful for the participants in previous ASTERICS VO Schools. To ensure that every participant gets the best out of this third day, the organizing committee aimed to assign each student a suitable tutor. In order to find the most suitable tutor for each student, a survey was conducted before the School. The questions of the survey were:

- What are topic and aim of your research? Which objects do you study? For example stars, galaxies, gravitational waves, etc.
- What type of data do you work with/do you need? For example catalogues, images, spectra, etc.
- At what "wavelength range" do you study your objects of interest? For example infrared, optical, radio, gravitational waves, neutrinos, etc.
- Do you know about any archives or catalogues that you want to access? For example SDSS, 2MASS, Gaia, etc.
- What do you want to do with your data: cross-match, filter, etc.?

Using the science use cases, which were required for application, a picture of the students' interest and needs could be painted. Based on this information, tutors were selected. Every tutor coached two to three participants. A guide describing the science cases (Figure 3) and a list of the participant-tutor assignment were distributed among the tutors.

The day itself evolved in a very organic way. While some participants advanced mostly with the projects they brought along, other participants formed unexpected teams and kick-started entirely new projects. This evolution was facilitated by the diverse backgrounds of the participants, who work in astronomy research, software development and data stewardship. At the end of the day, some participants or teams of participants presented the results of their work:

- *"High mass X-ray binaries in the Magellanic Clouds"* This project made use of TOPCAT, the SIMBAD database and the latest Gaia data release to analyse the proper motions of high mass X-ray binaries in the Magellanic Clouds as measured by Gaia.

- *"Characterization of BeXs and search for new candidates in Gaia catalog"* This project made use of TOPCAT and VOSA to find X-ray binaries that contain a Be star.
- "*Estimating the distance to Galactic molecular clouds*" This project used Aladin and TOPCAT to query the Gaia DR2 catalogue for stars that are related to Galactic molecular clouds. The parallax of these stars could provide an estimate of the distance of the Galactic molecular clouds.
- *"Open Cluster Analysis - TOPCAT & VOSA"* This project used TOPCAT and VOSA to find and define open stellar clusters and to subsequently analyse the member stars of these clusters.
- *"Follow-up of Gravitational Wave events"* This project explored two questions: (1) How can the python package GWsky together with Aladin help planning electromagnetic follow-up observations. (2) How can Aladin be used to compare the gravitational -wave localization with the field of view of observations of the HESS experiment.

CDS data stewards ("documentalists") also used the knowledge gained from the tutorials to assess ways of improving their work methods:

- *"A new script for the extraction of data from tables"* This project explored, how a new Python script can facilitate the work of CDS data stewards.
- *"How VO tools can improve CDS documentalists work?"* This project explored how TOPCAT can facilitate the work of CDS data stewards.

The program and the presentations are available through
https://www.asterics2020.eu/dokuwiki/doku.php?id=open:wp4:school4:program

One of the main objectives of the School was to gather requirements from the community. For this reason, the last session was dedicated to discuss the answers provided by the participants to the questions proposed in the feedback form. The questionnaire, available on the website and filled on-line during the morning session of the last day, included questions about the knowledge of VO before the School, the plans to use VO-tools after the School and on different aspects of the organization and structure of the School (see Annexes I for more information).

Topic of research : Transients, in particular supernovae and soon kilonovae and TDEs.

Data type : Spectra, images, catalogues

Wavelength range : Primarily IR and optical at the moment, but interested in radio.

Archives & Catalogs : Primarily SDSS, GAIA, ESO, 2MASS

Data operations : Light curve construction, spectral comparison and for catalogues some examples would be cross-matching for magnitude zero-point calculation, image alignment and supernova progenitor searches

Description : My research and its relevance:
My area of research concerns transient phenomena in general and supernovae in particular. The ability to collate multi-messenger data is indispensable in this area, which is currently undergoing a rapid expansion. Transient astronomical events are of great interest, especially given the recent detections of the gravitational waves from a neutron star merger and the detection of its optical counterpart.

Multi-messenger astrophysics is essential to our understanding of transient events such as supernovae, which often emit light across the spectrum. Integrating datasets from different sources aids our understanding immensely, thus a familiarity with the relevant VO tools is particularly important for comprehensive analysis of the relevant data.

Previous experience with tools:
I have previously used Aladin to aid in finding targets whilst observing at the Nordic Optical Telescope at the Roque de los Muchachos Observatory on La Palma and it has proven very useful. Given this, I am eager to learn the full extent of its capabilities, particularly the more advanced desktop version, as well as the benefits of additional VO tools.

Why I want to go:
This winter school would give me the opportunity to:
- Gain hands-on experience with a broad array of VO tools useful to my work
- Allow me to effectively leverage multi-messenger data
- Develop the skills to handle large datasets productively
- Understand the critical role of VO tools in time-domain astronomy
- Maximise the potential useful science outcomes of my research

Status : PhD Student

Tutors : Giuseppe Greco

Figure 3: Screenshot of the document describing a participant's science case and the assigned tutor.

5. Analysis

This was the fourth and last ASTERICS DADI VO School. The School ran very smoothly and it had a good number of participants with a perfect atmosphere. We did not arrive to the limit of 50 participants in total since there were several last minute cancellations due to various reasons (coincidence with other conferences, personal reasons, etc.). We concentrated on specific tools rather than having a more general view of all the available VO tools. All participants were nevertheless pointed to other tools and services and encouraged to test them by performing the tutorials listed under http://www.euro-vo.org/?q=science/scientific-tutorials. Mixing astronomy researchers with software engineers and with data stewards turned out to be a success as could be seen during the School from the interaction between participants, in particular on the third day and from the participants' comments during and after the School.

By analysing the result from the feedback, we conclude that:

- All tutorials have reached a level of maturity. This has been possible thanks to carefully taking into account comments from the three previous Schools. Tutorials were modified to best suit specific scientific cases and their duration was also modified to match the mean time users need to go thought them for the first time.

- A large fraction of the participants (2/3) had used VO tools or services previous to attending the School. Tutorials were found to have the right amount of difficulty, and all were found to be useful or very useful.

- The time allocated for each tutorial was judged to be about right. Surprisingly tutorial #5 for which we had accommodated two hours, was finished well in advance by most of the participants. This tutorial was seen as one of the most difficult tutorials in previous Schools, the reason why a bit more time was given to participants in this School. This emphasises that the order of tutorials plays an important role on the time each tutorial needs, since this time participants had already learnt some concepts from previous tutorials.

- Participants appreciated the scripting capabilities (Aladin, STILTS, ADQL, etc.) and in the future more time should be allocated to sections including scripts. Integration of python and Jupyter Notebooks was also appreciated and more sections making use of these could be also implemented in future tutorials.

- Comments on the tutorials and the School were very positive.

6. Conclusions and next steps

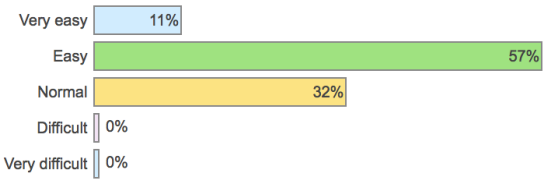
We conclude that the School was successful since it achieved its objectives: dissemination of the Virtual Observatory among the astronomical community, and collection of feedback and requirements from the participants. In light of comments gathered from participants, the tutorials should be adapted to dedicate more time to the scripting capabilities of VO tools and services. The diversity of the participants' profiles (astronomers, technical and data steward profiles) turned out to be a success, revealed through interaction between the three groups in a very positive way for all the groups. Comments and suggestions of participants will be taken into account by service developers to perform the appropriate updates to adjust at best to users' needs.

Participants were encouraged to act as VO-ambassadors in their research institutes by giving informal talks with colleagues, seminars and scientific workshops and conferences, and making use of the material employed during the School, which will remain publicly available after the end of the ASTERICS project.

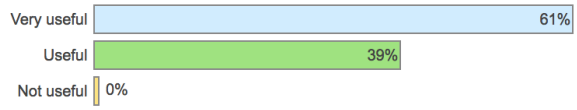
Annex I: Feedback analysis

1. Have you used VO tools and services before the school?

2. How easy or difficult was the CDS tutorial (#1)?



3. How useful was tutorial #1?

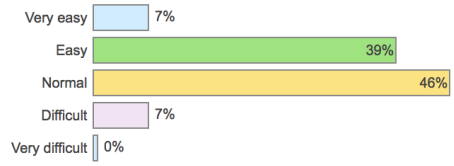


4. The time allocated for tutorial #1 was

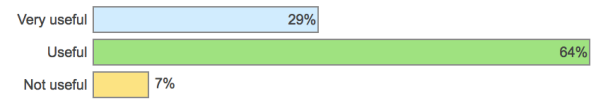
5. Comments on tutorial #1

- Very easy since I use the CDS services everyday ;) Nonetheless, I learnt a few tips!
- Section 6 not done whereas it was the most interesting part...
- The introductory lecture on this tutorial was really useful and straight to the point.
- it was really good. We did not came to the crossmatch tool, which I would have liked to see.
- It gave me a complementary information about my knowldedge in the tool
- Tutorials are very pedagogic.
- I used Aladin and Vizier before, but still I learnt quite a few useful things!

6. How easy or difficult was the VOSA tutorial (#2)?



7. How useful was tutorial #2?

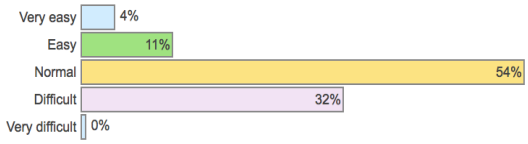


8. The time allocated for tutorial #2 was

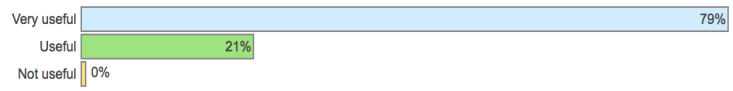
9. Comments on tutorial #2

- As a computer scientist, I had hard time to understand the physics behind it but the tool (VOSA) is quite easy to get hands with (step by step categories and good written explanations).
- I work on galaxies, hence stellar modelling like this isn't the most relevant. I can see how this would be good for someone working in the field though.
- A bit more difficult for me because I lacked the required scientific background
- The tutorial was too focused in one topic. I missed how VOSA can be used for different applications.
- There could be more scientific explanations about what is everything done in the tutorial instead of only follow the steps.
- I followed through much of this tutorial without any issues but I did not really understand the reasoning behind most of the things we did.
- I did not really had issues to understand the tool but I was severely lacking the knowledge of physics to understand what I was doing. It made things complicated.
- Good to know about the existence of VOSA^^
- VOSA for galaxies would be very useful
- I guess it will be very useful to my work
- Actually not directly useful for my own science, but I think it was a good amount of information for such a tutorial
- I personally would have like to spend more time on VOSA, we missed how to download data or interact from command line (if possible).

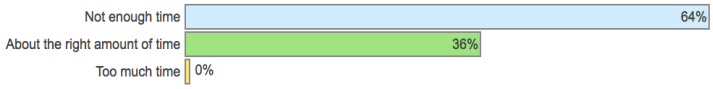
10. How easy or difficult was the ADQL tutorial (#3)?



11. How useful was tutorial #3?



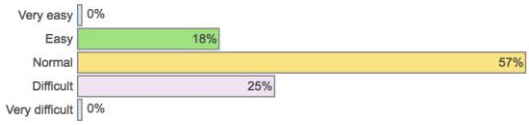
12. The time allocated for tutorial #3 was



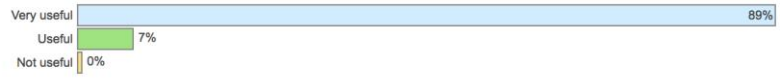
13. Comments on tutorial #3

- I would be interested to see a slightly more wide range of examples demonstrated. May need more time for this though
- I appreciated the format theory + problems to validate what was previously explained. Sadly, We didn't get to the finish line because of the lack of time.
- Need more examples.
- Very interesting!
- It would have been nice to have more time to do more advanced queries.
- The end of the tutorial was again really fast whereas it was the most interesting part...
- ADQL is not easy for people who has never used it before and it is very powerful, so I think it is necessary to give more time to this tutorial and after explaining ADQL language give more scientific examples.
- This tutorial was well understood and explanatory. The query concept relates very much to one of the goals I intend to achieve for my PhD study
- Important to know!
- I had knowledge about ADQL before, but it gave me more information, mainly about to how to use it on Topcat
- it would be better if we would have a bit more time for more practices.
- I was impressed by the power of the tools shown, very interesting... but too much, too fast!
- The tutorial was a little bit faster. I can't follow the instruction and execution at same time. I missing some parts
- The most tricky functions were left to the end, when the speaker had to rush and they were not seen in enough detail.

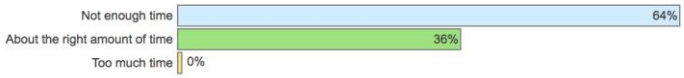
14. How easy or difficult was the TOPCAT & STILTS tutorial (#4)?



15. How useful was tutorial #4?



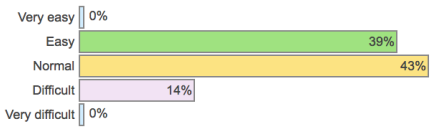
16. The time allocated for tutorial #4 was



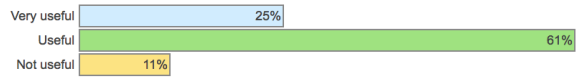
17. Comments on tutorial #4

- I couldn't follow all the steps as we were moving to the next part very fast. Though the topic very useful. 30 minutes more and would be fantastic.
- Very good and well explained tutorial. TOPCAT is now clearer for me as I understand the many use cases that it aims to solve.
- Maybe it'd have been better to have it at the first day?
- Tutorial was not too difficult but there just wasn't enough time to go through all of the content. I also want to see a wider range of topcat uses as it is a very useful tool
- The teacher went too fast while the software was at times not as much as responsive probably because of low connection. Not ideal for someone who never saw TOPCAT before in his life...
- Not enough time for STILTS. Would have been better if the approach had been "try follow the instructions for this section and then I will walk you through the section in a few minutes" as was done in some other tutorials. The way it was done was too fast with us trying to focus on what the speaker was doing and applying it on our own computers and then just falling behind and getting lost because he kept moving on quickly.
- The pace was a bit too quick for me: any mistake would cause a slight delay, which would prevent to keep following the explanations. I would have liked to see more about STILTS.
- We didn't have time to go into STILTS, but the TOPCAT part was great. Very clear and with very nice and varied examples.
- The STILTS part was really fast whereas it was the most interesting for me.
- I think stilts is very useful, so there could be more time for the tutorial to explain better stilts and also indicate if there are differences between TOPCAT and stilts, for example, things that can be done with stilts and not with TOPCAT if there are.
- Very comprehensive tutorial and a whole lot discussed under the given time. We just couldn't delve much into STILTS but it was a good tutorial in all.
- it was awesome!
- That was very important, however I could not follow quickly everything. It was a bit fast to understand the question behind every action and follow the commands.
- It was a bit difficult for me to follow all the tutorial
- It was very useful and understandable.
- not much time to speak about STILTS
- Also too much new things to follow for the time available

18. How easy or difficult was the Gravitational Wave tutorial (#5)?



19. How useful was tutorial #5?

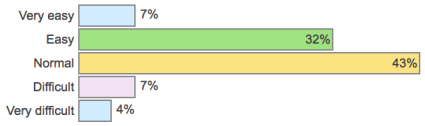


20. The time allocated for tutorial #5 was

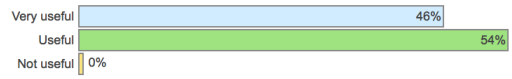
21. Comments on tutorial #5

- Nice science case
- Once again, not quite enough time to get through everything.
- The final phase of the tutorial was not properly explained as the other sections of the very same tutorial, so it was difficult to understand what was the aim.
- Nice use of Aladin! Console, mouse, etc... good tutorial videos and fun with VR.
- It could be interesting to have more explanations about GWsky.
- This was an interesting tutorial. I just have to repeat the tutorial to deepen my understanding on the goal which was being achieved.
- It was not explained as well as the others (in the text), though also very useful.
- In my opinion is more didactic to show a tool demonstration instead of give us a tutorial to read
- It was completely new for me. I think I'm not going to use it too much, but it's good to had learned something about it.
- It was interesting to see what you can do with Aladin, cross matching big survey areas.
- I think there was enough time in principle, but the presentation was a bit confusing, trying to bring the scientific background and the use of the VO tools was too much.
- No was useful for me due I don't have interest in gravitational wave
- It was not really very clear what we had to do until we spent some time following the tutorial, a much clear intro stating what we will practice would be much appreciated.

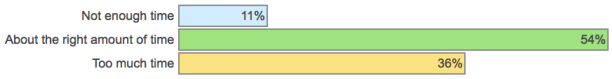
22. How easy or difficult was the HiPS & MOC tutorial (#6)?



23. How useful was tutorial #6?



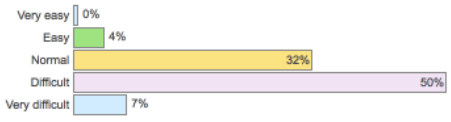
24. The time allocated for tutorial #6 was



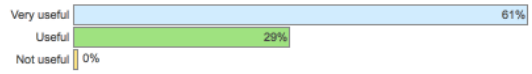
25. Comments on tutorial #6

- Could definitely add much more content since almost everyone was finished much earlier than the end.
- Very well prepared and clear. It was complementary with the Tutorial #1.
- I have to revisit the section on MOC.
- is was also a very good and helpful tutorial!
- It was a bit difficult for me to follow all the tutorial.
- It was easier to follow other tutorials because I used these before but I have never tried to use HIPS and MOC. For a beginner it was not easy to follow and it would be better to have more time to understand it.
- Most people completed the tutorial within less than an hour, although this was the only session with 2 hr available... But we could use the remaining time for more practice and discussion with the tutors, which was good.
- This tutorial was very useful, allowed to make different crossmatch data between my own catalogs and image and public MOCs

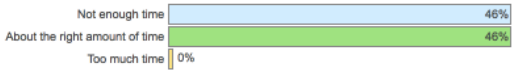
26. How easy or difficult was the Treasure Hunt?



27. How useful was the Treasure Hunt?



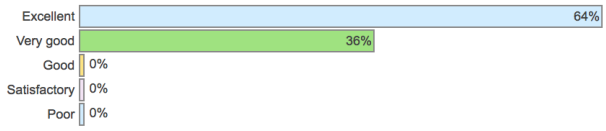
28. The time allocated for the Treasure Hunt was



29. Comments on the Treasure Hunt

- Very useful. Maybe add more time for the last question as it is a very tough one.
- Very useful for reviewing concepts. Maybe better if it was longer (more questions)?
- I'd prefer a little more time on the problems as the longest time is taken thinking about the best way to go about it, this is followed by some trial and error. 8 minutes gives you at maximum 1/2 attempts at a problem.
- Useful to apply what we learnt, but we needed more time to explore various strategies (or to solve the last question! :-))
- I think an overall problem solving session would be better. Do it like one of the tutorials with people attempting the problems and then afterwards having them explained.
- Challenging, but useful to see which tools to use in which context
- Maybe there can be a first simple Hunt on the first day and second more complex on the second day. It was fun and a good exercise.
- Really interesting this Treasure Hunt...
- This was really eye opening. I liked all five questions and is really useful for motivating why VO tools should be used widely.
- Really useful to see all capabilities of the programs together
- It would be nice to have the questions and some example answers.
- It was a very good idea for motivating the students to participate in the questions and to try to resolve them.
- It was fun and very useful.
- It was good to see more examples of typical cases... difficult with the limited amount of time, but that was part of the exercise!
- Great idea to test how much we have learnt about the VO tools possibilities and functionalities

30. How would you rate the school overall?



31. What (if any) capability did you miss in VO tools?

- More focus on non-stellar thingies? Like some VOSA for galaxies and galaxy clusters, maybe. Also, more focus on tools regarding simulations?
- I was not aware of all the things you could do with these tools. I don't think I will be using most of them because my particular project does not imply the use of such tools, but it is useful to learn new skills for the future.
- Maybe python pyvo, gaiaqueries, etc... but I understand there is not time for all!
- Not much was said about contributing to the development of the tools if you saw a useful feature to be implemented. But there was tutorials gave a good overview of the features in all the VO tools we were introduced to.
- I think I miss a tool with basic and advanced statistical tools.
- Maybe something about how to use the Gaia Archive or ARI's Gaia
- Could be interesting to understand how can access to data and image programatic. Usually is necessary collect or analysis data in bash mode

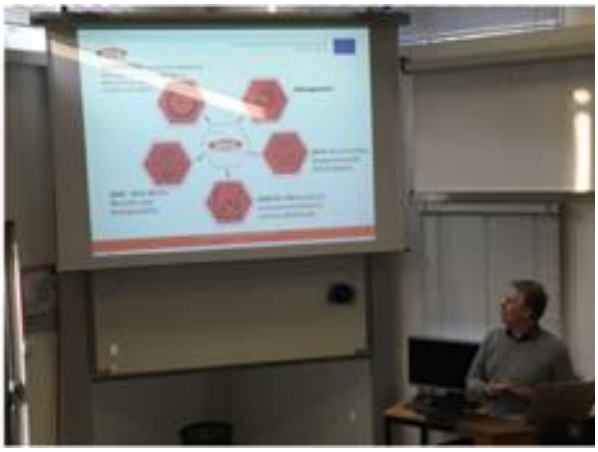
32. Comments on logistics (hotel, transportation, venue,...)

- Congratulations! Well organized. VO is very useful for our research
- Hotel was very nice, but maybe it could have been better for us to have breakfast included, even if the hotel was a cheaper one. For transportation, maybe it would have been great to have access to DB trains
- I didn't get an email about accomodation. It would be good in future if everyone was at the same hotel, it would improve interaction between people. Venue good though.
- It would be nice to offer a salty alternative to coffee break cookies.
- No breakfast included in Strasbourg hotel (Hilton), which I would recommend. Would have been nice to have 2 hour lunch one day in order to explore the city during the day, rather than the evening.
- Excellent. Hotel fine, transport too. Ambient and venue were very nice.
- All perfect.
- Communication on logistics was well done. I didn't have any issues booking my own accommodation or transport
- Good venue, well located.
- -
- I would have preferred a hotel reservation with breackfast included even if it was in a less nice hotel. Also, the agency organising the transportation didn't have an agreement with french trains/buses so they could not cover those parts of the travel. Apart form that everything was perfect.
- All great! Thank you!
- It was all very good prepared
- everything was good.
- excellent
- It could have been made clear in advance that eg. lunch and one dinner were included (but that's a minor detail)
- Anything was ok,

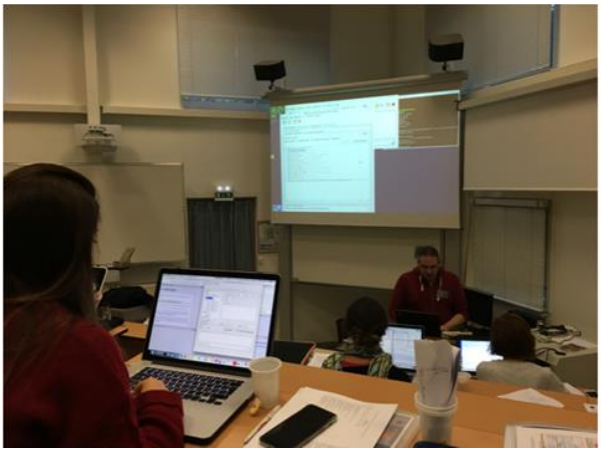
33. Any additional comment?

- Could be a bit more mixing between people and groups. I hardly know anyone from group 1 as I'm in group 2.
- The school was run very well.
- Maybe to have half day more for the tutorials.
- Very insightful workshop. No additional comments.
- I loved it! Thank you!
- Thank you very much the school has been really useful.
- For someone who does not have the same scientific questions to address it is more difficult to follow and think how to solve a problem in a quick way!
- unfortunately I could not attend treasure hunt and the last day, but everything was very well organized and very interesting!
- nice to have, if the Christmas market was open :)
- Missed more about command line interaction, batch processing, and scripts during the talks, they were very focused on the GUI frontends

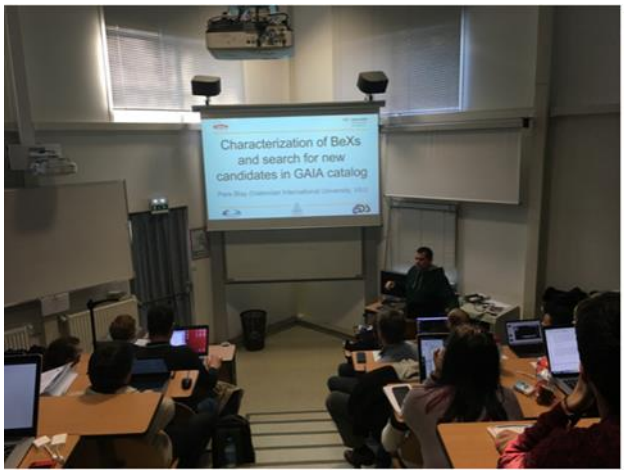
Annex II: Photos taken during the meeting



Introductory talks about the Observatory, the ASTERICS project and the VO School



Interaction between tutors and participants



Presentations of the participants' science cases

Group photo