



OBSERVATORI
ASTRONÒMIC
DEL GARRAF

OAG-SVO Star Analyser Spectroscopic Data Base (SASDABA)



CENTRO DE ASTROBIOLOGÍA

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EXCELENCIA
MARÍA
DE MAEZTU

OAG-SVO STAR ANALYSER SPECTROSCOPIC DATA BASE (SASDABA)

QUICK GUIDE / OAG-SVO SASDABA

HOW TO START

1. GENERAL CHECK

1. Detailed check of the Project OAG/nº14 (OAG Spectra Project) and its development at www.oagarraf.net
2. Access to the online data base **SASDABA** at <https://sdc.cab.inta-csic.es/sasdaba/>
3. Select language (Spanish / English)
4. Check the link to the detailed description of the project (Download **SASDABA's Tutorial**)
5. Check the link for software and tutorials for [RSpec](#)
6. Open the list of catalogued stars (**Object List** by ascending AR.2000,0 order) up to the checking date.

2. SELECT STARS AND FILE DOWNLOAD

2.1 Access the web site [SASDABA](#)

1. In **SEARCH** you can search the star by date or any other criterion compatible with [SIMBAD \(Query by identifiers\)](#)
2. The quickest way is with the HD catalogue number ([Henry Draper Catalogue \(1890-1949\)](#)).
3. **SASDABA** will show you the available observations for the selected star at this moment.

2.2 The result table gives you the following information:

1. Name.
2. HD number.
3. Bayer ID.
4. Flamsteed ID.
5. Link with SIMBAD.
6. Equatorial coordinates J2000.0 in degrees (AR/DEC).
7. Equatorial coordinates J2000.0 in hms/° ' " (AR/DEC).
8. Visual magnitude (V). A question mark indicates an explanation of the value.
9. Spectral type (with some references to the year published). A question mark indicates an explanation of the value.
10. Date of observation.
11. Universal Time (UT) of observation.
12. Observer code (see characteristics in Project OAG/nº14/Section VI/ at www.oagarraf.net).
13. Files related to the star

2.3 Actions:

1. Select and download the files.
2. For video files with format [.avi] or [.ser] you also need to download the text file with information about the image.
3. For image files [.fit] you only need to download this file (it already has the information).
4. Downloading time may vary according to the file.
5. Save and classify the files for later analysis.

3. CONTROL OF OBSERVATIONS AND LEARNING OPTIONS

1. SASDABA offers spectroscopic images of all stars in the sky (Northern and Southern hemispheres) up to magnitude V=5 and some with V=6.
2. SASDABA will include, at the end of the Project, expected in 2022-23, more than 2000 bright stars
3. Check the web site OAG/Project nº14 at www.oagarraf.net
4. Observers are amateur with good/advanced experience obtaining spectral images
5. The quality of the observation generally depends on the weather conditions
6. All the observations included have been previously reviewed by the coordination team
7. The coordinators don't eliminate any images except for extreme cases.
8. SASDABA is a data base that provides raw videos or CCD images (dark/flats subtracted by the authors)
9. SASDABA has observations obtained with the diffraction grating Star Analyser and various spectrographs.
10. The current dispersion range in SASDABA is of the order of 1.5 and 20 Å / pix
11. There are many ways to work with SASDABA images.
12. Students and amateurs can check their own results.
13. At a basic level, for secondary students, it allows to simulate direct observations, without any equipment.
14. The quality and characteristics in the image give an idea of the weather or equipment difficulties.
15. Practice with lots of examples in learning different spectroscopic analysis software.
16. The differences between dispersion and resolution in the observations are of great interest for basic learning of spectroscopy.
17. Introductory work about to stellar spectral classification.
18. Identification of absorption and emission lines.
19. Obtaining spectroscopic and astrophysical parameters.
20. Prepare educational presentations on multiple aspects of spectroscopy.

4. ANALYSIS OF SPECTROSCOPIC IMAGES

4.1 Starting

1. There are several software options to analyse spectroscopic images, being the most common BASS, ISIS, RSpec and VSpec.
2. By default, SASDABA's main option is [RSpec, software](#) under license designed and developed by Tom Field (USA).
3. Any other option is equally valid. It is usual to use more than one for completeness.
4. For the use and capabilities of RSpec it is advised a detailed checking of the tutorials.
5. Links for RSpec are in the [SASDABA](#) web site, authorised by the author.
6. Video images must be first compiled and reduced to an image file ([.fit] or other).
7. Compiling can be done with image treatment software. We use this function with the licensed commercial software [Astroart 7.0](#).
8. If you download [.fit] files, then you don't need to do any compilation. The observer has already done the previous work as well as the elimination of darks and flats. The images are ready to be analysed.
9. However, if there are different homogeneous observations, you can add them up.
10. For instance, if you want to study the spectrum of **HD_8890_Alfa_UMi, Polaris**, you can download 11 video observations (updated June 2021) for that star, obtained with the same configuration and observer.
11. Check [Section VI of the OAG Project nº14 "Observers and Stations"](#) to know what is the dispersion that particular observer works with. For TOB-1 it is 22Å/pix.

12. You will need this to calibrate the spectrum.
13. Small adjustments will let you know the exact (21.9Å/pix or 22.1Å/pix for example)
14. It also gives you data about the equipment and geographic location for the observer.
15. For example, for TOB-1, as the observations are homogeneous, you can get a final image with more than 4000 frames.
16. If you find that one star has been observed by different observers, or by the same observer but with different codes, you must be careful. It means that the dispersion will be different (although it can be similar).
17. It is necessary to treat the observations with homogeneous blocks (same dispersion) to get comparable conclusions.

4.2 Study phase (basic level with RSpec)

- Spend the time you need to study and practice the tutorials provided by the author.
- Once you have the skills how to use RSpec, run this sequence:
 1. Load the resulting image after processing the video files or the already prepared images with RSpec.
 2. If necessary, cut the image leaving only the part under study.
 3. If necessary, rotate the image to leave it horizontal.
 4. Calibrate the spectrum (according to the dispersion by the observer code)
 5. Cut the parts of the spectrum that you don't need.
 6. Identify the different lines of the chemical elements.
 7. Save the profile of the resulting semi continuum (example: **HD_8890_SC-1**)
 8. Open a reference profile for the RSpec data base with the same spectral type of the study star, in this case **F8**.
 9. If you don't find the exact one, use the closest spectral type.
 10. Smooth the curve of the reference star until you leave the continuum without any trace of absorption (you can control it with the generated synthetic spectrum).
 11. Save the final profile (example **F8_Smoothed_n10**), n10 means the level of adjustment got.
 12. Open again the profile **HD_8890_SC-1** and the reference profile **F8_Smoothed_n10**.
 13. With the option **Math on 2 Series, divide HD_8890_SC-1/F8_Smoothed_n10**.
 14. Bring the resulting profile to the main RSpec screen and save it (example **HD_8890_SC-2**)
 15. Open again the profile **HD_8890_SC-2** and smooth the curve the same way you have done before with the reference star F8.
 16. Save the profile (example: **F8_Instrumental_Response_n15**)
 17. Open the profile **HD_8890_SC-2** and **F8_Instrumental_Response_n15**
 18. With the option **Math on 2 Series, divide HD_8890_SC-2 / F8_Instrumental_Response_n15**.
 19. You will get a rectified profile (it is close to horizontal). In some authors, "rectified" may be equivalent to "normalized"
 20. Bring the new rectified/normalized profile (**N=1**) to the main RSpec screen and save it (example **HD_8890_N1**)
 21. From the rectified profile **HD_8890_N1** you can get valuable scientific data by applying the options allowed by the program.
 22. The smoothed curves (**Smoothed** and **Instrumental_Response**) for F8 are useful for all analysed stars with the same spectral type and for the equipment used.
 23. If the equipment changes, then you need to determine again your new instrumental response.
 24. Take all the time you need to smooth the curves. The final result depends on the quality you got.
 25. For type M stars, the process is more complex, but doable.
 26. Start your practice with type A stars.
 27. Carefully, write down all the experiences and results in your notebook
 28. Repeat all the steps until you master all the details.
 29. An experienced helper will make the learning process easier.
- We hope that this Quick Guide can be of use to you.
- **If you wish to participate in this Pro-Am project**, do not hesitate to contact the coordination team.

- ❖ *Coordination contact: informaciooag@gmail.net*
Web SVO-SASDABA: <https://sdc.cab.inta-csic.es/sasdaba/>
Web OAG: www.oagarraf.net
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July, 2021

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This investigation has used the Virtual Spanish Observatory (<http://svo.cab.inta-csic.es>) with the support of Spanish MINECO/FEDER through the grant AyA2017-84089.
