NEW FUNCTIONALITIES OF VOSA

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Abstract. The physical parameters of astronomical objects can be determined comparing observational data with theoretical models and templates. In the traditional way, this methodology can easily become tedious and even unfeasible when applied to large amounts of data. To alleviate this problem, a team from the SVO has developed a VO-tool called VOSA (Virtual Observatory SED Analyzer), that allows astronomers to manage multiwavelength large datasets of stars and galaxies in an easy and efficient way (Fig.1).

Fig.1. You can access VOSA from: http://svo.cab.inta-csic.es/theory/VOSA
A detailed description of VOSA can also be found in Bayo et al. (2008, A&A, 492, 277).

The workflow is the following :

1 GATHERING DATA

- Upload user photometry data (if any) .
- Look for the coordinates (if they have not been provided).
- Query several photometry catalogs accessible through VO services. (Fig.2).
- Visualize the observational SEDs. At this stage the user can manually remove photometric points and/or modify the VOSA estimation on the infrared excess (the latter only for stars). (Fig.3).

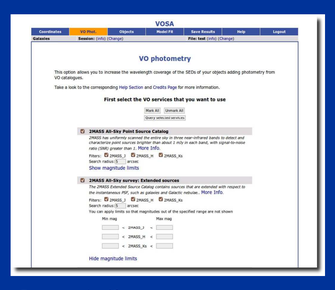

Fig.2. The user can choose which catalogues to use as well as the search radius and range of magnitudes for each one of them.

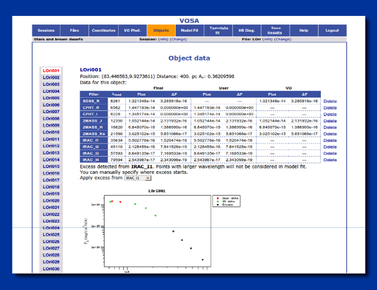

Fig.3. The user can visualize and edit the observational SED.

2 FITTING OBSERVED DATA WITH THEORETICAL MODELS

- Query VO-compliant theoretical models (spectra) and calculate their synthetic photometry (Fig4).
- Determine which model reproduces best the observed data.
- Use the best fitting model to estimate for each object:
  - Stars:
    - Teff, Logg, metallicity (fig.5).
    - Total flux (the model that best fits is used to infer the flux beyond the observational wavelength range).
    - Bolometric luminosity (if the distance is provided).
  - Galaxies:
    - Age and metallicity.

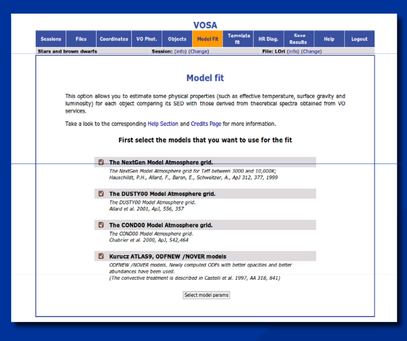

Fig.4. Theoretical models available in VOSA for stars and galaxies.

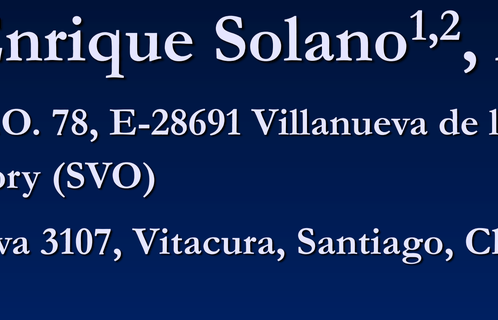

Fig.5. VOSA gives you back the final table with the best twenty fits for each object.

3 BUILDING THE H-R DIAGRAM (stars only)

- Query VO-compliant theoretical models (isochrones and evolutionary tracks) (Fig.6).
- Interpolate them to estimate masses and ages (Fig.7).

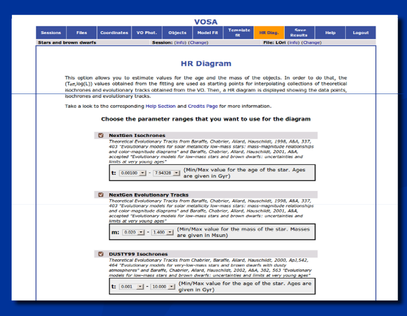

Fig.6. Some of the isochrones and evolutionary tracks available from VOSA.

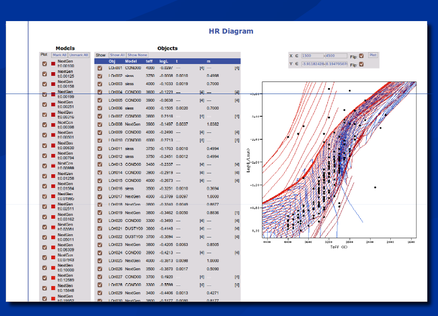

Fig.7. Example of an H-R diagram (extracted from Bayo et al. 2008).

4 SAVING THE RESULTS

- VOSA allows to save the following information:
  - Table of best fit results, both in VOTable and ASCII format.
  - The observed photometry for each object together with the synthetic one of the best fitting model. (VOTable, ASCII and PNG).
  - The parameters derived from the HR diagram (VOTable, ASCII and PNG).

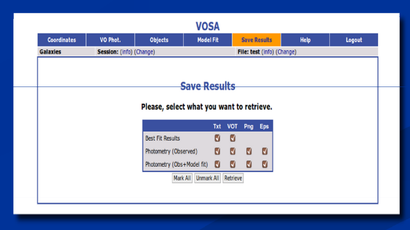

Fig.8. Saving the results

5 IMPROVEMENTS TO COME

- Models for hot stars (Husfeld and TLUSTY).
- Search of information on distance through VO services.
- Search of information on extinction through VO services.
- Bayesian analysis complementary to the χ^2-fitting.