



VOSA: SED building and analysis of thousands of stars in the framework of Gaia

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VOSA (VO Sed Analyzer) is a public web-tool developed by the Spanish Virtual Observatory (<http://svo.cab.inta-csic.es>) and designed to help users to (1) build Spectral Energy Distributions (SEDs) combining user data with photometry from VO services, (2) analyze them comparing observed photometry with synthetic photometry from theoretical models or observational templates, using different techniques (chi-square fit, Bayesian analysis) and thus (3) estimate physical parameters for the observed objects. VOSA is in operation since 2008 (Bayo et al, 2008, A&A 492,277B).

In the framework of the GENIUS (<https://gaia.am.ub.es/Twiki/bin/view/GENIUS>) project we are upgrading VOSA to provide access to Gaia photometry and give a reliable estimation of the physical parameters (effective temperatures, gravities, metallicities, masses and ages) of thousands of objects at a time. This upgrade has required the implementation of a new distributed environment capable of submitting and processing jobs in an asynchronous way.



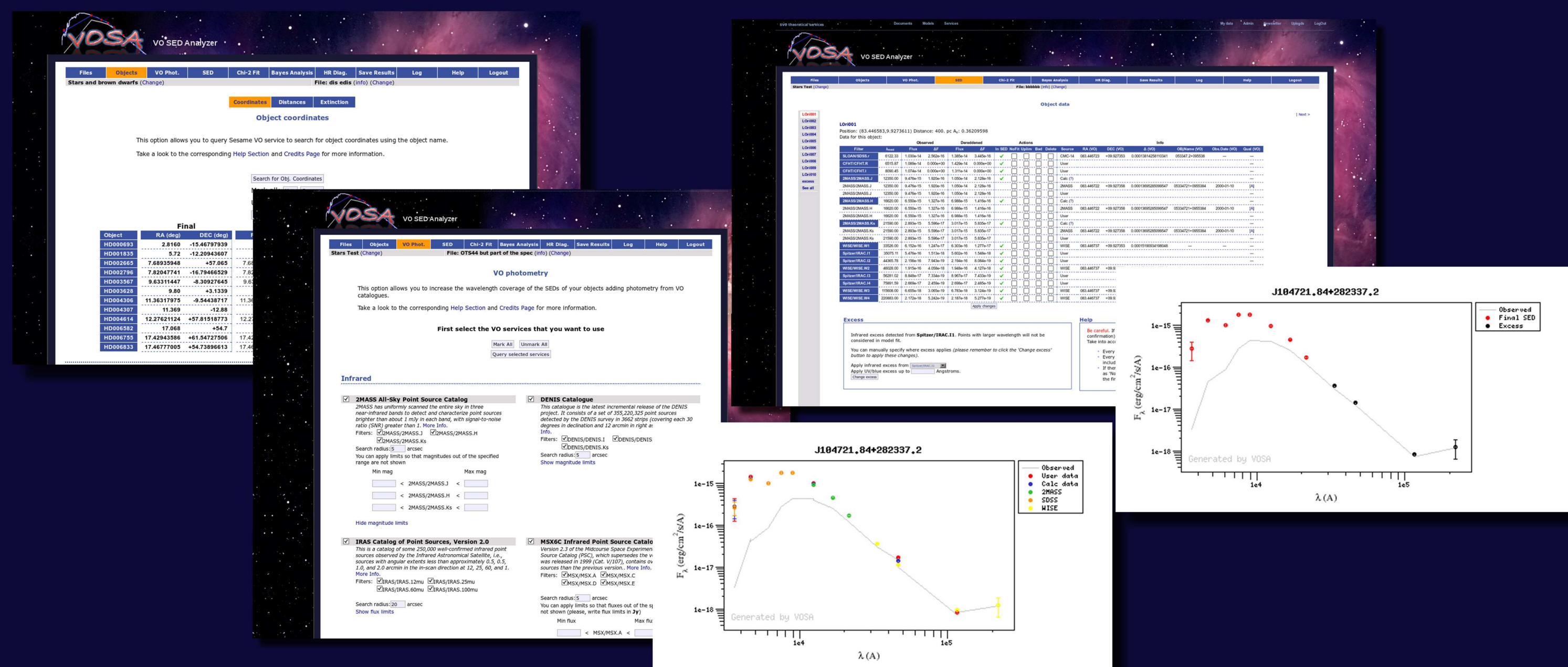
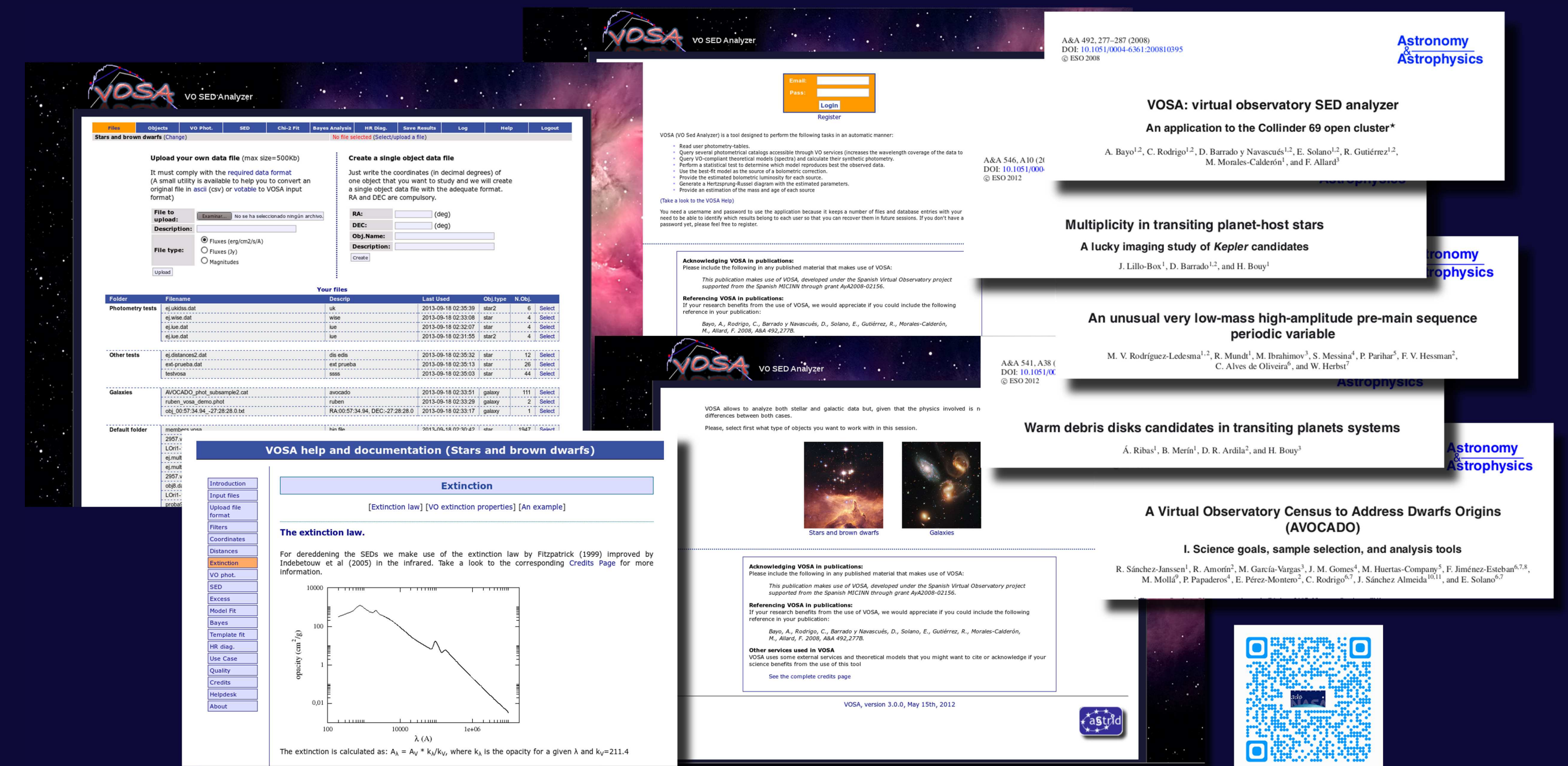
<http://svo2.cab.inta-csic.es/theory/vosa/>

Contact us: vosa-support@cab.inta-csic.es



VOSA: VO SED Analyzer

- Build, edit and visualize SEDs (User+VO data).
- Obtain relevant properties from VO services (name resolution, distance, extinction).
- Compare observed and synthetic photometry from theoretical models \Rightarrow Teff,logg, metallicity, luminosity (using panchromatic bolometric correction), etc.
- Interpolate isochrones and evolutionary tracks \Rightarrow mass, age.
- Works with many objects at the same time (~ 2000).
- Using SAMP to share data with other VO tools (TOPCAT, Aladin, VOSTat, ...).
- Different workflows for stars and galaxies.
- Online help and documentation.
- More than 300 active users and more than 240.000 objects analyzed.
- At least ~ 60 scientific papers published using VOSA.

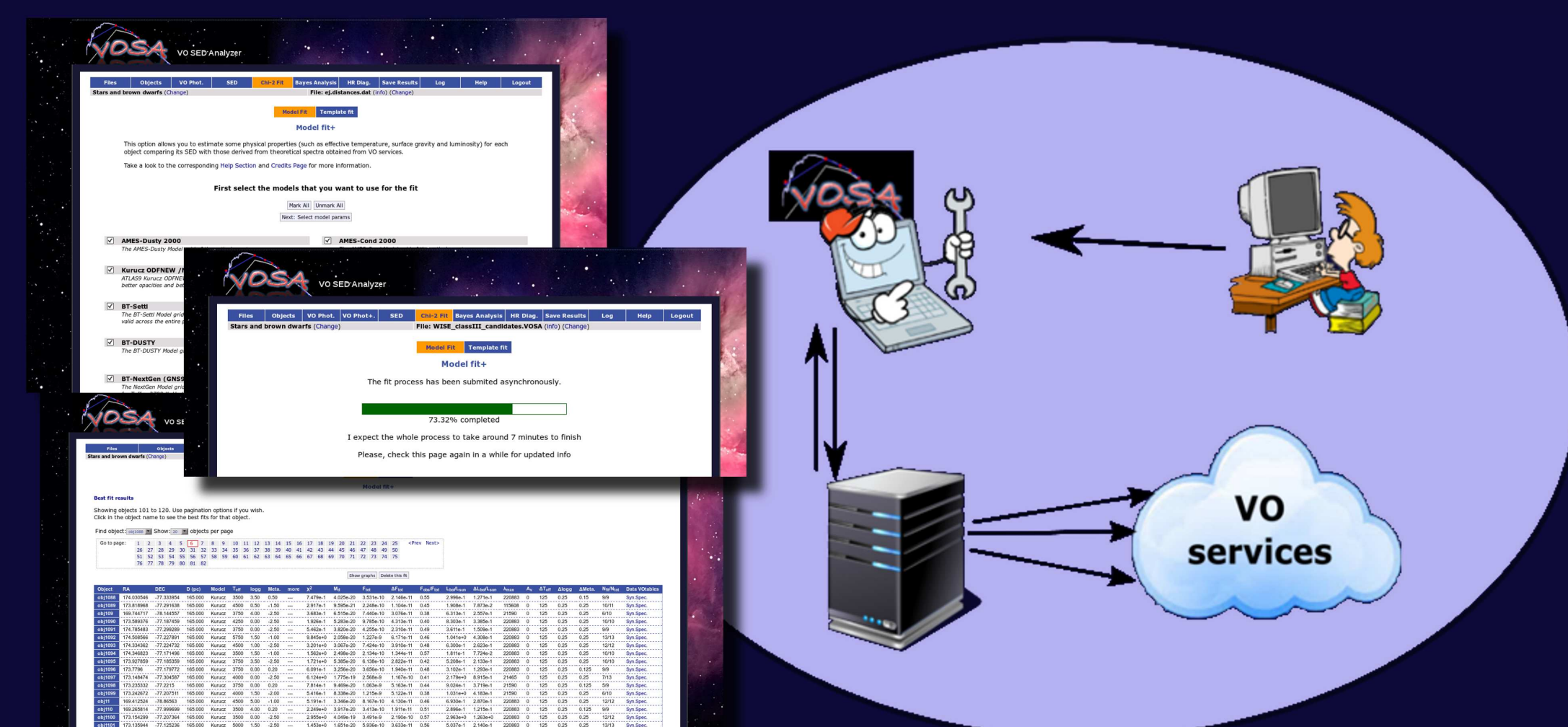
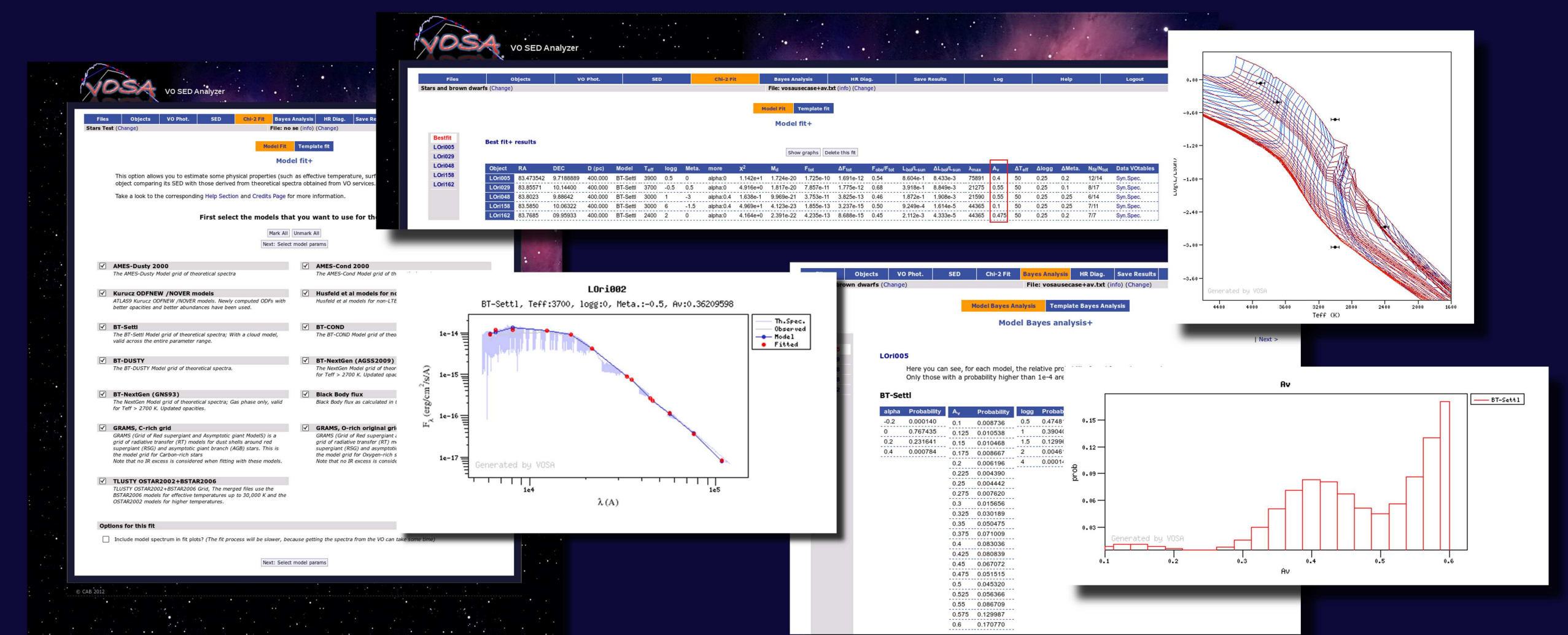


Build, visualize and edit SEDs

- User photometry tables + VO catalogs.
- More than 20 well characterized VO photometry catalogues covering from the ultraviolet to the infrared.
- Handling of multi-epoch photometry (e.g. VISTA VVV).
- Search for objects properties in VO services (coordinates, distance, extinction).
- Automatic detection of infrared excess following the parametrization by Lada et al. (AJ, 2006, 131, 1547).
- SED visualization and edit capabilities.

Analyze SEDs and beyond

- Chi-square fit, Bayes analysis. Extinction as a free parameter.
- HR diagram analysis with isochrones and evolutionary tracks linear interpolation.
- Using VO services: more than 30 collection of theoretical models, observational templates, isochrones, evolutionary tracks to estimate physical parameters (Teff,logg, metallicity, luminosity, age, mass, ...).



VOSA+: Massive jobs

- VOSA+ is the response of the Spanish VO to the need of estimating physical parameters from Gaia photometry.
- Able to work with tens of thousands of objects at the same time.
- Asynchronous jobs. VOSA operations (VO searches, model fits, etc) are executed asynchronously in a different machine/grid. Users can access the results later, when the process is finished.
- Parallel computing to increase the speed of photometric searches and model fitting.
- Seamless access to future GAIA data using the VO Table Access Protocol (TAP).

Filter Profile Service

- Properties of nearly 3000 filters: Transmission Curve, full characterization, zero points, etc.
- According to IVOA Photometry data model.
- Used by VOSA to identify photometry values unambiguously, convert magnitudes into fluxes, transform spectral information to photometry, get effective λ , etc.
- Used to calculate synthetic photometry for more than 30 collections of theoretical models.
- <http://svo2.cab.inta-csic.es/theory/fps3/>

