VOSA: A short introduction.

SEDs in the Virtual Observatory

Francisco Jiménez-Esteban

Enrique Solano, Carlos Rodrigo
Why SEDs (Spectral Energy Distributions)?
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Why SEDs (Spectral Energy Distributions)?
Building SEDs: Difficulties

- Discovery of information: Observational photometry and theoretical models.
Building SEDs: Difficulties

- Data Manipulation: From magnitudes to fluxes

VOSA Intro.
Building SEDs: Difficulties

- **Data Manipulation:** From theoretical spectra to synthetic photometry
Available since 2008.

> 1500 users.

> 4,700,000 objects.

> 100 refereed papers.
Accurate Empirical Radii and Masses of Planets and Their Host Stars with *Gaia* Parallaxes

Keivan G. Stassun\textsuperscript{1,2},\textsuperscript{iD} Karen A. Collins\textsuperscript{1,2},\textsuperscript{iD} and B. Scott Gaudi\textsuperscript{3,4}

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Masses and radii of planets are necessary to:

- Shed light on inflated hot-Jupiters.
  - 0.2-2.1M\textsubscript{Jup}. Radii larger than predicted by models.
  - Internal heating.
    → Planet radius as a function of irradiation, age, magnetic fields, winds,...

\[ \Delta F = \left( \frac{R_{\text{planet}}}{R_{\text{star}}} \right)^2 \]

\[ M_p = \frac{K_{\text{RV}} \sqrt{1 - e^2}}{\sin i} \left( \frac{P}{2\pi G} \right)^{1/3} M_\star^{2/3} \]
Science case

- Empirical determination (model independent) of the radii and masses of stars hosting planets.
- SED fitting → $F_{bol}$ and $T_{eff}$
- $L = 4\pi D^2 F_{bol}$ (D from Gaia-DR2 parallaxes)
- $R = \sqrt{L/(4\pi\sigma T_{eff}^4)}$
- $g = G \frac{M}{R^2}$