

Photometry data in the VO

Photometry data in the VO

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Motivation

- More photometry in the VO: great!
 - Building and plotting SED's.
 - Analyzing those SED's..
- Photometry usually in catalogues.
 - as magnitudes.
 - not so useful.
- Problems:
 - What those magnitudes mean?
 - How to convert them to fluxes?
 - How to compare them with spectra?

Some use cases

- Proper characterization of photometric values (understanding them)
- Building a SED and plotting it
- Using synthetic photometry to prepare observations (exposure time...)
- Estimate physical properties of an object by comparing observed photometry to theoretical models.

Motivation: VOSA

At the Spanish VO we have developed VOSA, a tool that

- Reads user photometry tables.
- Queries VO photometry catalogs to improve/complete the observed SED.
- Fits observed data with synthetic photometry derived from VO-compliant theoretical spectra and estimate physical parameters for the objects.
- etc
- Bayo et al, 2008 A&A 429,277B

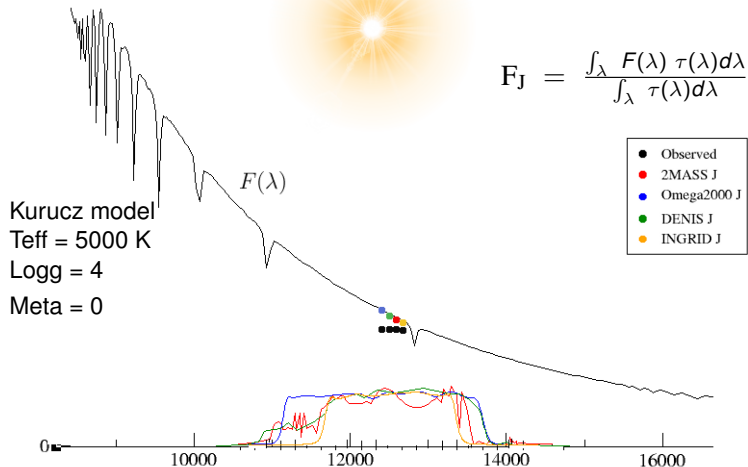
<http://svo.laeff.inta.es/theory/vosa>
talk on theory session.

What is needed

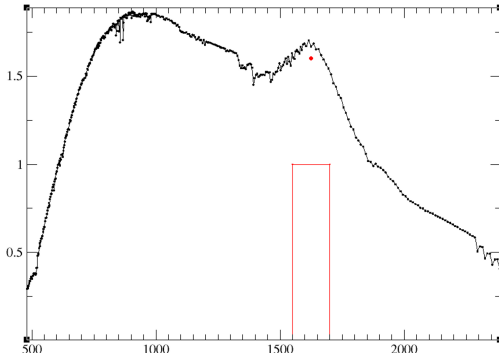
- To build a SED and, at least, plot it, we need
 - the magnitude
 - the zero point
 - a relevant λ ($\lambda_{eff}, \lambda_{mean} \dots$)
- To understand the value we need more info
 - instrument, facility...
 - filter width
- To be able to compare with spectra or theoretical models
 - filter transmission curve

(observed photometry must not be compared to spectra but to synthetic photometry!)

Synthetic photometry



Synthetic photometry



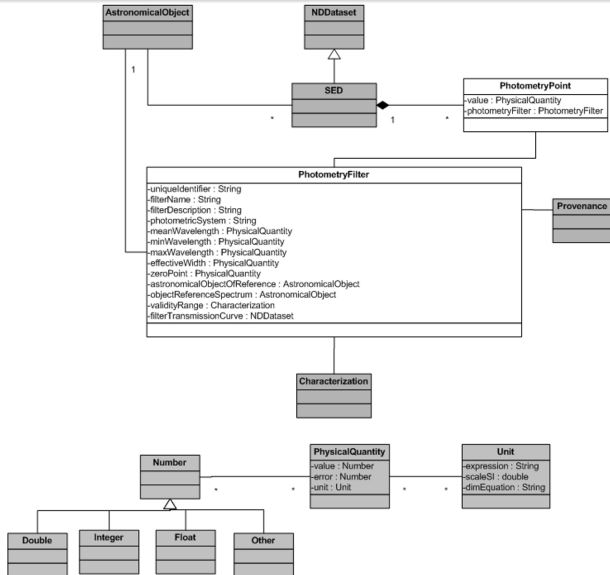
In some cases good fit does not mean that the photometric point is on the spectrum

What is needed

An observed magnitude should be given together with

- all the relevant information needed to understand it.
 - Filter name
 - Zero point
 - Relevant λ (λ_{eff} , λ_{mean} , λ_0 , ...)
 - Filter transmission curve
 - Filter width (effective width, FWHM...)
 - ...
- or: a way to obtain that information.
 - **A Unique filter ID so that all the information can be obtained somewhere else.**
- or: a combination of both

Photometry/Filter Data model



Activities (SVO+ESAVO)

- 5 SSAP services for photometry
 - 4 TSAP for synthetic photometry for different models
 - 1 pure SSAP for IUE photometry
 - Registered in EuroVO registry (SVO)
 - VOSpec (ESAVO)) adapted to consume these services
- Filter Profile Service
 - Client implemented by ESAVO and integrated in VOSpec
- 1 ConeSearch service for IUE photometry

Activities

- S3 service to fit observed photometry with theoretical data.
 - Used by VOSA
 - inputs: observed photometry + model param ranges
 - Best fit model
 - Physical parameters

SSAP IUE photometry

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<PARAM name="Email" utype="ssa:Curation.ContactEmail" datatype="char" arraysize="" value="esm@laeff.inta.es"/>
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SSAP synthetic photometry

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  <PARAM name="Email" utype="ssa:Curation.ContactEmail" datatype="char" arraysize="" value="esm@laeff.inta.es"/>
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IUE photometry ConeSearch

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IUE photometry ConeSearch

```

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Filter profile service

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</VOTABLE>

```

Find: nobel Previous Next Highlight all Match case Reached end of page, continued from top

Filter Profile Service



Filter Database Interface

An experiment about filter standardization in the VO framework



VO Service Browse Search New Filter

Autoblog svo.laeff LogOut

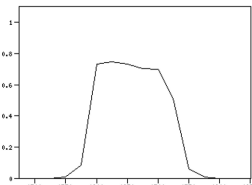
Groups	CAHA	FilterId	λ_{mean}	λ_{eff}	λ_{min}	λ_{max}	Δ_{eff}	F_0 (Jy)	Ph.System	Facility	Instrument	Short. Descrip	
ZMASS	BUSCA	CAHA/BUSCA.b	4058.3	4550	4775	107.2	4235.1	Stromgren	CAHA	BUSCA	BUSCA b	edit	
CAHA	Omega2000	CAHA/BUSCA.u	3571.7		3200	3900	190.4	1398.5	Stromgren	CAHA	BUSCA	BUSCA u	edit
CFHT		CAHA/BUSCA.v	4123.5		3975	4275	115.1	4198.5	Stromgren	CAHA	BUSCA	BUSCA v	edit
DENIS		CAHA/BUSCA.y	5488.5		5275	5650	101.0	3608.8	Stromgren	CAHA	BUSCA	BUSCA y	edit

Generic:
Hipparchos
INT
IRAS
SLOAN
Spitzer
TYCHO
WHT

CAHA/BUSCA.b

Filter ID: CAHA/BUSCA.b
 Phot.Sys.: Stromgren
 Obs. facility: CAHA
 Instrument: BUSCA
 λ_{mean} : 4058.2684934 Å
 λ_{eff} : 0 Å
 λ_{min} : 4550 Å
 λ_{max} : 4775 Å
 Δ_{eff} : 107.242605556 Å
 Zero point: 4235.14069518 Jy
 Short descrip.: BUSCA b
 Reference:

Transmission curve



Filter Profile Service

Groups	CAHA	FilterId	λ_{mean}	λ_{eff}	λ_{min}	λ_{max}	Δ_{eff}	F_0 (Jy)	Ph. System	Facility	Instrument	Short_Descrip	
2MASS	BUSCA	CAHA/BUSCA.b	4658.3	4550	4775	107.2	4235.1	Stromgren	CAHA	BUSCA	BUSCA b	edit	
CAHA	Omega2000	CAHA/BUSCA.u	3571.7	3200	3900	190.4	1398.5	Stromgren	CAHA	BUSCA	BUSCA u	edit	
CFHT		CAHA/BUSCA.v	4123.5	3975	4275	115.1	4196.5	Stromgren	CAHA	BUSCA	BUSCA v	edit	
DENIS		CAHA/BUSCA.y	5488.5	5275	5650	101.0	3006.8	Stromgren	CAHA	BUSCA	BUSCA y	edit	

Generic:	
Hipparcos	
INT	
IRAS	
SLOAN	
Spitzer	
TYCHO	
WHT	

Filter ID:

Short descrip.:

Transmission curve: (select a file)

Phot. Sys.: (select a previously defined value or define a new one)

Obs. facility: (select a previously defined value or define a new one)

Instrument: (select a previously defined value or define a new one)

λ_{mean} : (Angstrom) (let empty so that it is calculated from the transmission curve)

λ_{eff} : (Angstrom) (let empty so that it is calculated from the transmission curve and the Vega spectrum)

λ_{min} : (Angstrom) (let empty so that it is calculated from the transmission curve)

λ_{max} : (Angstrom) (let empty so that it is calculated from the transmission curve)

Width_{eff}: (Angstrom) (let empty so that it is calculated from the transmission curve)

Zen point: (Jy) (let empty so that it is calculated from the transmission curve and the Vega spectrum)

Valid from: to

Version: This is version of filter:

Based on: standard filter

Reference URL:

Reference Text:

Description:

Conclusions

- Flexible approach.
- A lot of photometry can be integrated in the VO with little work
- Inputs from photometry providers are important (CDS, ESO...?)

THANK YOU!