

# The SVO Filter Profile Service

Carlos Rodrigo<sup>1,2</sup>  
Enrique Solano<sup>1,2</sup>, Amelia Bayo<sup>3</sup>

<sup>1</sup>CAB,INTA-CSIC

<sup>2</sup>Spanish Virtual Observatory

<sup>3</sup>European Southern Observatory

IVOA interoperability meeting  
Sao Paulo, Oct 21-26, 2012



## The SVO Filter Profile Service

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

- More than **1800 filters** (right now).
- Transmission curve.
- Algebraic properties.
- Vega, AB and ST calibration.
- Web and VO interface.
- Compliant to the IVOA Photometry Data Model.

## Category/Subcategory.Filter

In many cases, “Category” is a physical facility (for instance a telescope), “Subcategory” is the name of a given instrument and Filter is the name of a Band.

- Paranal/NACO.J
- CAHA/CAHA.353\_41
- 2MASS/2MASS.J
- Generic/Johnson.R

*UTYPE: PhotometryFilter.identifier*

# Filter Description

- Short description.  
(*PhotometryFilter.description*)
- Photometric System.  
(*PhotometricSystem.description*)
- Detector type (photon/energy counter).  
(*PhotometricSystem.detectorType*)
- Band name.  
(*PhotometryFilter.bandName*)
- Facility.
- Instrument.
- Comments.

## Characteristic wavelengths:

- $\lambda_{\text{mean}}$
- $\lambda_{\text{min}}$
- $\lambda_{\text{max}}$
- $\lambda_{\text{eff}}$
- $\lambda_{\text{cen}}$
- $\lambda_{\text{peak}}$
- $\lambda_{\text{pivot}}$
- $\lambda_{\text{phot}}$

## Other properties

- $W_{\text{eff}}$
- FWHM
- $A_{\text{F}}/A_{\text{V}}$

$$\lambda_{\text{mean}} \equiv \frac{\int \lambda T(\lambda) d\lambda}{\int T(\lambda) d\lambda}$$

$$\lambda_{\text{eff}} \equiv \frac{\int \lambda T(\lambda) v_{\text{g}}(\lambda) d\lambda}{\int T(\lambda) v_{\text{g}}(\lambda) d\lambda}$$

$$W_{\text{eff}} \equiv \frac{\int T(\lambda) d\lambda}{\text{Max}(T(\lambda))}$$

(...)

# Calibration Properties

- PhotCalID
  - Vega, AB, ST.
  - Ex: Paranal/NACO.J/Vega  
*utype: PhotCal.identifier*
- Zero Point.
  - *utype: PhotCal.ZeroPoint.Flux.value*
- Zero Point Type.
  - Pogson, Asinh, Linear  
*utype: PhotCal.ZeroPoint.type*
  - Reference magnitude  
*utype: PhotCal.ZeroPoint.referenceMagnitude.value*
  - Softening parameter  
*utype: PhotCal.ZeroPoint.softeningParameter*



# Filter Profile Service

An experiment about filter standardization in the VO



VO Service Browse Search New Filter

svo.laeff Logout

2MASS	AAO	AKARI	CAHA	CFHT	CTIO	DENIS	GALEX	Gemini	Generic	Geneva	GTC	Herschel	Hipparcos	HST
IAC80	INT	IRAS	IUE	Keck	Kepler	KPNO	LaSilla	MSX	NIRT	NOT	OAF	OSN	Paranal	SAO
SLOAN	Spitzer	Subaru	TCS	TNG	TYCHO	UKIRT	WHT	WISE						

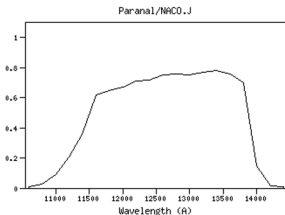
Paranal filters: FORS1 FORS2 HAWKI ISAAC NACO VISIR VISTA

Filter ID	$\lambda_{mean}$	$\lambda_{eff}$	$\lambda_{min}$	$\lambda_{max}$	$\lambda_{weff}$	ZP (Jy)	Obs. Facility	Instrument	Description
Paranal/NACO.NB104	10467.5	10466.7	10360	10580	139.2	2046.8	Paranal	NACO	NACO NB 1.04
Paranal/NACO.NB108	10902.0	10898.6	10780	11040	148.9	1780.0	Paranal	NACO	NACO NB 1.08, He I
Paranal/NACO.NB109	10967.3	10968.7	10840	11100	143.4	1738.6	Paranal	NACO	NACO NB 1.09, Py
Paranal/NACO.NB124	12441.2	12440.5	12320	12580	144.0	1583.1	Paranal	NACO	NACO NB 1.24
Paranal/NACO.NB126	12588.9	12588.2	12460	12720	146.1	1551.6	Paranal	NACO	NACO NB 1.26, [Fe II]
Paranal/NACO.J	12650.9	12477.5	10600	14400	2438.3	1537.5	Paranal	NACO	NACO J
Paranal/NACO.NB128	12856.1	12857.6	12740	12980	145.4	1391.1	Paranal	NACO	NACO NB 1.28, Pb
Paranal/NACO.NB164	16509.7	16511.2	16360	16660	182.1	1027.4	Paranal	NACO	NACO NB 1.64, [Fe II]
Paranal/NACO.H	16588.1	16372.5	14400	18800	3380.6	1018.8	Paranal	NACO	NACO H
Paranal/NACO.NB175	17536.2	17536.2	17340	17740	246.9	948.8	Paranal	NACO	NACO NB 1.75
Paranal/NACO.IB200	20045.3	20039.0	19600	20500	589.3	763.8	Paranal	NACO	NACO IB 2.00
Paranal/NACO.IB203	20326.2	20319.5	19840	20800	614.7	745.6	Paranal	NACO	NACO IB 2.03
Paranal/NACO.IB206	20632.4	20625.6	20160	21100	608.4	726.4	Paranal	NACO	NACO IB 2.06
Paranal/NACO.IB209	20982.7	20975.6	20500	21460	609.0	704.9	Paranal	NACO	NACO IB 2.09
Paranal/NACO.NB212	21261.7	21260.8	21060	21460	229.1	688.0	Paranal	NACO	NACO NB 2.12, H2 (1-0) S(1)
Paranal/NACO.IB212	21315.7	21309.6	20900	21740	527.0	682.5	Paranal	NACO	NACO IB 2.12
Paranal/NACO.Ks	21449.5	21240.6	19000	24200	3610.0	677.4	Paranal	NACO	NACO Ks
Paranal/NACO.IB215	21589.1	21582.3	21160	22020	544.3	654.8	Paranal	NACO	NACO IB 2.15
Paranal/NACO.NB217	21714.2	21715.3	21500	21920	231.4	631.1	Paranal	NACO	NACO NB 2.17, Bry
Paranal/NACO.IB218	21893.8	21892.8	21460	22320	547.2	641.5	Paranal	NACO	NACO IB 2.18
Paranal/NACO.IB221	22167.1	22161.8	21700	22600	546.2	639.9	Paranal	NACO	NACO IB 2.21
Paranal/NACO.IB224	22435.9	22430.8	22000	22880	542.4	626.9	Paranal	NACO	NACO IB 2.24
Paranal/NACO.IB227	22756.8	22751.2	22320	23220	567.6	611.5	Paranal	NACO	NACO IB 2.27
Paranal/NACO.IB230	23130.4	23124.8	22620	23600	581.7	594.5	Paranal	NACO	NACO IB 2.30
Paranal/NACO.IB233	23427.8	23422.2	22920	23940	593.0	581.6	Paranal	NACO	NACO IB 2.33
Paranal/NACO.IB236	23711.3	23705.8	23220	24180	572.5	569.6	Paranal	NACO	NACO IB 2.36
Paranal/NACO.IB239	23965.4	23959.8	23480	24480	599.6	558.9	Paranal	NACO	NACO IB 2.39

## Filter Description

Filter ID (?): Paranal/NACO.J  
 Description (?): NACO J  
 Phot.System (?): NACO  
 Detector Type (?): Energy counter  
 Band Name (?): J  
 Obs. Facility (?): Paranal  
 Instrument (?): NACO  
 Comments (?): -----

## Transmission curve



Data file: [ascii\\_VOTable](#)

Reference for transmission curve: [ESO: NACO](#)

## Mathematical properties

Property	Calculated	Specified	Unit
$\lambda_{\text{mean}}$ (?):	12650.92	-----	(Angstrom)
$\lambda_{\text{cen}}$ (?):	12667.90	-----	(Angstrom)
$\lambda_{\text{eff}}$ (?):	12477.51	-----	(Angstrom)
$\lambda_{\text{peak}}$ (?):	13400.00	-----	(Angstrom)
$\lambda_{\text{pivot}}$ (?):	12626.76	-----	(Angstrom)
$\lambda_{\text{phot}}$ (?):	12527.18	-----	(Angstrom)
$\lambda_{\text{min}}$ (?):	10600.00	-----	(Angstrom)
$\lambda_{\text{max}}$ (?):	14400.00	-----	(Angstrom)
$W_{\text{eff}}$ (?):	2438.29	-----	(Angstrom)
FWHM (?):	2489.65	-----	(Angstrom)
$A_t/A_v$ (?):	0.30	-----	()

## Calibration properties

## Vega System

Property	Specified	Calculated	Unit
Zero Point (?):	-----	2.961e-10	(erg/cm <sup>2</sup> /s/Å)
	-----	1537.53	(Jy)
ZP Type (?):	Pogson		
PhotCal ID (?):	Paranal/NACO.J/Vega		

## AB System

Property	Specified	Calculated	Unit
Zero Point (?):	-----	6.992e-10	(erg/cm <sup>2</sup> /s/Å)
	-----	3631.00	(Jy)
ZP Type (?):	Pogson		
PhotCal ID (?):	Paranal/NACO.J/AB		

## ST System

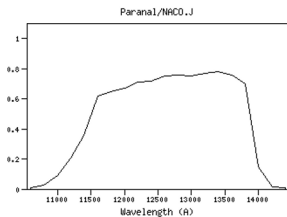
Property	Specified	Calculated	Unit
Zero Point (?):	-----	3.631e-9	(erg/cm <sup>2</sup> /s/Å)
	-----	18856.50	(Jy)
ZP Type (?):	Pogson		
PhotCal ID (?):	Paranal/NACO.J/ST		



## Filter Description

Filter ID (?): Paranal/NACO.J  
 Description (?): NACO J  
 Phot.System (?): NACO  
 Detector Type (?): Energy counter  
 Band Name (?): J  
 Obs. Facility (?): Paranal  
 Instrument (?): NACO  
 Comments (?): -----

## Transmission curve



Data file: [ascii\\_VOTable](#)

Reference for transmission curve: [ESO: NACO](#)

## Mathematical properties

Property	Calculated	Specified	Unit
$\lambda_{\text{mean}}$ (?)	12650.92	-----	(Angstrom)
$\lambda_{\text{cen}}$ (?)	12667.90	-----	(Angstrom)
$\lambda_{\text{eff}}$ (?)	12477.51	-----	(Angstrom)
$\lambda_{\text{peak}}$ (?)	13400.00	-----	(Angstrom)
$\lambda_{\text{pivot}}$ (?)	12626.76	-----	(Angstrom)
$\lambda_{\text{phot}}$ (?)	12527.18	-----	(Angstrom)

$\lambda_{\text{min}}$  (?)

$\lambda_{\text{max}}$  (?)

$W_{\text{eff}}$  (?)

FWHM (?)

$A_t/A_v$  (?)

## Calibrati

## Vega Syst

Property

Zero Point

ZP Type (?)

PhotCal ID

## AB System

Property

Zero Point

ZP Type (?)

PhotCal ID

## ST System

Property

Zero Point

ZP Type (?)

PhotCal ID

 **$\lambda_{\text{phot}}$** 

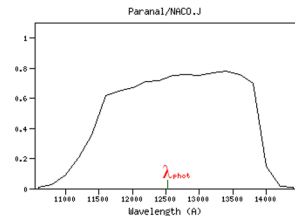
Photon distribution based effective wavelength. Calculated by the service as:

$$\lambda_{\text{phot}} \equiv \frac{\int \lambda^2 T(\lambda) V_g(\lambda) d\lambda}{\int \lambda T(\lambda) V_g(\lambda) d\lambda}$$

where:

$T(\lambda)$  = filter transmission

$V_g(\lambda)$  = Vega spectrum



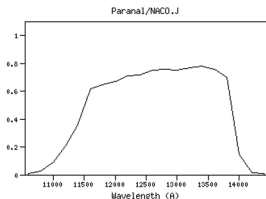
Property info:

- **Unit:** Angstrom
- **UCD:** em.wl

## Filter Description

Filter ID (?): Paranal/NACO.J  
 Description (?): NACO J  
 Phot.System (?): NACO  
 Detector Type (?): Energy counter  
 Band Name (?): J  
 Obs. Facility (?): Paranal  
 Instrument (?): NACO  
 Comments (?): -----

## Transmission curve



Data file: [ascii](#), [VOTable](#)

Reference for transmission curve: ESO: NACO

## Mathematical

Property Calculated  
 $\lambda_{\text{mean}}$  (?): 12500  
 $\lambda_{\text{cen}}$  (?): 12500  
 $\lambda_{\text{eff}}$  (?): 12500  
 $\lambda_{\text{peak}}$  (?): 12500  
 $\lambda_{\text{pivot}}$  (?): 12500  
 $\lambda_{\text{phot}}$  (?): 12500  
 $\lambda_{\text{min}}$  (?): 10000  
 $\lambda_{\text{max}}$  (?): 14000  
 FWHM (?): 2000  
 $A_i/A_v$  (?): 1.0

## Calibration p

## Vega System

## Property

Zero Point (?): ----- 2.961e-10 (erg/cm<sup>2</sup>/s/Å)  
 ----- 1537.53 (Jy)  
 ZP Type (?): Pogson  
 PhotCal ID (?): Paranal/NACO.J/Vega

## AB System

## Property

Specified Calculated Unit  
 Zero Point (?): ----- 6.992e-10 (erg/cm<sup>2</sup>/s/Å)  
 ----- 3631.00 (Jy)  
 ZP Type (?): Pogson  
 PhotCal ID (?): Paranal/NACO.J/AB

## ST System

## Property

Specified Calculated Unit  
 Zero Point (?): ----- 3.631e-9 (erg/cm<sup>2</sup>/s/Å)  
 ----- 18856.50 (Jy)  
 ZP Type (?): Pogson  
 PhotCal ID (?): Paranal/NACO.J/ST

## Zero Point in Vega System.

Calculated by the service as:

$$\text{ZeroPoint} \equiv \frac{\int T(\lambda) V_g(\lambda) d\lambda}{\int T(\lambda) d\lambda}$$

where:

$T(\lambda)$  = filter transmission  
 $V_g(\lambda)$  = Vega spectrum

$$F_{0,v}(Jy) = (2.9979246)^{-1} 10^5 * \lambda_{\text{eff}}^2 * F_{0,\lambda}(\text{erg/cm}^2/\text{s}/\text{Å})$$

In the case that filter owner specifies its own values, they will be the ones provided by the service when queried through the VO.

VO PhotDM Utypes:

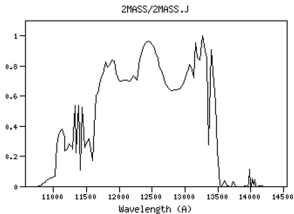
*PhotCal.MagnitudeSystem.type* -> VEGAmag  
*PhotCal.ZeroPoint.Flux.value* ->  $F_0$

Property info:

- **UCD:** phot.flux.density
- **Utype:** photdm:PhotCal.ZeroPoint.Flux.value

**Filter Description**

Filter ID (?): 2MASS/2MASS.J  
 Description (?): 2MASS.J  
 Phot.System (?): 2MASS  
 Detector Type (?): Energy counter  
 Band Name (?): J  
 Obs. Facility (?): 2MASS  
 Instrument (?): -----  
 Comments (?): -----

**Transmission curve**

Data file: [ascii\\_VOTable](#)

Reference for transmission curve: [2MASS at IPAC documentation](#)

**Calibration properties**

Property	Calculated	Specified	Unit
$\lambda_{\text{mean}}$ (?):	12410.57	12350	(Angstrom)
$\lambda_{\text{cen}}$ (?):	12390.58	-----	(Angstrom)
$\lambda_{\text{eff}}$ (?):	12285.38	12350	(Angstrom)
$\lambda_{\text{peak}}$ (?):	13260.00	-----	(Angstrom)
$\lambda_{\text{pivot}}$ (?):	12393.15	-----	(Angstrom)
$\lambda_{\text{phot}}$ (?):	12320.92	-----	(Angstrom)
$\lambda_{\text{min}}$ (?):	10806.47	-----	(Angstrom)
$\lambda_{\text{max}}$ (?):	14067.97	-----	(Angstrom)
$W_{\text{eff}}$ (?):	1624.15	-----	(Angstrom)
FWHM (?):	2149.14	-----	(Angstrom)
$A_t/A_v$ (?):	0.31	-----	()

**Calibration properties****Vega System**

Property	Specified	Calculated	Unit
Zero Point (?):	3.129e-10	3.143e-10	(erg/cm <sup>2</sup> /s/Å)
	1594	1582.23	(Jy)
ZP Type (?):	Pogson		
PhotCal ID (?):	2MASS/2MASS.J/Vega		

**AB System**

Property	Specified	Calculated	Unit
Zero Point (?):	-----	7.212e-10	(erg/cm <sup>2</sup> /s/Å)
	-----	3631.00	(Jy)
ZP Type (?):	Pogson		
PhotCal ID (?):	2MASS/2MASS.J/AB		

**ST System**

Property	Specified	Calculated	Unit
Zero Point (?):	-----	3.631e-9	(erg/cm <sup>2</sup> /s/Å)
	-----	18280.26	(Jy)
ZP Type (?):	Pogson		
PhotCal ID (?):	2MASS/2MASS.J/ST		

Reference for calibration: [Cohen 2003](#)

- Filter transmission curves are described by the IVOA Spectral Data Model.
- SSAP (Appendix A) is an adequate protocol to query the service.
- Three main operations:
  - **Capabilities**  
what parameters are available for queries and which are the possible values for those parameters.
  - **Search query**  
get the available results for some values, or ranges of values, of those parameters.
  - **Data query**  
retrieve data for a particular filter.

The service can be queried using the following keywords:

- WavelengthMean
- WavelengthEff
- WavelengthMin
- WavelengthMax
- WidthEff
- FWHM
- Instrument
- Facility
- PhotSystem

# VO interface: SSAP: Capabilities

<http://svo2.cab.inta-csic.es/theory/fps/fps.php?FORMAT=metadata>

Código fuente de: <http://svo2.cab.inta-csic.es/theory/fps/fps.php?FORMAT=metadata> - Mozilla Firefox

Archivo Editar Ver Ayuda

```
1 <?xml version="1.0"?>
2 <VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-insta
3 <RESOURCE type="meta">
4 <DESCRIPTION>Filter information service</DESCRIPTION>
5 <PARAM name="INPUT:WavelengthMean_min" ucd="em.wl" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Location.Value" unit="
6 <DESCRIPTION>Mean wavelength. Defined as  $\int x * filter(x) dx / \int filter(x) dx$ </DESCRIPTION>
7 <VALUES>
8 <MIN value="1275"/>
9 <MAX value="1671355.2526434"/>
10 </VALUES>
11 </PARAM>
12 <PARAM name="INPUT:WavelengthMean_max" ucd="em.wl" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Location.Value" unit="
13 <DESCRIPTION>Mean wavelength. Defined as  $\int x * filter(x) dx / \int filter(x) dx$ </DESCRIPTION>
14 <VALUES>
15 <MIN value="1275"/>
16 <MAX value="1671355.2526434"/>
17 </VALUES>
18 </PARAM>
19 <PARAM name="INPUT:WavelengthEff_min" ucd="em.wl.effective" utype="" unit="Angstrom" datatype="float" >
20 <DESCRIPTION>Effective wavelength. Defined as  $\int x * filter(x) * vega(x) dx / \int filter(x) * vega(x) dx$ </DESCRIPTION>
21 <VALUES>
22 <MIN value="1284.70317662"/>
23 <MAX value="1594671.63075"/>
24 </VALUES>
25 </PARAM>
26 <PARAM name="INPUT:WavelengthEff_max" ucd="em.wl.effective" utype="" unit="Angstrom" datatype="float" >
27 <DESCRIPTION>Effective wavelength. Defined as  $\int x * filter(x) * vega(x) dx / \int filter(x) * vega(x) dx$ </DESCRIPTION>
28 <VALUES>
29 <MIN value="1284.70317662"/>
30 <MAX value="1594671.63075"/>
31 </VALUES>
32 </PARAM>
33 <PARAM name="INPUT:WavelengthMin_min" ucd="em.wl;stat.min" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.Start"
34 <DESCRIPTION>Minimum filter wavelength. Defined as the first lambda value with a transmission at least 1% of maximum transmi
35 <VALUES>
36 <MIN value="1150"/>
37 <MAX value="1375772.76061"/>
38 </VALUES>
```

# VO interface: SSAP: Search query

<http://svo2.cab.inta-csic.es/theory/fps/fps.php?>

WidthEff=0/100& WavelengthMean=10000/20000

Código fuente de: [http://svo2.cab.inta-csic.es/theory/fps/fps.php?WidthEff\\_max=100&WavelengthMean\\_min=10000&WavelengthMean\\_min=10000](http://svo2.cab.inta-csic.es/theory/fps/fps.php?WidthEff_max=100&WavelengthMean_min=10000&WavelengthMean_min=10000)

Archivo Editar Ver Ayuda

```
1 <?xml version="1.0"?>
2 <VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
3   <INFO name="QUERY_STATUS" value="OK"/>
4   <RESOURCE type="results">
5     <TABLE>
6       <FIELD name="FilterProfileService" ucd="meta.ref.ivorn" utype="PhotometryFilter.fpsIdentifier" unit="" datatype="char" arraysize="*/>
7       <FIELD name="filterID" ucd="meta.id" utype="photdm:PhotometryFilter.identifier" unit="" datatype="char" arraysize="*/>
8       <FIELD name="WavelengthUnit" ucd="meta.unit" utype="PhotometryFilter.SpectralAxis.unit" unit="" datatype="char" arraysize="*/>
9       <FIELD name="WavelengthUCD" ucd="meta.ucd" utype="PhotometryFilter.SpectralAxis.UCD" unit="" datatype="char" arraysize="*/>
10      <FIELD name="PhotSystem" ucd="" utype="photdm:PhotometricSystem.description" unit="" datatype="char" arraysize="*/>
11      <FIELD name="DetectorType" ucd="" utype="photdm:PhotometricSystem.detectorType" unit="" datatype="char" arraysize="*/>
12      <FIELD name="Band" ucd="" utype="photdm:PhotometryFilter.bandName" unit="" datatype="char" arraysize="*/>
13      <FIELD name="Instrument" ucd="instr" utype="" unit="" datatype="char" arraysize="*/>
14      <FIELD name="Facility" ucd="instr.obsty" utype="" unit="" datatype="char" arraysize="*/>
15      <FIELD name="ProfileReference" ucd="" utype="" unit="" datatype="char" arraysize="*/>
16      <FIELD name="CalibrationReference" ucd="" utype="" unit="" datatype="char" arraysize="*/>
17      <FIELD name="Description" ucd="meta.note" utype="photdm:PhotometryFilter.description" unit="" datatype="char" arraysize="*/>
18      <FIELD name="Comments" ucd="meta.note" utype="" unit="" datatype="char" arraysize="*/>
19      <FIELD name="WavelengthMean" ucd="em.wl" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Location.Value" unit="Angstrom" datatype="float" />
20      <FIELD name="WavelengthEff" ucd="em.wl.effective" utype="" unit="Angstrom" datatype="float" />
21      <FIELD name="WavelengthMin" ucd="em.wl.stat.min" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.Start" unit="Angstrom" datatype="float" />
22      <FIELD name="WavelengthMax" ucd="em.wl.stat.max" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.Stop" unit="Angstrom" datatype="float" />
23      <FIELD name="WidthEff" ucd="instr.bandwidth" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.Extent" unit="Angstrom" datatype="float" />
24      <FIELD name="WavelengthCen" ucd="em.wl" utype="" unit="Angstrom" datatype="float" />
25      <FIELD name="WavelengthPivot" ucd="em.wl" utype="" unit="Angstrom" datatype="float" />
26      <FIELD name="WavelengthPeak" ucd="em.wl" utype="" unit="Angstrom" datatype="float" />
27      <FIELD name="WavelengthPhot" ucd="em.wl" utype="" unit="Angstrom" datatype="float" />
28      <FIELD name="FWHM" ucd="instr.bandwidth" utype="" unit="Angstrom" datatype="float" />
29      <FIELD name="PhotCalID" ucd="meta.id" utype="photdm:PhotCal.identifier" unit="" datatype="char" arraysize="*/>
30      <FIELD name="MagSys" ucd="meta.code" utype="photdm:PhotCal.MagnitudeSystem.type" unit="" datatype="char" arraysize="*/>
31      <FIELD name="ZeroPoint" ucd="phot.flux.density" utype="photdm:PhotCal.ZeroPoint.Flux.value" unit="Jy" datatype="float" />
32      <FIELD name="ZeroPointUnit" ucd="meta.unit" utype="photdm:PhotCal.ZeroPoint.Flux.unit" unit="" datatype="char" arraysize="*/>
33      <FIELD name="Mag0" ucd="phot.mag" utype="photdm:PhotCal.ZeroPoint.referenceMagnitude.value" unit="" datatype="float" />
34      <FIELD name="ZeroPointType" ucd="meta.code" utype="photdm:PhotCal.ZeroPoint.type" unit="" datatype="char" arraysize="*/>
35      <FIELD name="AsinhSoft" ucd="obs.param" utype="photdm:PhotCal.AsinhZeroPoint.softeningParameter" unit="" datatype="float" />
36      <FIELD name="TransmissionCurve" ucd="DATA_LINK" utype="photdm:PhotometryFilter.filterTransmissionCurve" datatype="char" arraysize="*/>
37    </TABLE>
38    <TABLEDATA>
39      <TR>
40        <TD>ivo://svo/fps</TD>
```

```

Archivo  Editar  Ver  Ayuda
32 <FIELD name="ZeroPointType" ucd="meta.code" utype="phoTdm:PhotCal.ZeroPoint.type" unit="" datatype="char" arraysize="*" />
33 <FIELD name="Mag0" ucd="phot.mag" utype="phoTdm:PhotCal.ZeroPoint.referenceMagnitude.value" unit="" datatype="float" />
34 <FIELD name="ZeroPointType" ucd="meta.code" utype="phoTdm:PhotCal.ZeroPoint.type" unit="" datatype="char" arraysize="*" />
35 <FIELD name="AsinhSoft" ucd="obs.param" utype="phoTdm:PhotCal.AsinhZeroPoint.softeningParameter" unit="" datatype="float" />
36 <FIELD name="TransmissionCurve" ucd="DATA_LINK" utype="phfDm:PhotometryFilter.filterTransmissionCurve" datatype="char" arraysize="*" />
37 <DATA>
38 <TABLEDATA>
39 <TR>
40 <TD>ivo://svo/fps</TD>
41 <TD>LaSilla/SOFI.NB106</TD>
42 <TD>Angstrom</TD>
43 <TD>em.wl</TD>
44 <TD>SOFI</TD>
45 <TD>0</TD>
46 <TD></TD>
47 <TD>SOFI</TD>
48 <TD>La Silla</TD>
49 <TD>http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html</TD>
50 <TD></TD>
51 <TD>SOFI NB106</TD>
52 <TD></TD>
53 <TD>10622.3466721</TD>
54 <TD>10622.9809031</TD>
55 <TD>10530.355</TD>
56 <TD>10713.7415385</TD>
57 <TD>95.887833635</TD>
58 <TD>10622.023548</TD>
59 <TD>10622.298722</TD>
60 <TD>10611</TD>
61 <TD>10622.0766501</TD>
62 <TD>94.6030806172</TD>
63 <TD>LaSilla/SOFI.NB106/Vega</TD>
64 <TD>Vega</TD>
65 <TD>2002.5667619</TD>
66 <TD>Jy</TD>|
67 <TD>0</TD>
68 <TD>Pogson</TD>
69 <TD>0</TD>
70 <TD><![CDATA[http://svo2.cab.inta-csic.es/theory/fps/fps.php?ID=LaSilla/SOFI.NB106]]></TD>
71 </TR>
72 <TR>
73 <TD>ivo://svo/fps</TD>
74 <TD>Gemini/NIRI.Jcont1065-G0239</TD>
75 <TD>Angstrom</TD>
76 <TD>em.wl</TD>
77 <TD>NIRI</TD>
78 <TD>0</TD>
79 <TD></TD>
80 <TD>NIRI</TD>
81 <TD>Gemini</TD>

```



# VO interface: SSAP: Data query

http://svo2.cab.inta-csic.es/theory/fps/fps.php?ID=LaSilla/SOFI.NB106

Código fuente de: file:///tmp/LaSilla.SOFI.NB106.xml - Mozilla Firefox

Archivo Editar Ver Ayuda

```
1 <?xml version="1.0"?>
2 <VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
3   <INFO name="QUERY_STATUS" value="OK"/>
4   <RESOURCE type="results">
5     <PARAM name="FilterProfileService" value="ivo://svo/fps" ucd="meta.ref.ivo" utype="PhotometryFilter.fpsIdentifier" datatype="char" arraysize="*" />
6     <PARAM name="filterID" value="LaSilla/SOFI.NB106" ucd="meta.id" utype="photdm:PhotometryFilter.identifier" datatype="char" arraysize="*" />
7     <PARAM name="WavelengthUnit" value="Angstrom" ucd="meta.unit" utype="PhotometryFilter.SpectralAxis.unit" datatype="char" arraysize="*" />
8     <PARAM name="WavelengthUCD" value="em.wl" ucd="meta.ucd" utype="PhotometryFilter.SpectralAxis.UCD" datatype="char" arraysize="*" />
9     <PARAM name="Description" value="SOFI NB106" ucd="meta.note" utype="photdm:PhotometryFilter.description" datatype="char" arraysize="*" />
10    <PARAM name="PhotSystem" value="SOFI" utype="photdm:PhotometricSystem.description" datatype="char" arraysize="*" />
11    <DESCRIPTION>Photometric system</DESCRIPTION>
12  </PARAM>
13  <PARAM name="Instrument" value="SOFI" ucd="instr" datatype="char" arraysize="*" />
14  <DESCRIPTION>Instrument</DESCRIPTION>
15 </PARAM>
16 <PARAM name="Facility" value="La Silla" ucd="instr.obst" datatype="char" arraysize="*" />
17 <DESCRIPTION>Observational facility</DESCRIPTION>
18 </PARAM>
19 <PARAM name="ProfileReference" value="http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html" datatype="char" arraysize="*" />
20 <PARAM name="Description" value="SOFI NB106" ucd="meta.note" utype="photdm:PhotometryFilter.description" datatype="char" arraysize="*" />
21 <PARAM name="WavelengthMean" value="10622.3466721" unit="Angstrom" ucd="em.wl" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Location.Value" />
22 <DESCRIPTION>Mean wavelength. Defined as  $\int \lambda \times \text{filter}(\lambda) \, d\lambda / \int \text{filter}(\lambda) \, d\lambda$ </DESCRIPTION>
23 </PARAM>
24 <PARAM name="WavelengthEff" value="10621.9809031" unit="Angstrom" ucd="em.wl.effective" datatype="float" />
25 <DESCRIPTION>Effective wavelength. Defined as  $\int \lambda \times \text{filter}(\lambda) \times \text{vega}(\lambda) \, d\lambda / \int \text{filter}(\lambda) \times \text{vega}(\lambda) \, d\lambda$ </DESCRIPTION>
26 </PARAM>
27 <PARAM name="WavelengthMin" value="10530.355" unit="Angstrom" ucd="em.wl.stat.min" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.Start" />
28 <DESCRIPTION>Minimum filter wavelength. Defined as the first lambda value with a transmission at least 1% of maximum transmission</DESCRIPTION>
29 </PARAM>
30 <PARAM name="WavelengthMax" value="10713.7415385" unit="Angstrom" ucd="em.wl.stat.max" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.End" />
31 <DESCRIPTION>Maximum filter wavelength. Defined as the last lambda value with a transmission at least 1% of maximum transmission</DESCRIPTION>
32 </PARAM>
33 <PARAM name="WidthEff" value="95.887833635" unit="Angstrom" ucd="instr.bandwidth" utype="photdm:PhotometryFilter.SpectralAxis.Coverage.Bounds.Extent" />
34 <DESCRIPTION>Effective width. Defined as  $\int \lambda \times \text{filter}(\lambda) \, d\lambda / \int \text{filter}(\lambda) \, d\lambda$ . Equivalent to the horizontal size of a rectangle with height equal to maximum transmission</DESCRIPTION>
35 </PARAM>
36 <PARAM name="WavelengthCen" value="10622.023548" unit="Angstrom" ucd="em.wl" datatype="float" />
37 <DESCRIPTION>Central wavelength. Defined as the central wavelength between the two points defining FWHM</DESCRIPTION>
38 </PARAM>
39 <PARAM name="WavelengthPivot" value="10622.298722" unit="Angstrom" ucd="em.wl" datatype="float" />
40 <DESCRIPTION>Peak wavelength. Defined as  $\sqrt{\int \lambda \times \text{filter}(\lambda) \, d\lambda / \int \text{filter}(\lambda) \, d\lambda}$ </DESCRIPTION>
41 </PARAM>
42 <PARAM name="WavelengthPeak" value="10611" unit="Angstrom" ucd="em.wl" datatype="float" />
43 <DESCRIPTION>Peak wavelength. Defined as the lambda value with longer transmissions</DESCRIPTION>
```

Archivo Editar Ver Ayuda

```

45 </PARAM>
46 <PARAM name="WavelengthPhot" value="10622.0766501" unit="Angstrom" ucd="em.wl" datatype="float" >
47   <DESCRIPTION>Photon distribution based effective wavelength. Defined as  $\int x^2 \cdot \text{filter}(x) \cdot \text{vega}(x) dx / \int x \cdot \text{filter}(x) \cdot \text{vega}(x) dx$ </DESCRIP
48 </PARAM>
49 <PARAM name="FWHM" value="94.6030806172" unit="Angstrom" ucd="instr.bandwidth" datatype="float" >
50   <DESCRIPTION>Full width at half maximum. Defined as the difference between the two wavelengths for which filter transmission is half maximum</D
51 </PARAM>
52 <PARAM name="PhotCalID" value="LaSilla/SOFI.NB106/Vega" ucd="meta.id" utype="photdm:PhotCal.identifier" datatype="char" arraysize="*" />
53 <PARAM name="MagSys" value="Vega" ucd="meta.code" utype="photdm:PhotCal.MagnitudeSystem.type" datatype="char" arraysize="*" />
54 <PARAM name="ZeroPoint" value="2002.5667619" unit="Jy" ucd="phot.flux.density" utype="photdm:PhotCal.ZeroPoint.Flux.value" datatype="float" />
55 <PARAM name="ZeroPointUnit" value="Jy" ucd="meta.unit" utype="photdm:PhotCal.ZeroPoint.Flux.unit" datatype="char" arraysize="*" />
56 <PARAM name="ZeroPointType" value="Pogson" ucd="meta.code" utype="photdm:PhotCal.ZeroPoint.type" datatype="char" arraysize="*" />
57 <TABLE utype="photdm:PhotometryFilter.transmissionCurve.spectrum">
58   <FIELD name="Wavelength" utype="spec:Data.SpectralAxis.Value" ucd="em.wl" unit="Angstrom" datatype="float" />
59   <FIELD name="Transmission" utype="spec:Data.FluxAxis.Value" ucd="phys.transmission" unit="" datatype="float" />
60   <DATA>
61     <TABLEDATA>
62       <TR>
63         <TD>10525.000000</TD>
64         <TD>0.000800</TD>
65       </TR>
66       <TR>
67         <TD>10526.000000</TD>
68         <TD>0.002100</TD>
69       </TR>
70       <TR>
71         <TD>10527.000000</TD>
72         <TD>0.003800</TD>
73       </TR>
74       <TR>
75         <TD>10529.000000</TD>
76         <TD>0.005600</TD>
77       </TR>
78       <TR>
79         <TD>10530.000000</TD>
80         <TD>0.007400</TD>
81       </TR>
82       <TR>
83         <TD>10531.000000</TD>
84         <TD>0.009000</TD>
85       </TR>
86       <TR>
87         <TD>10532.000000</TD>
88         <TD>0.010400</TD>
89       </TR>
90       <TR>
91         <TD>10533.000000</TD>
92         <TD>0.011600</TD>
93     </TABLEDATA>

```

- Retrieving information about a filter knowing its ID

[http://svo2.cab.inta-csic.es/theory/fps/fps.php?  
PhotometryFilter.identifier=LaSilla/SOFI.NB106](http://svo2.cab.inta-csic.es/theory/fps/fps.php?PhotometryFilter.identifier=LaSilla/SOFI.NB106)

- Retrieving information about a filter and its calibration knowing its PhotCalID

[http://svo2.cab.inta-csic.es/theory/fps/fps.php?  
PhotCal.identifier=SLOAN/SDSS.u/AB](http://svo2.cab.inta-csic.es/theory/fps/fps.php?PhotCal.identifier=SLOAN/SDSS.u/AB)

- Not only a repository of filter information.
- It intends to be useful as a reference point around which other services and applications can be built in a much easier way (VO interface).
- Use cases:
  - Transform catalog magnitudes into fluxes
  - Calculate synthetic photometry
    - for theoretical models or
    - for observed spectra
  - Compare observed and synthetic photometry

- Synthetic photometry for theoretical models.
  - FPS filters (1800)
  - More than 20 theoretical models  
<http://svo2.cab.inta-csic.es/theory/newov/syph.php>
- Synthetic photometry for observed spectra.
  - Observational templates.
  - User spectra  
<http://svo2.cab.inta-csic.es/theory/myspec>
- VOSA
  - User and VO catalog observed photometry.
  - Translate magnitudes to fluxes.
  - Compare synthetic and observed photometry (Fit process).

# SVO Synthetic Photometry

## Synthetic Photometry Web Server

 Model: BT-Settl Change
**BT-Settl**

The BT-Settl Model grid of theoretical spectra; With a cloud model, valid across the entire parameter range.

### Model parameters

 T<sub>eff</sub>: 1800 - 3000 (?)

 Logg: 4 - 5.5 (?)

 Metallicity: 0 - 0 (?)

 Show: all results


### Filters

 2MASS/2MASS.H  
 2MASS/2MASS.J  
 2MASS/2MASS.Ks  
 AAO/AAO.aao1  
 AAO/AAO.aao14  
 AAO/AAO.aao2  
 AAO/AAO.aao21  
 AAO/AAO.aao22  
 AAO/AAO.aao23  
 AAO/AAO.aao24

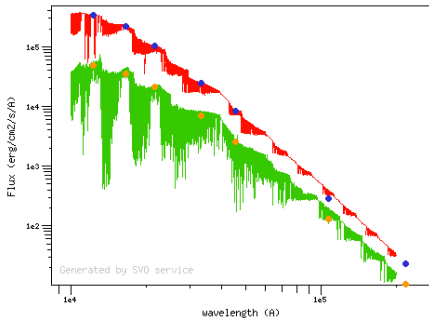
Show only filters with:

 λ<sub>mean</sub>:  -  Å

 Facility: 

 Instrument: 


(You can select 50 filters at most.)



- BT-Settl model,teff:3000, logg:5.5, m
- BT-Settl model,teff:3000, logg:5.5, m
- BT-Settl model,teff:1800, logg:4, met
- BT-Settl model,teff:1800, logg:4, met

 X: log scale:  range: 

 Y: log scale:  range: 
 Plot filters

58 files found






T <sub>eff</sub>	Logg	Alpha	Fetch	Mark	Fetch	Mark	Plot
2600	4	0	VOTable	<input type="checkbox"/>	ASCII	<input type="checkbox"/>	<input type="checkbox"/>

The filter profile service can be used as a common reference framework . It provides, in summary:

- a unique label for each filter.
- the transmission curve for each filter so that synthetic calculations can be performed
- the properties for each filter so that data can be handled (or plotted) adequately (mean wavelength value, range, width...)
- the calibration information so that observed magnitudes can be transformed into fluxes.

# THANK YOU!