



The ASDC SED Builder

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Overview

- ASDC SED Builder v 2.1
 - General characteristics
 - New Features:
 - Time information handling
 - Interoperability with other VO tools (SAMP Web Profile)
 - Export VOTable
 - Communication with IRIS
- Ongoing work and future plans
 - Add functions for SEDs analysis (in particular to explore the time domain)
 - Collaborations for data, physical models, fitting interchange



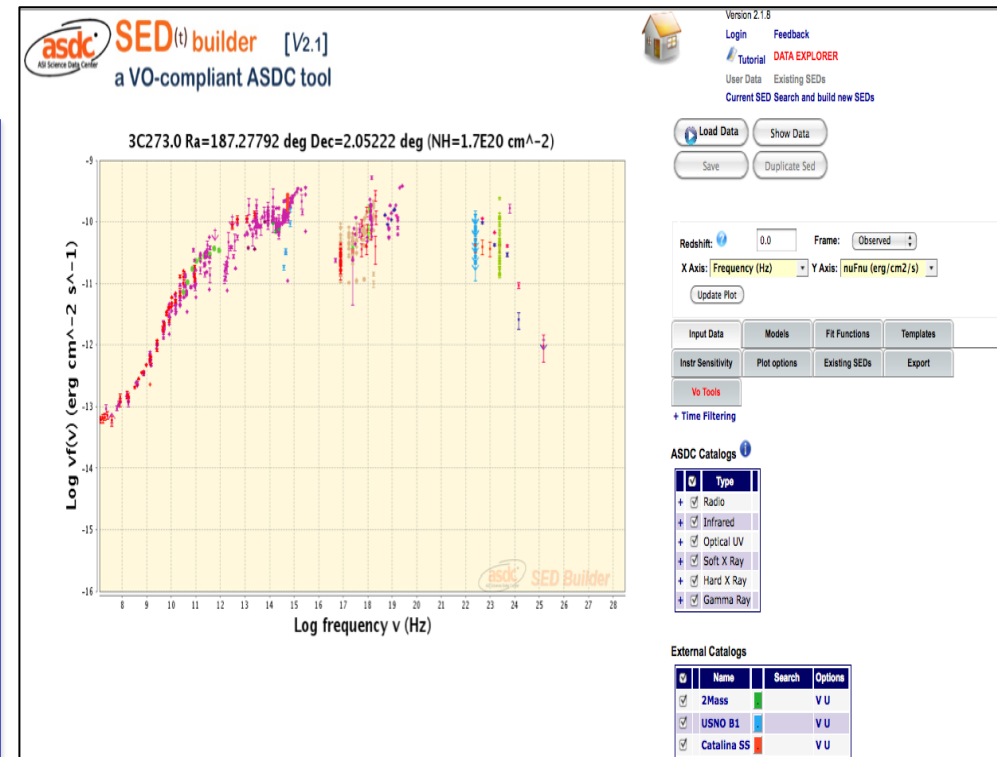
ASDC Builder v2.1

WEB application allowing to build and analyse SEDs, available at :

<http://tools.asdc.asi.it/SED/>

- Input data -

- Query to **ASDC** catalogs and **external** catalogs/services from radio to gamma rays e.g. NED, Catalina,...
- **Cone search query**, appropriate radius for each catalog, can be changed by the user
- **Time info handling**
- possibility to upload **user data**





Input catalogs

ASDC Catalogs

<input checked="" type="checkbox"/>	Type
+ <input checked="" type="checkbox"/>	Radio
+ <input checked="" type="checkbox"/>	Infrared
+ <input checked="" type="checkbox"/>	Optical UV
+ <input checked="" type="checkbox"/>	Soft X Ray
+ <input checked="" type="checkbox"/>	Hard X Ray
+ <input checked="" type="checkbox"/>	Gamma Ray

External Catalogs

<input checked="" type="checkbox"/>	Name	Sev
<input checked="" type="checkbox"/>	2Mass	
<input checked="" type="checkbox"/>	USNO B1	
<input checked="" type="checkbox"/>	Catalina SS	
<input checked="" type="checkbox"/>	Ned	3C2
<input checked="" type="checkbox"/>	SDSS7	
<input checked="" type="checkbox"/>	USNO A2.0	

- AT

AT20GCAT (flux 20 GHz)

AT20GCAT (flux 5 GHz)

AT20GCAT (flux 8 GHz)

ATCAPMN (flux 3.6 cm)

ATCAPMN (flux 6 cm)

CRATES

DIXON

FIRST

+ GBT

JVSPOL

KUEHR

NIEPPOCAT

NVSS

PKSCAT90

+ PLANCK

PMN

SUMSS

VLANEP

VLSS

WENSS

+ WMAP

Name	Options
<input checked="" type="checkbox"/> GALEXISFUV	V U
<input checked="" type="checkbox"/> GALEXISNUV	
<input type="checkbox"/> GALEXMISFUV	
<input type="checkbox"/> GALEXMISNUV	

- GALEX

+ Swift

+ ASCA

+ Ariel V

- BeppoSAX

WFCCAT

WFCCAT FUL

+ CHANDRA

+ EXOSAT

- Einstein

IPC

IPCSLEW

- ROSAT

SKYROSAT

WGACAT2

- Swift

XRTGRBDEEP

U

+ UHURU

- XMM

TWOXMMIDR3

V U

- HEAO-1

A4 (25-40)

A4 (40-80)

A4 (80-180)

- INTEGRAL

IBISSG4CAT (20-40 keV)

IBISSG4CAT (40-100 keV)

- Swift

BAT39MCAT (10-150keV)

BAT39MCAT (15-30keV)

BAT54MCAT (15-150keV)

BAT54MCAT (15-50keV)

SWBAT58M (14-195 keV)

AGILE Grid

EGRET3

Fermi1FGL (200 Mev)

Fermi1FGL (2Gev)

Fermi1FGL (600 Mev)

Fermi1FGL (60Gev)

Fermi1FGL (6Gev)

- Fermi

Fermi2FGL (200 Mev)

Fermi2FGL (2Gev)

Fermi2FGL (600 Mev)

Fermi2FGL (60Gev)

Fermi2FGL (6Gev)

Fermi2FgILC





Multi-Mission Interactive Archive

SED data points can be obtained also by performing an on-line data analysis of data archived at ASDC.

Query results for: **3C45**
 Details: query by **COORDINATE** with RA = 347.490417; DEC = 16.148056; EQUINOX = 2000; RAI

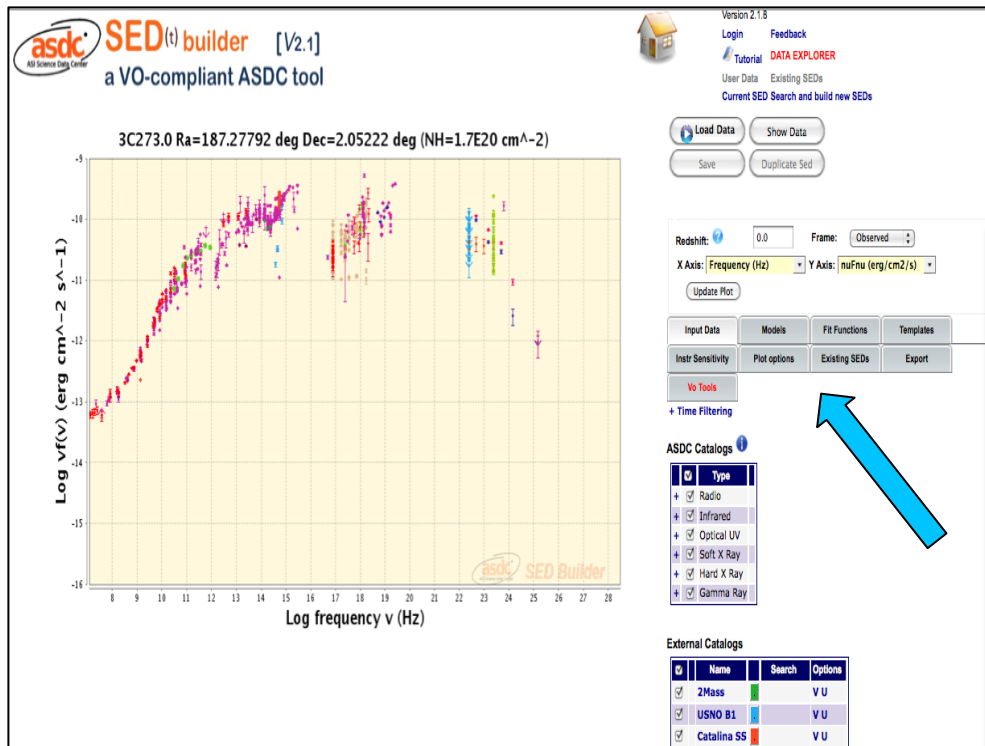
Export Current view of Table in: [Latex format](#) [FITS format](#) [Print](#)

Approximate Sensitivity

Entry number	XRT Interactive Analysis	Archive	Target Name	obsid	RA (J2000)	Dec (J2000)	start_time	processing_date	xrt_exposure	uvot_exposure	bat_exposure	archive_date	Dist. from searched position	
1	ASDC Data Explorer	Online Analysis	Data Access	3C454.3	00035030197	22 53 40.4	+16 11 07.0	Jan 7, 2011 06:34:00	Jan 13, 2011	1181.449	1180.611	1199	Jan 14, 2011	4.7
2	ASDC Data Explorer	Online Analysis	Data Access	3C454.3	00035030067	22 53 40.5	+16 07 34.6	Sep 16, 2009 22:15:00	Sep 22, 2009	1503.207	1478.167	1522	Sep 23, 2009	4.3
3	ASDC Data Explorer	Online Analysis	Data Access	3C454.3	00035030213	22 53 42.8	+16 07 27.1	Nov 7, 2011 11:12:00	Nov 13, 2011	1409.058	1352.714	1414	Nov 14, 2011	3.8

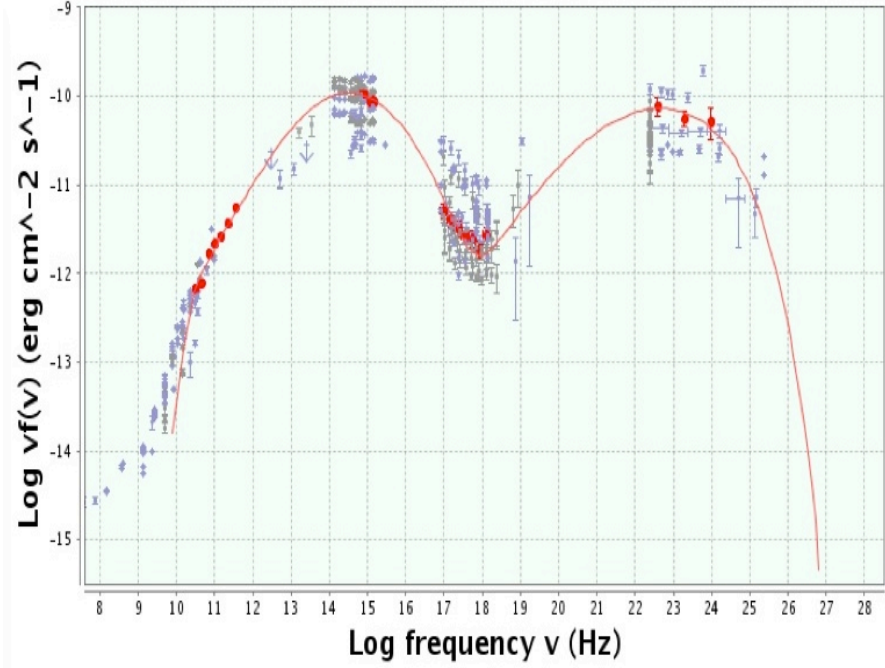
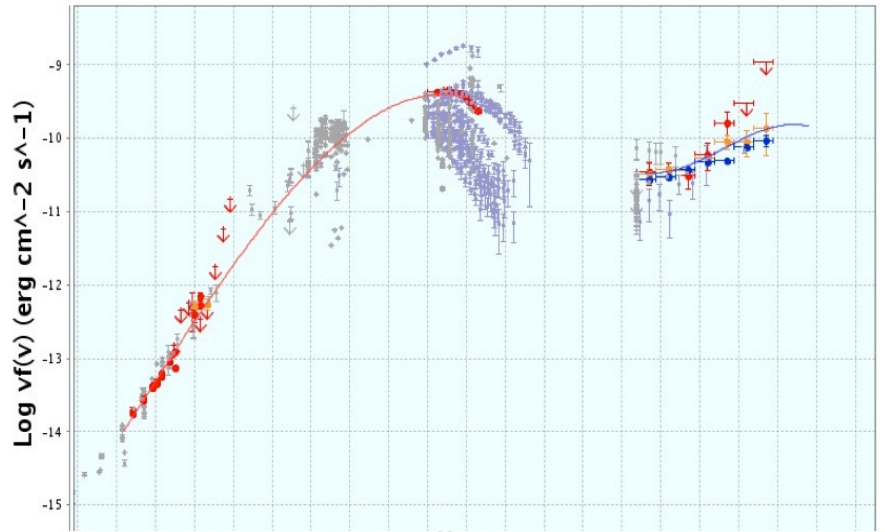


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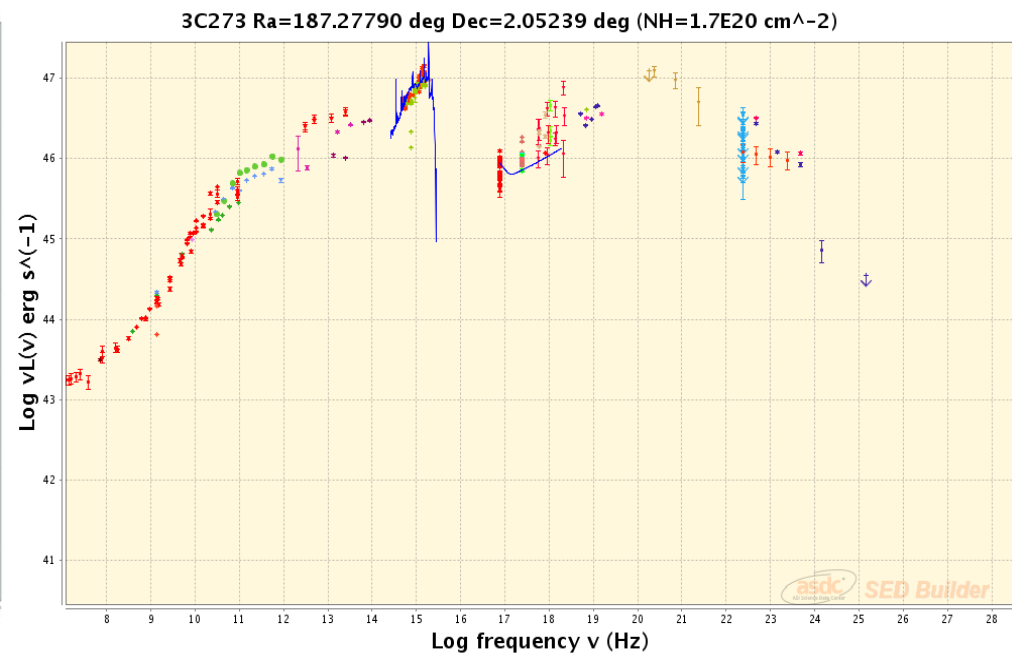


- Visualization & Analysis -

- Choose plot axis
 (Y: $F(\nu)$, $\nu F\nu$, $L(\nu)$, $\nu L\nu$; X: frequency, wavelength, energy)
- SED analysis (polynomial fit, compare data with templates of spectral models and emission models simulations, sensitivity curves of many instruments, photometric redshift estimation)



polynom. fit
models
templates





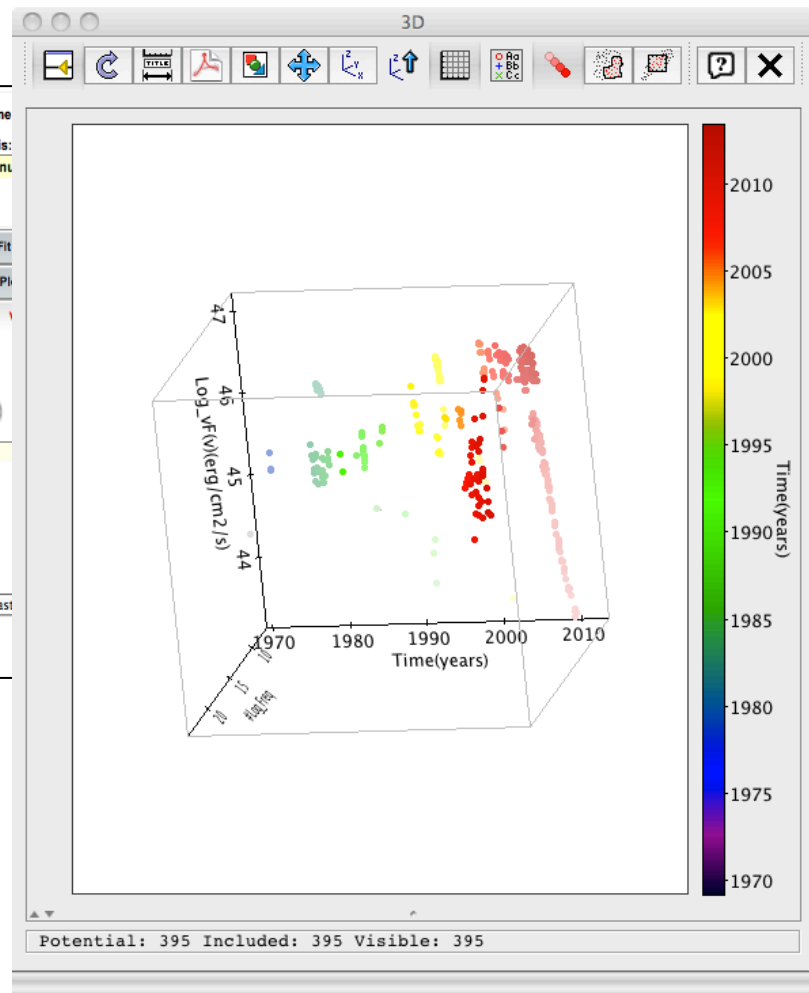
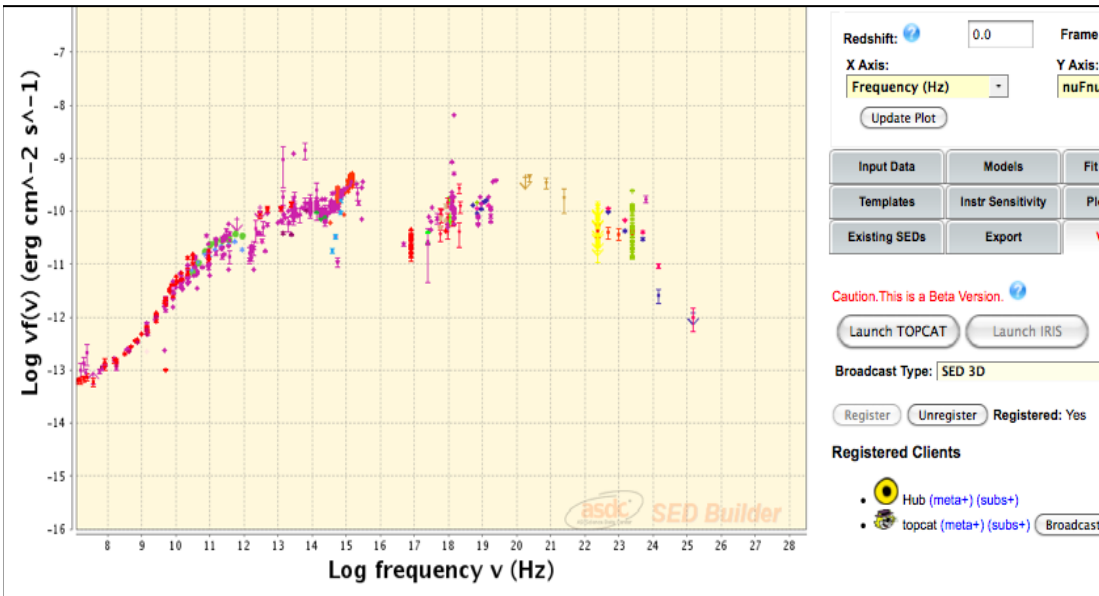
Latest changes

- **Interoperability** with other VO applications using **SAMP WebProfile** (Beta version)
 - allow to exploit the capability of other tools for the visualization and/or analysis (e.g.: 3D visualization and multi-plot in TOPCAT, IRIS fitting capability)
 - we used the SAMP javascript library **samp.js**, (provided by Mark Taylor <http://www.star.bristol.ac.uk/~mbt/websamp/samp.js>)
- Export SED in **VOTable** format



Interoperability using SAMP Web Profile

3D plot



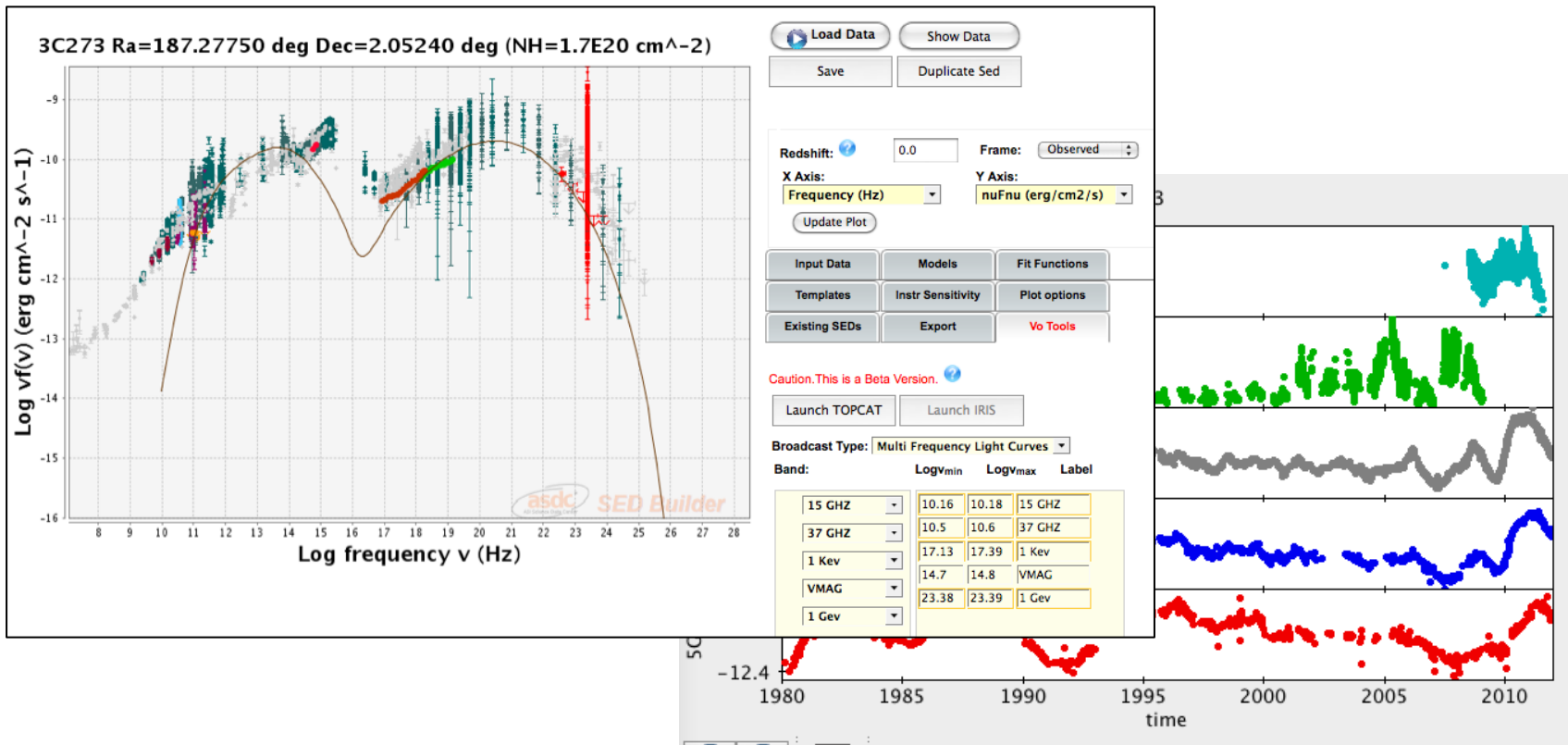
ASDC SED





Interoperability using SAMP Web Profile

multi-plot



ASDC SED





Export VOTable

- Option to export SEDs data in VOTable format (each segment follows the IVOA Spectrum Data Model Vers. 1.2)
- Work in progress to populate metadata tables used by the SED tool and to update the software following new version of the IVOA standards (Spectrum 2.0/Photometry/SED Data Model)

The screenshot shows a software interface for SED analysis. At the top, there are input fields for 'Redshift' (set to 0.0) and 'Frame' (set to 'Observed'). Below these are dropdown menus for 'X Axis' (set to 'Frequency (Hz)') and 'Y Axis' (set to 'nuFnu (erg/cm2/s)'). An 'Update Plot' button is located below the axis settings. A grid of buttons follows, including 'Input Data', 'Models', 'Fit Functions', 'Templates', 'Instr Sensitivity', 'Plot options', 'Existing SEDs', and 'Export'. Below the grid is a 'Vo Tools' button. The 'Export Type' dropdown is set to 'VOTABLE'. A red warning message reads 'Caution.This is a Beta Version.' At the bottom, there is an 'Export VoTable' button.



Export VOTable

VOTable size can be very large (a lot of metadata!) a 'reduced' version could simplify the data interchange

```

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- <GROUP name="Spectrum" utype="Spectrum">
  <PARAM name="DataModel" utype="Spectrum.DataModel" datatype="char" arraysize="*" value="Spectrum-1.2"/>
  <PARAM name="DataSetType" utype="Spectrum.Type" datatype="char" arraysize="*" value="Spectrum"/>
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  <PARAM name="Title" utype="Spectrum.DataID.Title" ucd="meta.title;meta.dataset" datatype="char" arraysize="*" value="(none)"/>
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  <PARAM name="Collection" utype="Spectrum.DataID.Collection" datatype="char" arraysize="*" value="None"/>
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- <GROUP name="Instruments" ucd="meta.id;instr" utype="Spectrum.DataID.Instruments">
  <PARAM name="InstrumentFilter" utype="Spectrum.DataID.Instruments.Filter" ucd="meta.id;instr.filter" datatype="char" arraysize="*" value="DEFAULT"/>
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</GROUP>
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  <PARAM name="Rights" utype="Spectrum.Curation.Rights" datatype="char" arraysize="*" value="PUBLIC"/>
  <PARAM name="ContactName" utype="Spectrum.Curation.ContactName" ucd="meta.bib.author;meta.curation" datatype="char" arraysize="*" value="VO_HELPDESK"/>
  <PARAM name="ContactEmail" utype="Spectrum.Curation.ContactEmail" ucd="meta.ref.url;meta.email" datatype="char" arraysize="*" value="vo_helpdesk@asdc.asi.it"/>
</GROUP>
- <GROUP name="Target" utype="Spectrum.Target">
  <PARAM name="TargetName" utype="Spectrum.Target.Name" ucd="meta.id;src" datatype="char" arraysize="*" value="3C273"/>
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  </GROUP>
</GROUP>

```



Ongoing work and future plans

- Project for the SED timing analysis
- Collaboration between ASDC and VAO on ASDC SED and VAO IRIS
 - our data now available for visualization within IRIS (IRIS plug-in)
 - collaboration will likely continue on the time domain exploration and visualization
- Design interoperation with other services providing theoretical predictions and best fitting of physical emission models (e.g. ISDC Geneva)



ASDC Plug-in for IRIS

The screenshot displays the ASDC software interface. On the left, a sidebar contains icons for 'Load File', 'SED Builder', 'ASDC Data', and 'SAMP status: connected'. The main window is titled 'SED Builder' and contains a 'File' menu, 'X axis' (SpectralAxis), 'Y axis' (FluxAxis), 'Grid off', and 'Auto' options. A plot shows the spectral energy distribution (SED) for target 'mkn501'. The y-axis is labeled $\nu F(\nu)$ (erg/s/cm²) and ranges from 1.0×10^{-13} to 1.0×10^{-9} . The x-axis is labeled 'Frequency (Hz)' and ranges from 1.0×10^{11} to 10.0×10^{20} . The plot shows data points from various catalogs, including Swift, HEAO-1, and INTEGRAL. A modal window is open over the plot, showing target information for 'mkn501' (NED Name) and 'Version: 1....'. It includes date format and date selection options (TStart Date: 2007-10-16, TStop Date: 2012-10-10). The 'Catalogs Available' list includes Infrared, Hard X Ray, Swift, HEAO-1, and INTEGRAL. The 'SED Creation Mode' is set to 'Append' and the 'Search Radius' is 5.0 arc... A 'Submit' button is at the bottom of the modal window.