CHANDRA
X-RAY OBSERVATORY

Constructing and Analyzing Spectral Energy Distributions with Iris

Jamie Budynkiewicz, SAO

Download demo data

On flash drives

<path-to-driver>/iris/worksheets/demo

On Github

git clone https://github.com/ChandraCXC/aas229iris
cd aas229iris/worksheets/demo

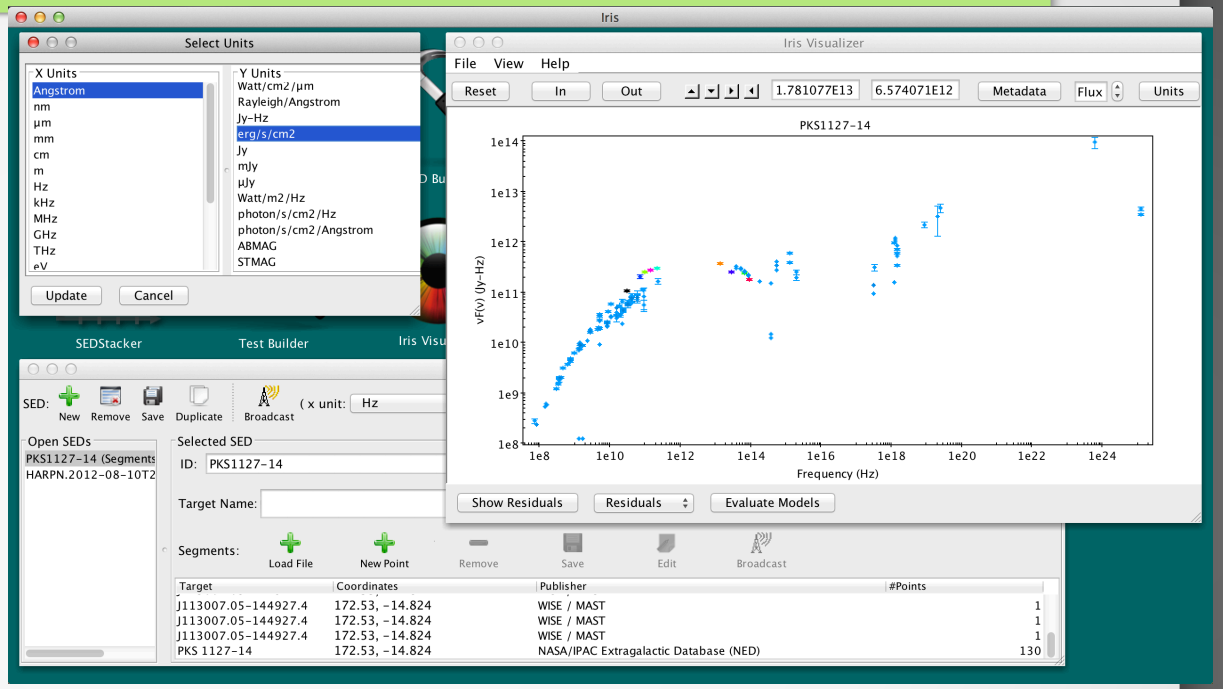
See meeting website for more details

http://bit.ly/aas229_modelingws

In this talk…

- Iris

Main features
Demonstration



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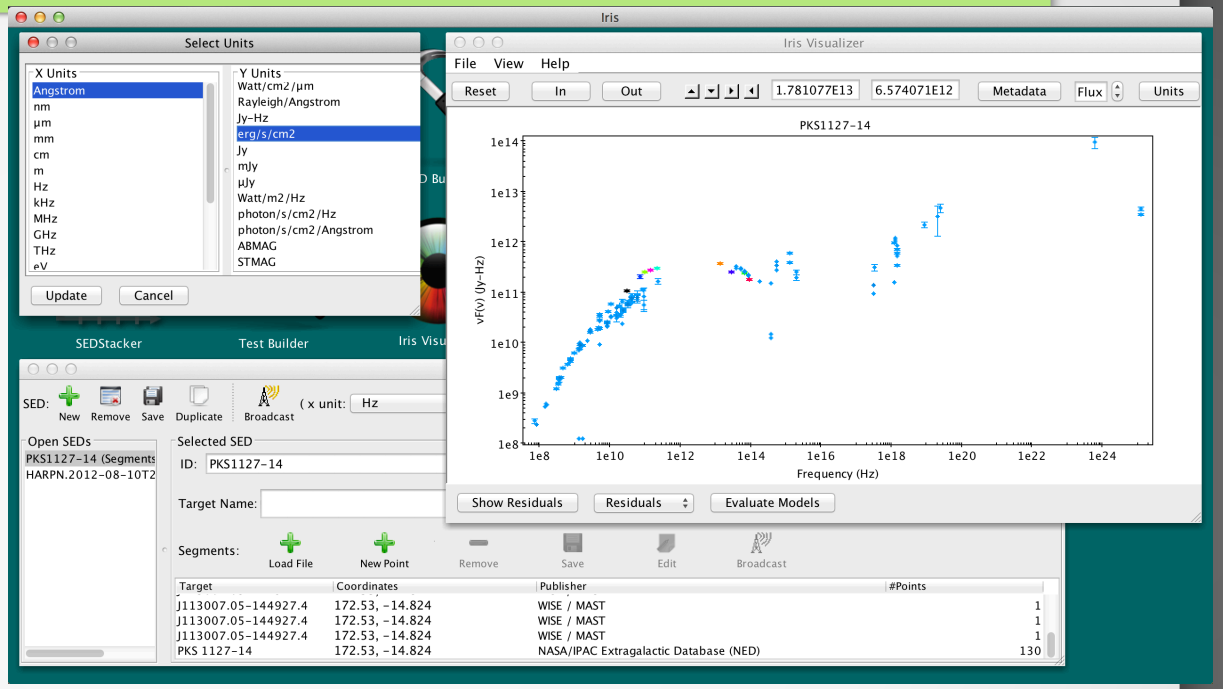
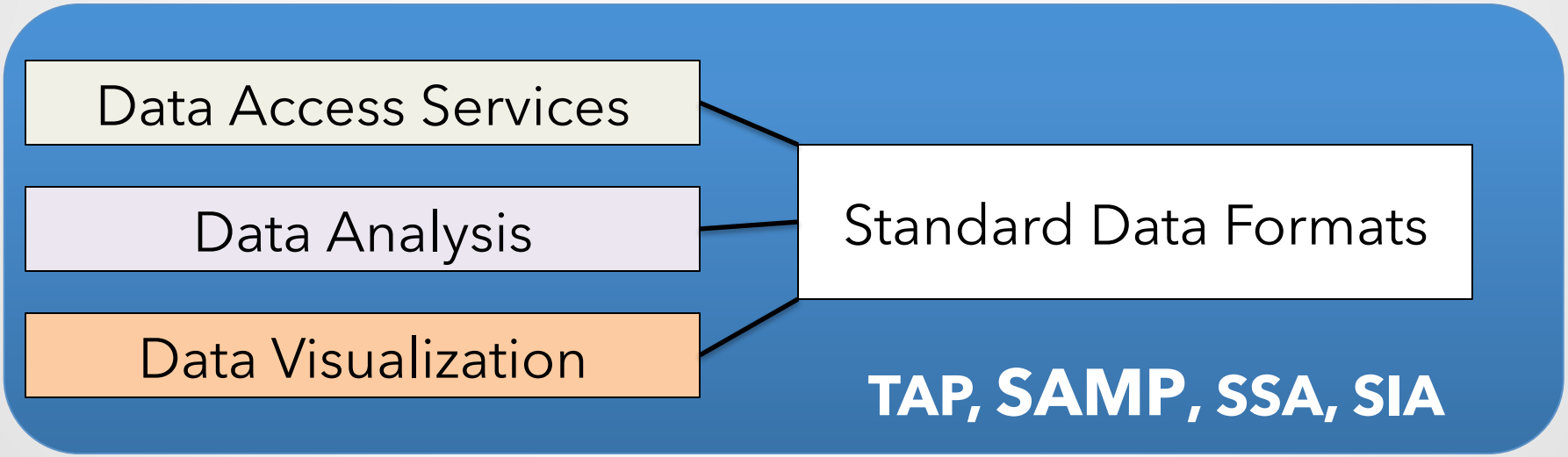


Virtual Observatory efforts

Virtual Observatory

Main goal – provide a framework that allows easy data discovery and access on a global scale



SAMP (Simple Application Messaging Protocol)
communication between applications and services

For more info:
ivoa.net

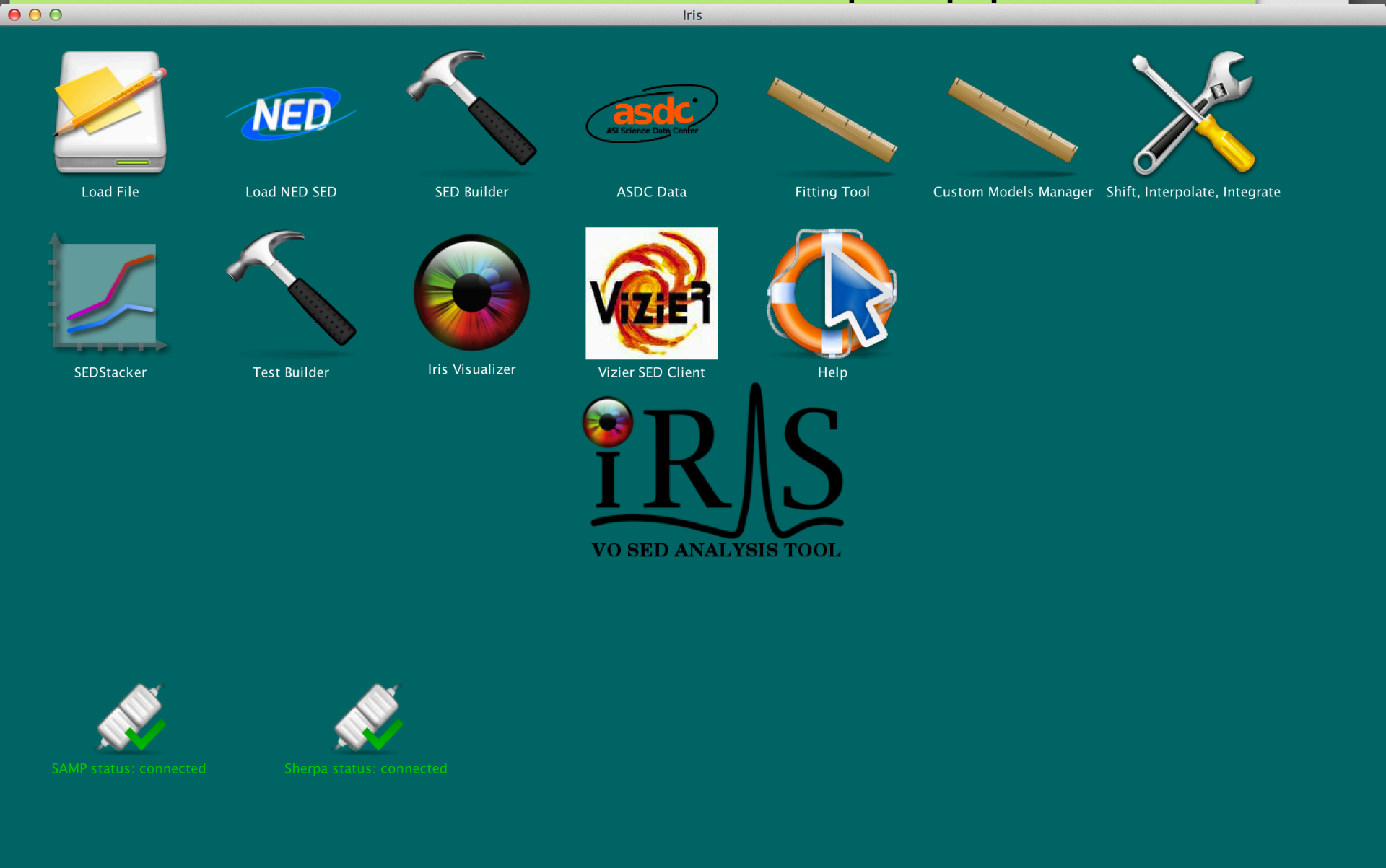
Iris Development Efforts

CHANDRA
X-RAY OBSERVATORY

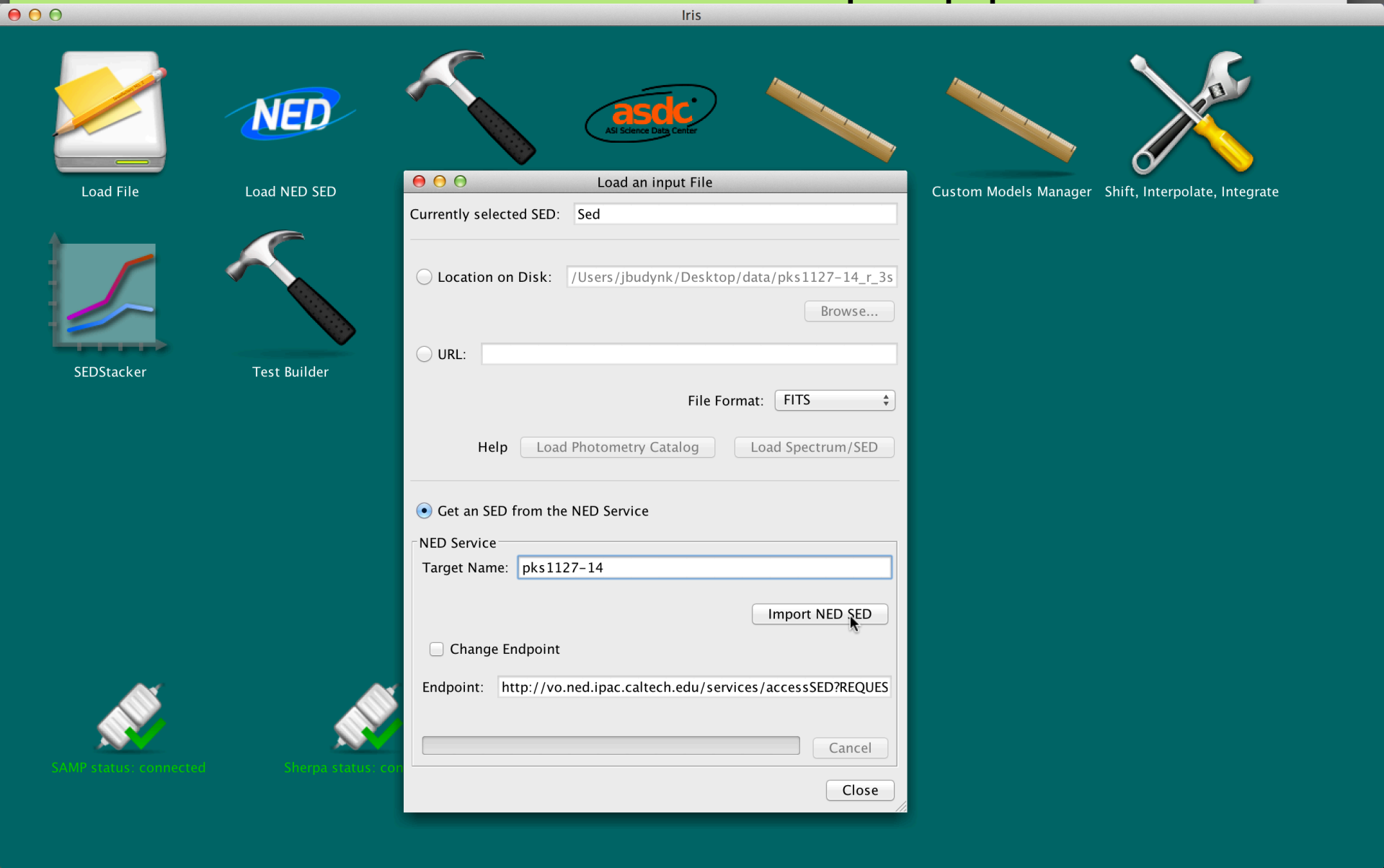
VAO
VIRTUAL ASTRONOMICAL OBSERVATORY

What is Iris?

Iris – an interactive desktop app



Iris – an interactive desktop app



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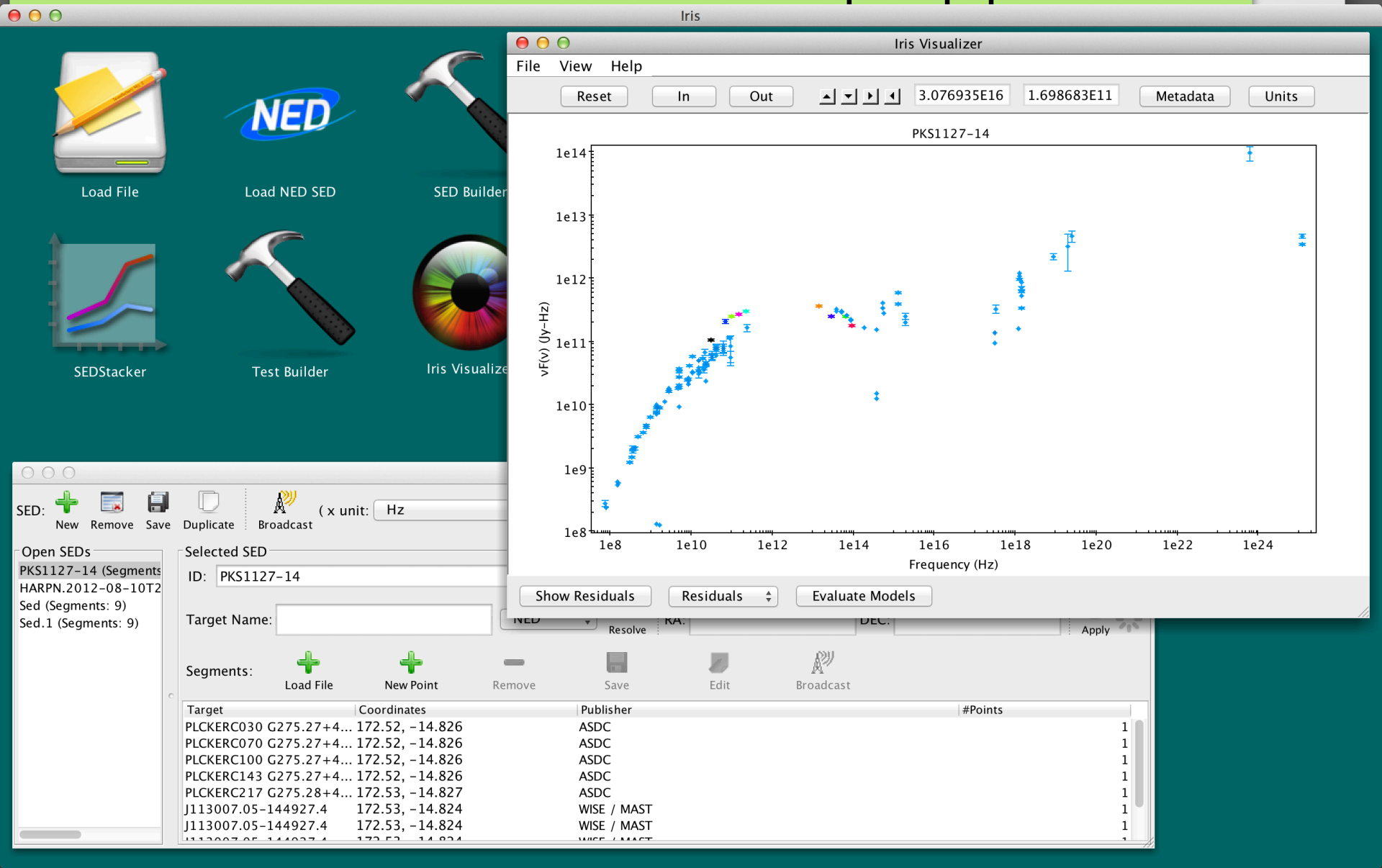

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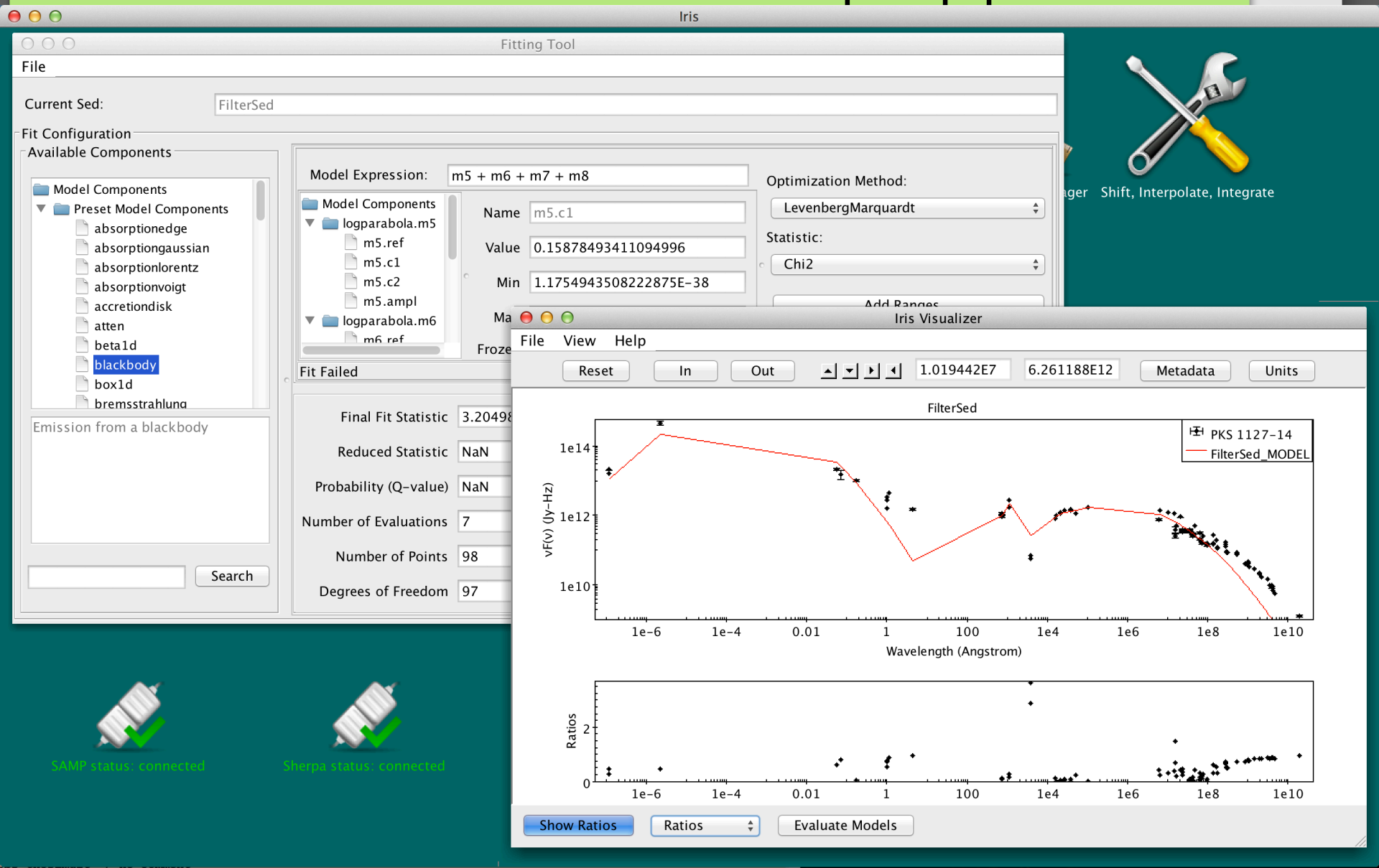

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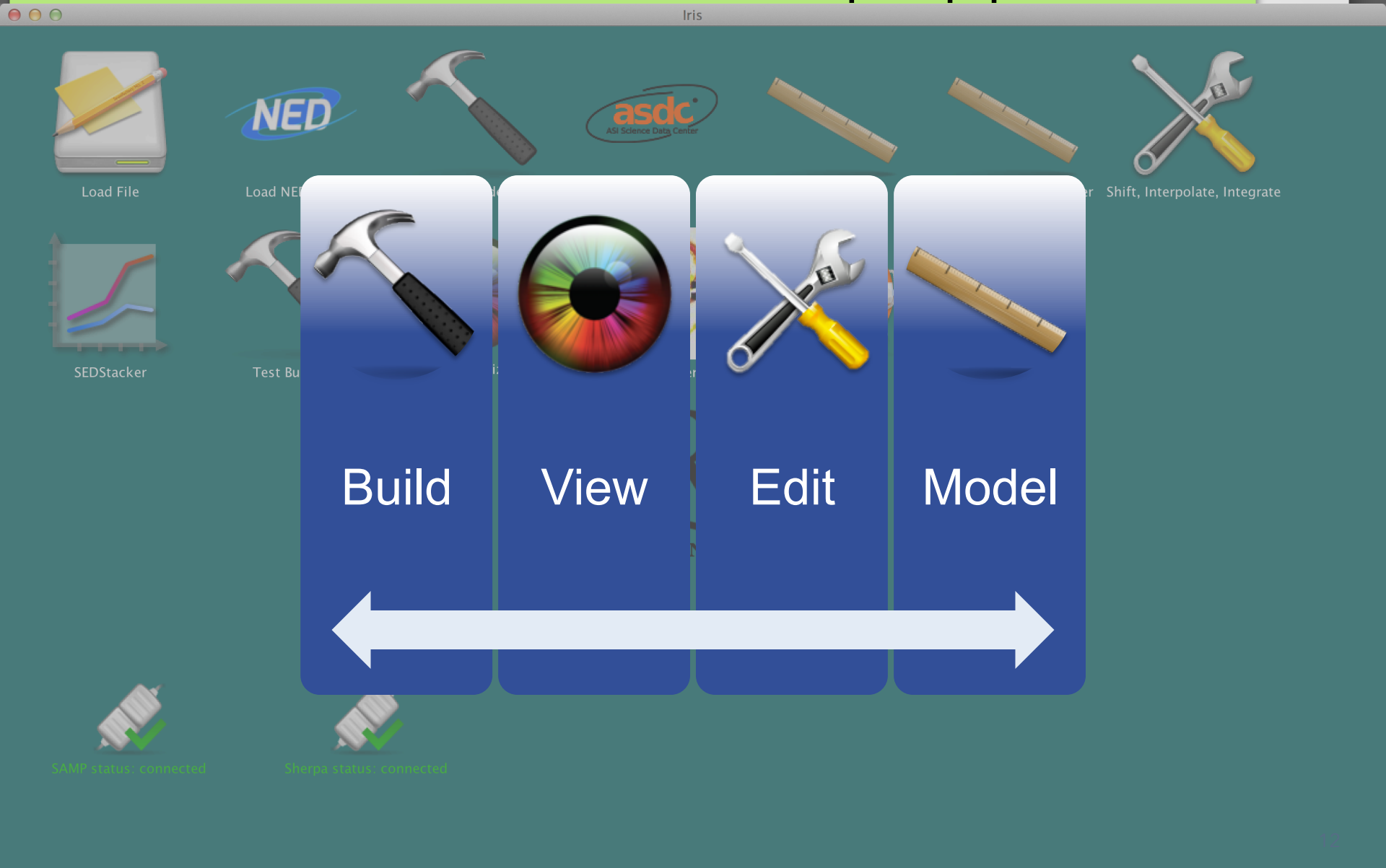
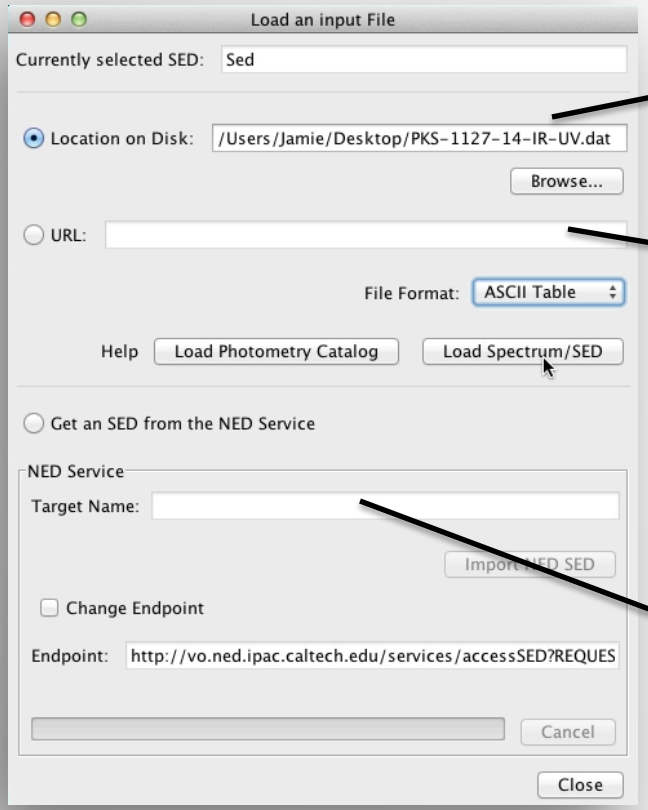


Main Features

Iris – Main Features

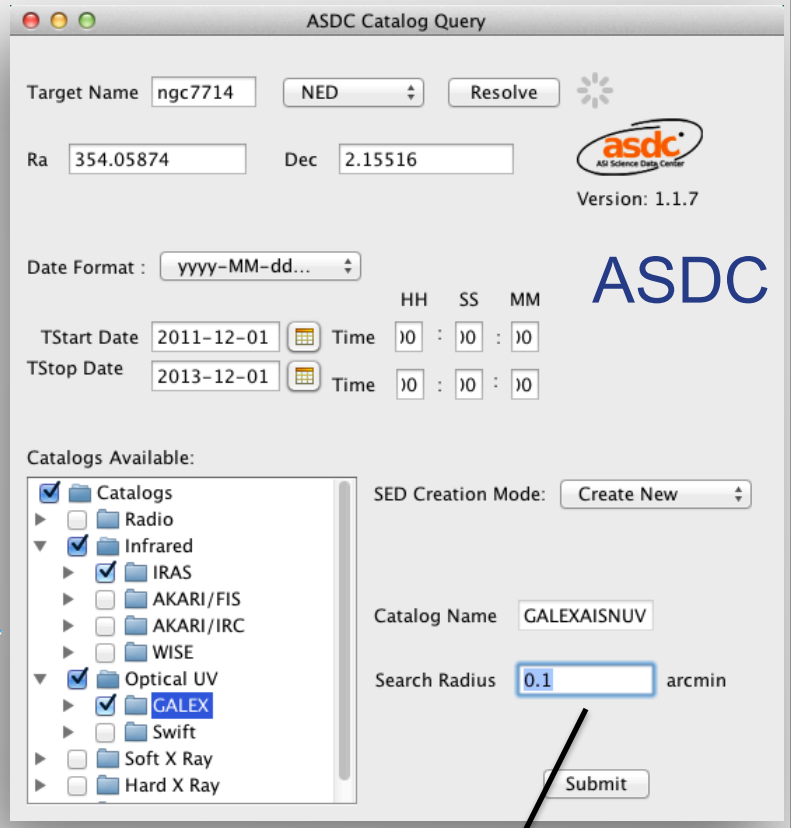
SED Builder: Data I/O & Management



File

URL

NED



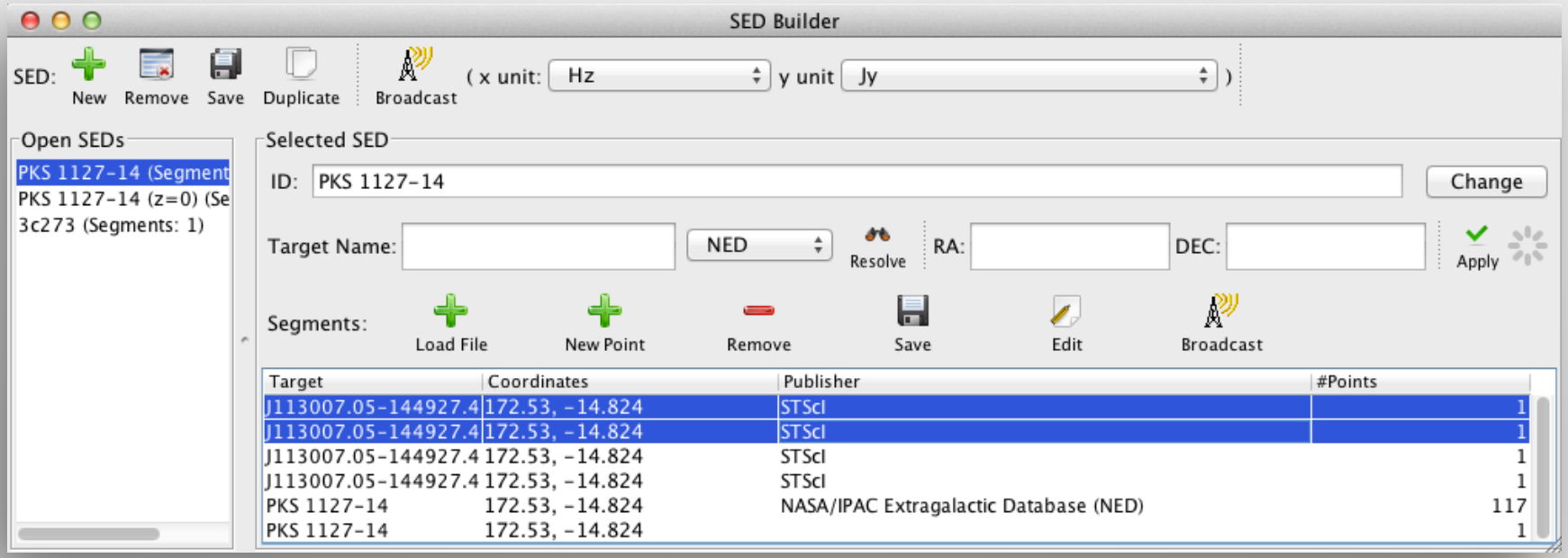
ASDC

Cone Search

Iris – Main Features

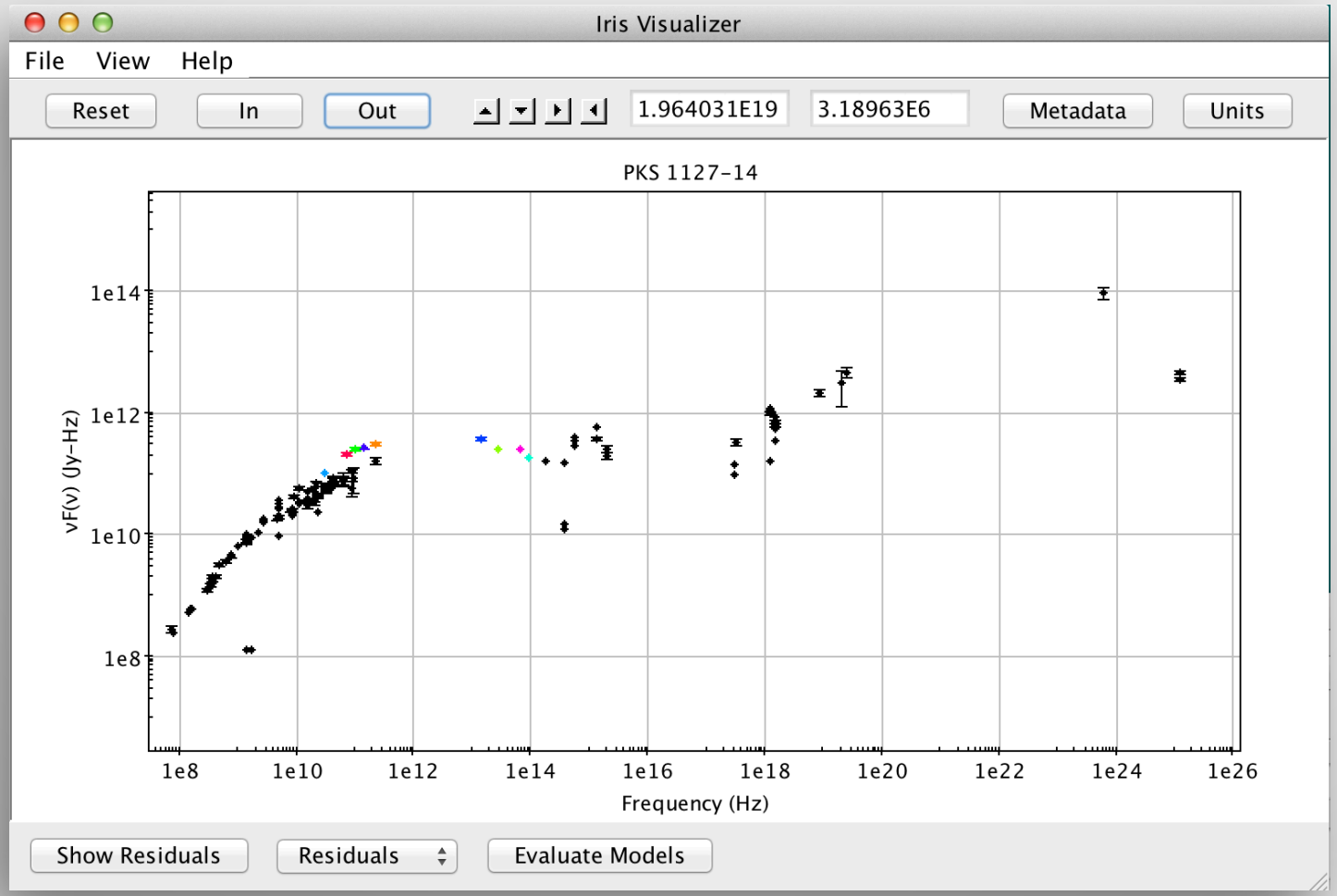
SED Builder: Data I/O & Management

- Manage each dataset separately
- **Save** SEDs in VO-compliant **FITS** and **VOT**, also **ASCII**
- Send data between applications via **SAMP**



Iris – Main Features

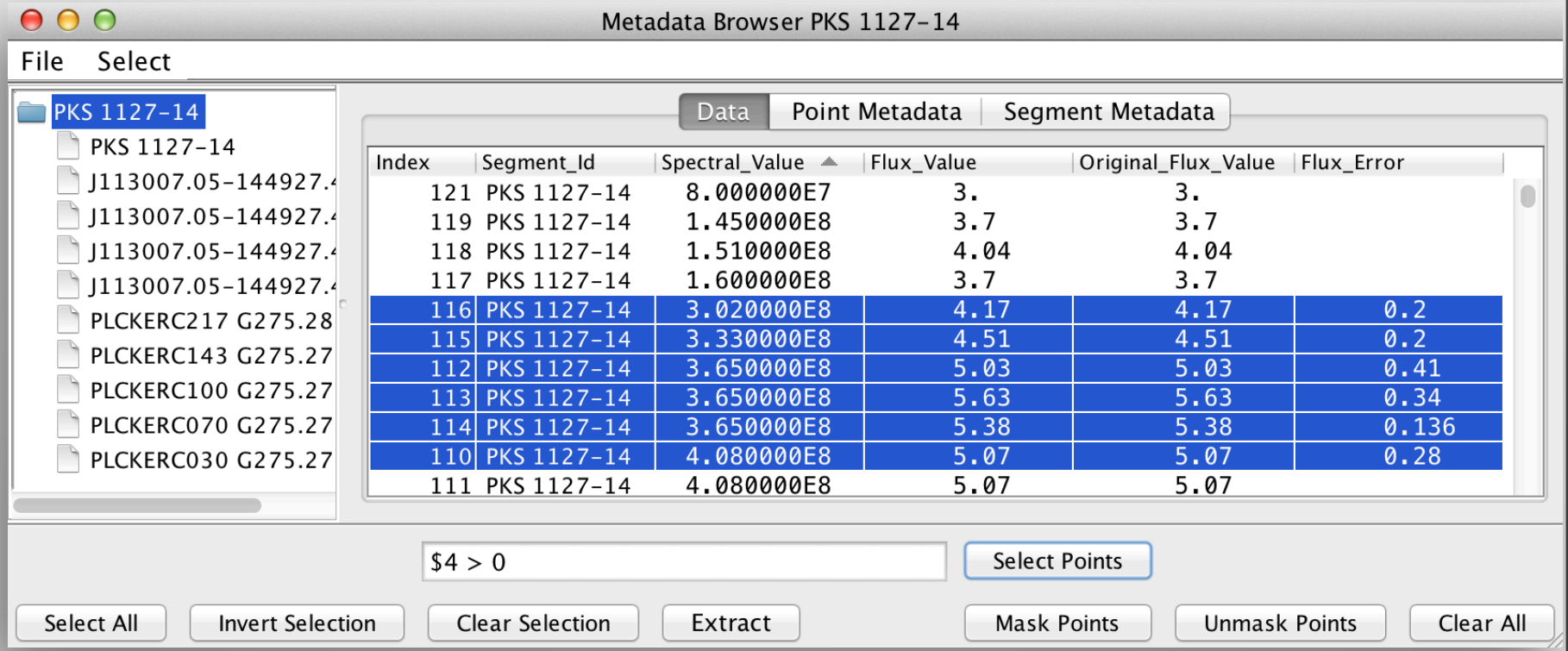
Visualizer: Visualization & Data Inspection



Iris – Main Features

Visualizer: Visualization & Data Inspection

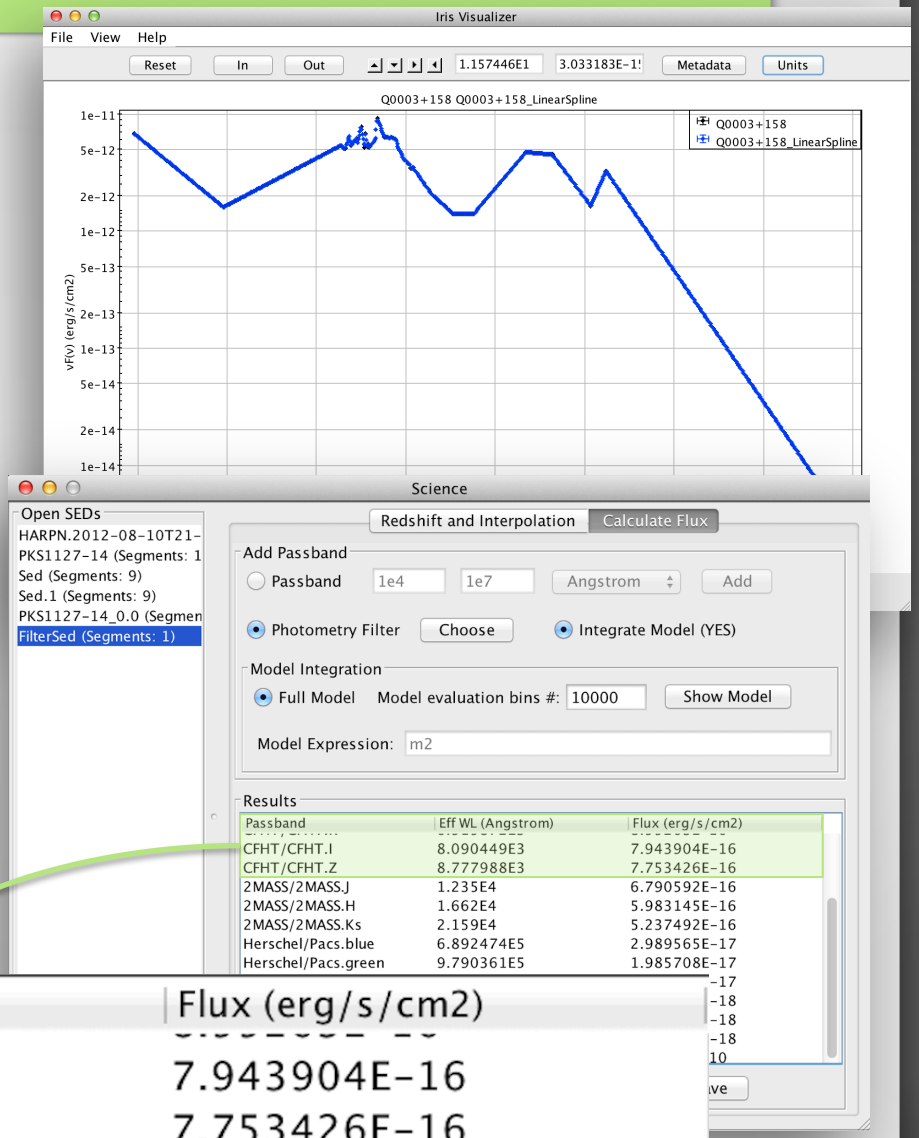
- Mask
- Filter
- Create new SEDs



Iris – Main Features

Science Tools: Shift, Interpolate & Integrate

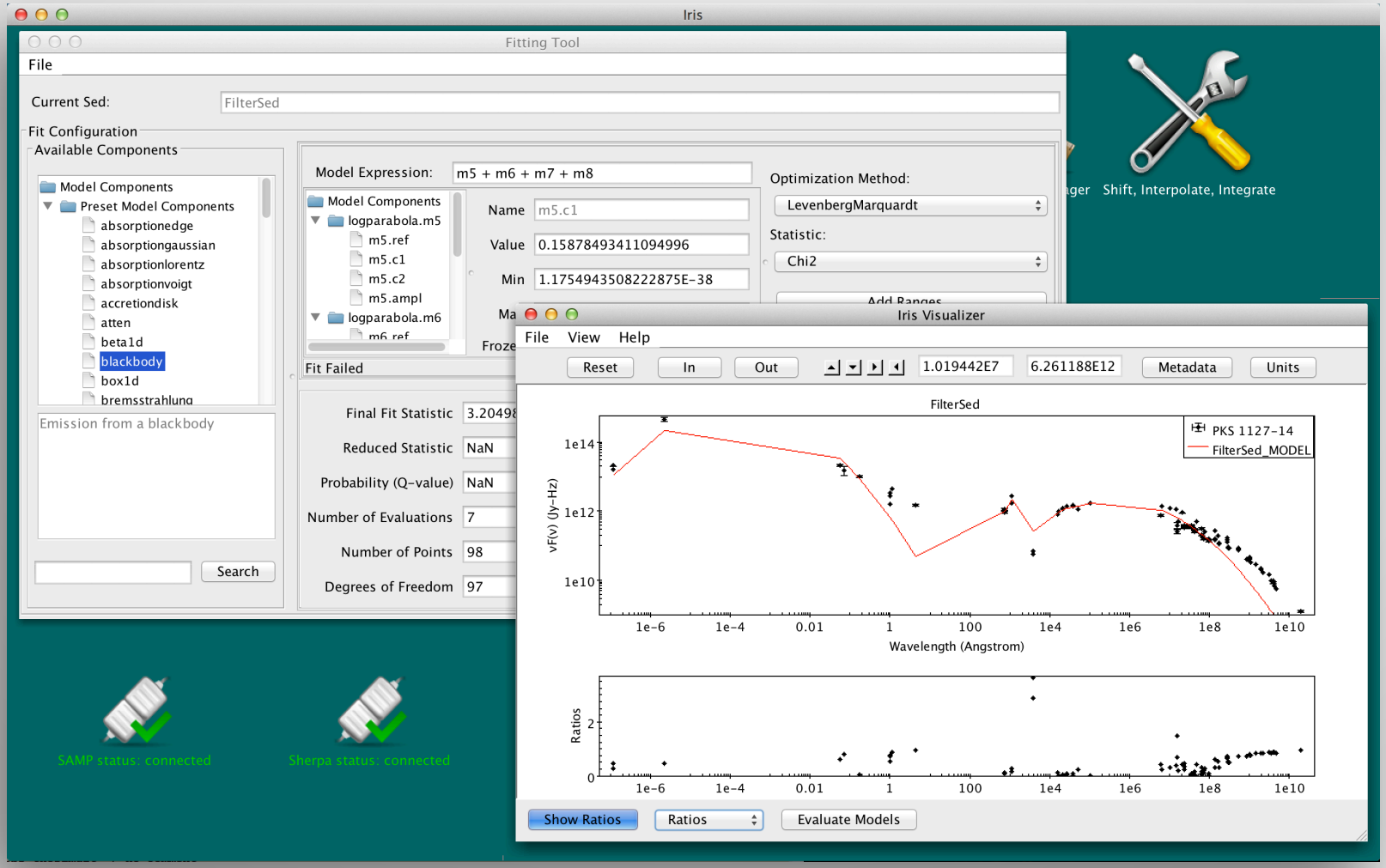
- Redshift
- Interpolate
- Calculate integrated flux
- Statistically combine (stack) SEDs



Passband	Eff WL (Angstrom)	Flux (erg/s/cm2)
CFHT/CFHT.I	8.090449E3	7.943904E-16
CFHT/CFHT.Z	8.777988E3	7.753426E-16

Iris – Main Features

Fitting Tool: a GUI for Sherpa

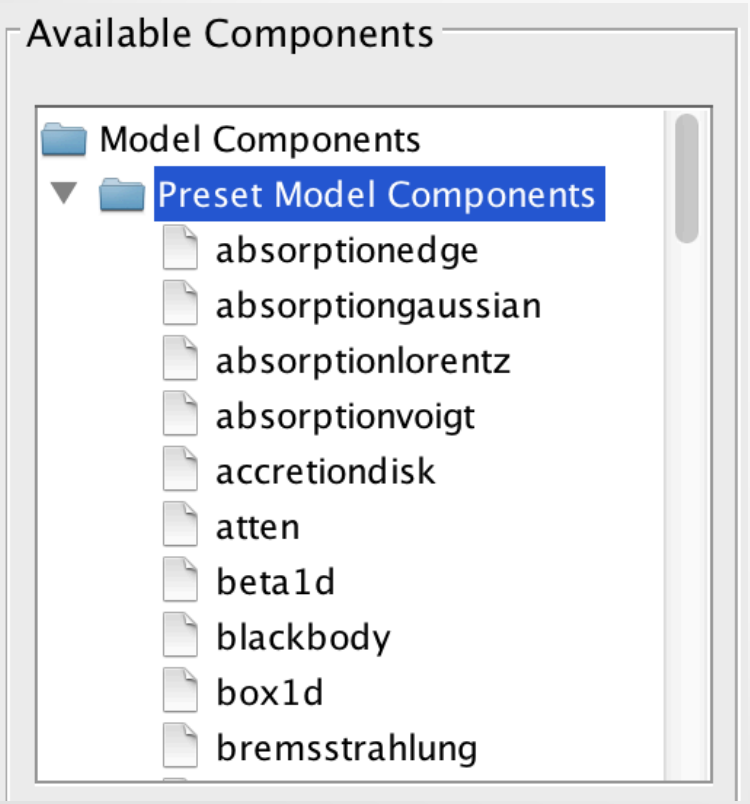


Iris – Main Features

Fitting Tool

Model Components

Preset 1D Sherpa models



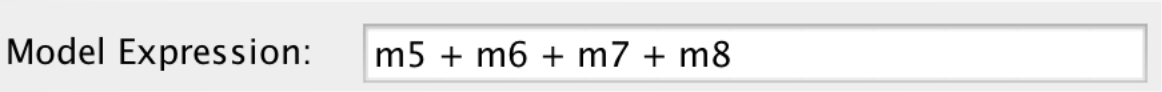
Upload your own…

- templates
- template libraries
- Python functions

Iris – Main Features

Fitting Tool: a GUI for Sherpa

Arbitrarily combine models together



Iris – Main Features

Fitting Tool: a GUI for Sherpa

Arbitrarily combine models together

Model Expression: m5 + m6 + m7 + m8

or

Model Expression: m5 + (m6*m7 + 3.14*m8)/42

Iris – Main Features

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Iris – Main Features

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- templates
- tables
- functions

Iris – Main Features

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or

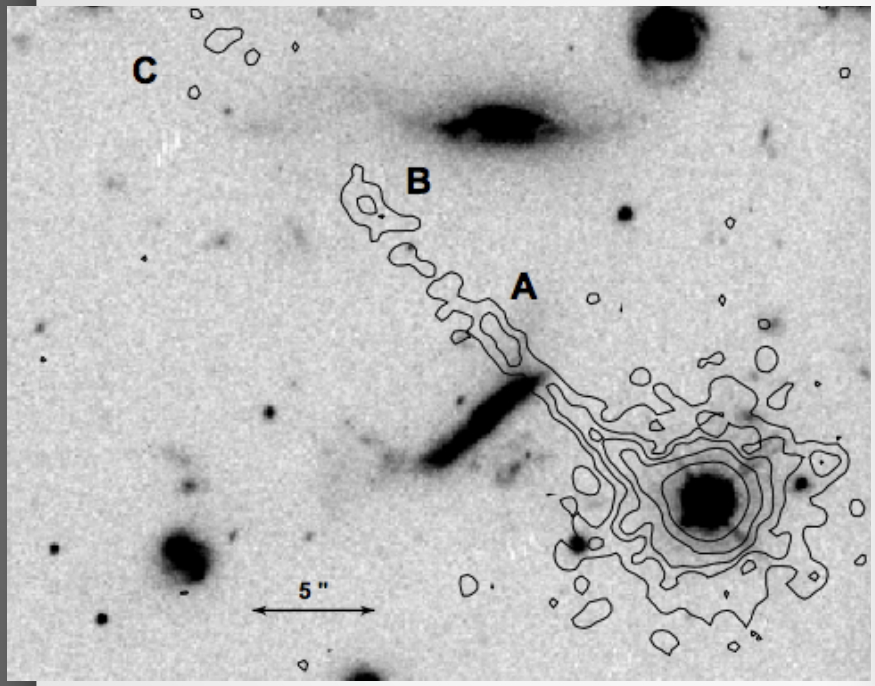
Model Expression: m5 + m5 / m6 – m8

- templates
- tables
- functions

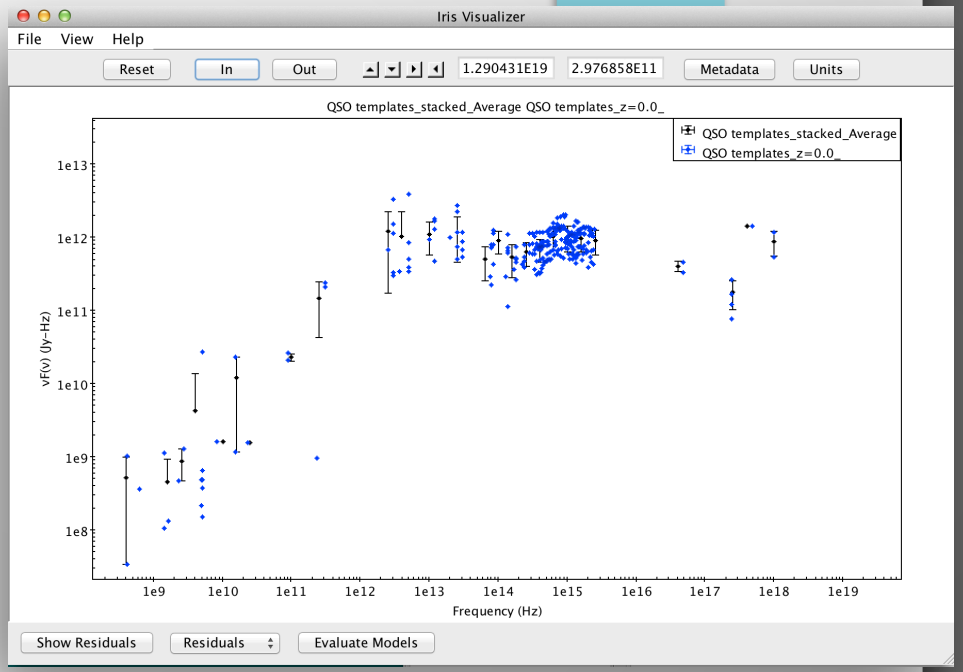
It's just math

if the expression is mathematically correct, you can fit it to the data

Iris – Demonstration



Siemiginowska et al. 2002



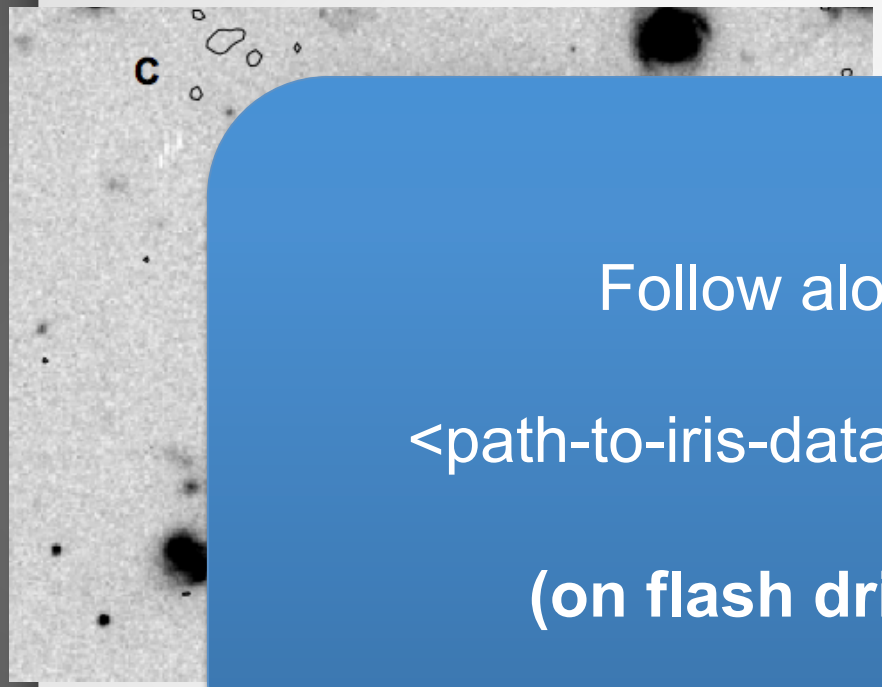
- Part 1 -

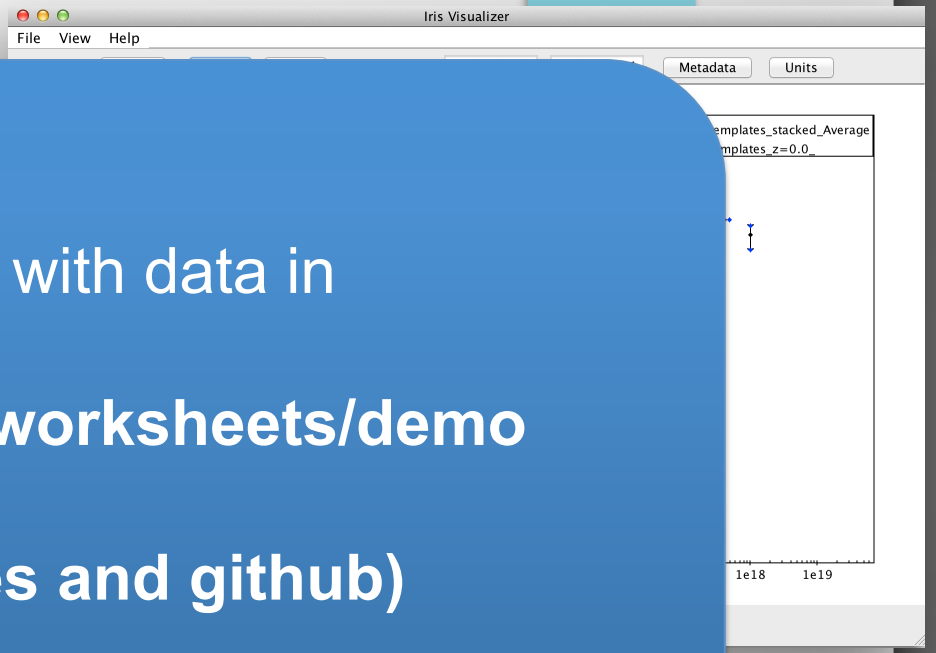
aggregate data for and **model** the SED of blazar PKS 1127-14

- Part 2 -

statistically combine similarly shaped quasar SEDs

Iris – Demonstration





Follow along with data in

<path-to-iris-data>**/worksheets/demo**

(on flash drives and github)

- Part 1 -

aggregate data for and **model** the SED of blazar PKS 1127-14

- Part 2 -

statistically combine similarly shaped quasar SEDs

Future Additions to Iris…

- Add more template fitting capabilities
  - Photometric redshift fitting
  - Provide stellar/galaxy templates with Iris package
- Hook-up to Sherpa's MCMC fitting
- Add more statistics options to stacking tool
  - uncertainties shading
  - sparse data statistics
- Add Python framework

Worksheets

Iris worksheets are located in

`<path-to-iris>/worksheets`

Get them at

https://github.com/ChandraCXC/aas229iris, or
http://bit.ly/aas229iris (tarfile)

Sherpa worksheets are in the Jupyter notebooks at

http://sherpa.cfa.harvard.edu/

See us at the Chandra booth

Wednesday

1:30-4:00pm	Omar
4:00-6:30pm	Jamie, Omar

Thursday

4:30-6:30pm	Jamie, Omar

Friday

9:00-1:30pm	Jamie