

ETC-42

a generic, VO compliant, Exposure Time Calculator

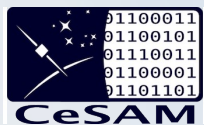


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Nikolaos Apostolakos

nikolaos.apostolakos@oamp.fr

**Laboratoire Astrophysique de Marseille
CeSAM**



What is ETC-42 ?

- It is an **Exposure Time Calculator**
- It is **generic**
(not designed for a specific instrument)
- Provides a very flexible SNR calculation
- It is easily extensible
- It is **VO** compliant
- It targets a broader range of users

Input configuration

The screenshot shows the ETC-42 software interface. At the top, there is a menu bar with 'File', 'SAMP', 'Options', and 'Plugins'. Below the menu bar is a toolbar with four icons: 'Instruments' (satellite), 'Sites' (globe), 'Sources' (planet), and 'Observing Parameters' (gears). An 'Execute' button with a green arrow is on the right. The main window is divided into two panes. The left pane is titled 'Instruments' and contains a 'Choice' dropdown set to 'new', a 'Description' text box, and buttons for 'New', 'Reload', 'Save', and 'Save As'. Below these are sections for 'Telescope' (Aperture: Diameter 0.0 cm, Obstruction 0.0 %), 'PSF' (Distribution: Automatic), 'Transmission' (Total: dropdown), 'Detector' (Dark 0.0 e/pixel/s, Readout 0.0 e/pixel, Pixel Scale 0.0 arcsec/pixel), and 'Type' (Imaging) with a 'Filter Transmission' field. The right pane has tabs for 'Results', 'Images', 'Graphics', and 'Command history', with a large empty blue area below. Four orange arrows point from the text on the right to the 'Instruments', 'Sites', 'Sources', and 'Observing Parameters' icons in the toolbar.

Input configuration is grouped in four components:

- Instruments**
- Sites**
- Sources**
- Observing Parameters**

Instrument configuration

ETC-42

File SAMP Options Plugins

Instruments Sites Sources Observing Parameters Execute

PSF
Distribution: Automatic

Transmission
Total: [] [] []

Detector
Dark: 0.0 e/pixel/s
Readout: 0.0 e/pixel
Pixel Scale: 0.0 arcsec/pixel

Type: Spectrograph

Spectrograph
Range
Min: 0.0 A
Max: 0.0 A
Spectral Resolution (per pixel)
 Fixed Delta Lambda: 0.0 A/pixel
 Function: [] [] []

Type: Slit

Results Images Graphics Command history

PSF modes:

- Automatic
- Gaussian FWHM profile
- AO (coming soon)

Instrument types:

- Imager
- Slit Spectrograph
- Fiber Spectrograph
- Slitless Spectrograph

Site configuration

ETC-42

File SAMP Options Plugins

Instruments **Sites** Sources Observing Parameters Execute

Sites

Choice: new

Description:

+ New Reload Save Save As

Location: Ground

Ground

Seeing Limited: 0.0 arcsec

Air Mass: 0.0

Sky Background

Sky Emission

Template: [dropdown] +

Sky Brightness: [dropdown] [icon]

Sky Absorption: [dropdown] + [icon]

Sky Extinction: [dropdown] + [icon]

Results Images Graphics Command history

Ground and Space sites

Ground Sites:

- Seeing
- Sky information

Space Sites:

- Zodiacal light
- Galactic light

Source configuration

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File SAMP Options Plugins

Instruments Sites Sources Observing Parameters Execute

Sources

Choice: new

Description:

+ New Reload Save Save As

Magnitude

AB Magnitude: 0.0

Band: U (3600)

Spatial Distribution

Type: Extended Source

Extended Source

Radius: 0.0 arcsec

Surface Brightness Profile: Uniform

Spectral Distribution

Type: Black Body

Black Body

Temperature 0.0 K

Spatial Distribution:

- Point Source
- Extended Source (circularly symmetric)

Spectral Distribution:

- Continuum
- Black Body
- Emission Line
- Template

Observing Parameters configuration

ETC-42

File SAMP Options Plugins

Instruments Sites Sources **Observing Parameters** Execute

Observing Parameters

Choice: new

Description:

New Reload Save Save As

Fixed Parameter: Fixed Exposure Time

Fixed Exposure Time

Exposure Time: 0.0 sec

Time Sample

DIT: 0.0 sec

N. expo: 0

Spectral Quantum

Spectral Pixel

Spectral Resolution Element

Results Images Graphics Command history

Calculation for:

- Fixed exposure time
- Fixed SNR

Calculation in spectroscopy mode:

- Per spectral pixel
- Per spectral resolution element

Simulation Results

The screenshot shows the ETC-42 software interface. The 'Options' menu is open, showing 'Result Level' with options: Final, Intermediate (important), Intermediate (unimportant), and Debug. The 'Execute' button is highlighted with an orange box. The 'Observing Parameters' section shows 'Choice: VIMOS-Obs-Params-Tests' and 'Fixed Parameter: Fixed Exposure Time'. The 'Results' tab is active, showing two simulation results: '17:05:02' and '17:06:53'. The 'Final Results' section includes: Signal to noise, Total background noise, Total detector noise, and Total signal. The 'Intermediate Results (important)' section includes: Atmospheric transmission, Filter response, Normalization factor, Number of pixels, Spatial binning, System efficiency, and Telescope area (514899.18194173306 cm²). The 'Intermediate Results (unimportant)' section includes: Background Flux, Background Noise, Convolution kernel size, and Delta lambda.

Simulation is executed by pressing the Execute button. Results of multiple simulations are shown in different tabs for easy comparison.

Graphics Panel

ETC-42
✕

File SAMP Options Plugins

Instruments

Sites

Sources

Observing Parameters

Execute

N. expo: 1

Spectral Quantum

Spectral Pixel

Spectral Resolution Element

Results
Images
Graphics
Command history

Signal to noise (17:15:43) ✕
MultiPlot ✕

MultiPlot

— Signal to noise (17:15:43)
 — Signal to noise (17:21:08)

The Graphics panel is based on the JfreeChart library and it provides all the default functionality (zoom, line styles, etc)

It has been extended to support over-plotting by drag and drop of the tabs

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Nikolaos APOSTOLAKOS
<http://projets.oamp.fr/projects/etc>

VO Functionality

The screenshot shows the ETC-42 software interface. The top menu bar includes 'File', 'SAMP', 'Options', and 'Plugins'. The 'SAMP' menu is open, showing 'Connect to hub' and 'Disconnect from hub'. The 'Sources' panel on the left has a 'Choice' dropdown set to 'new' and a 'Description' field. Below are buttons for 'New', 'Reload', 'Save', and 'Save As'. The 'Spectral Distribution' section is expanded, showing 'Type' set to 'Template'. An orange box highlights the 'SAMP' menu and 'Connect to hub' option, with an arrow pointing to the 'Template' dropdown in the 'Spectral Distribution' section. Another orange arrow points from the text 'Source spectral distribution template can be imported via SAMP as a spectrum type' to the 'Template' dropdown. A dialog box titled 'Option' is open, asking 'Do you want to import a new template from VO?' with 'Yes' and 'No' buttons.

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File SAMP Options Plugins

Connect to hub
Disconnect from hub

Sources

Observing Parameters

Execute

Sources

Choice: new

Description:

New Reload Save Save As

Magnitude

AB Magnitude: 0.0

Band: U (3600)

Redshift: 0.0

Spatial Distribution

Type: Point Source

Spectral Distribution

Type: Template

Template

Template

Results Images Graphics Command history

Source spectral distribution template can be imported via SAMP as a spectrum type

Option

Do you want to import a new template from VO ?

Yes No

VO Functionality II

Observing Parameters

Choice: **VIMOS-Obs-Params-Tests**

Description:

Results Images Graphics Command history

17:05:02 17:06:53

Final Results:

Signal to noise : [Graph] [Icon]

Total background noise : [Graph] [Icon]

Total detector noise : [Graph] [Icon]

Total signal : [Graph] [Icon]

Intermediate Results (important):

Atmospheric transmission : [Graph] [Icon]

Filter response : [Graph] [Icon]

Normalization : [Graph] [Icon]

Number of observations : [Graph] [Icon]

Spatial binning : [Graph] [Icon]

System efficiency : [Graph] [Icon]

Telescope area : 514899.18194173306 cm²

Intermediate Results (unimportant):

Background Flux : [Graph] [Icon]

Background Noise : [Graph] [Icon]

Convolution kernel size : [Graph] [Icon]

Delta lambda : [Graph] [Icon]

Please select the application to send the VO table to:
topcat

OK Cancel

Results can be broadcasted via SAMP as a VOTable

Other Functionalities

- Importing / Exporting
 - XML files
 - Import locally or from remote repositories
- Command line mode
 - Scripts are supported
- Plugin framework
 - Access and modify the input configuration
 - Run the simulation (one or multiple times)
 - Use the ETC-42 results panel

Future development

VO related

- Source flux from image
- Slit definition via SAMP (from Aladin)
- Import / Export in
CharacterizationDM - ObsCoreDM

Other

- PSF from data cube
- Simulated image as output
- Hybrid mode (GUI with command line)

More information

ETC-42 web page:

<http://projets.oamp.fr/projects/etc>

- Download the ETC-42
- Download documentation
- Download configuration files
- Report bugs
- Request new features
- Stay updated with latest news via Atom feed

Want to contribute?

- Download and use ETC-42
- Let other people know about it
- Contribute instrument and site configurations
- Suggest new features
- Build and contribute plugins

For more information please contact:

nikolaos.apostolakos@oamp.fr

or

christian.surace@oamp.fr

END OF PRESENTATION

ANY QUESTIONS?