

Download the code here: http://maat.iaa.es/maat_etc.html

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History:

- **20220222@10:07 updated; includes new input parameters, more SEDs (including blackbody), and new output (ascii files and figure with input/output spectra).**
- 20211109@17:35 updated; MAAT efficiency is now as provided by Winlight 20211011. Three curves are implemented, but only the one with highest efficiency is used.
- 20210815@11:48 updated; correct bug in directory location (thanks to Nicolas).
- 20210806@10:24 updated; many more SEDs; housekeeping. Updated description below in this page.
- 20210708@19:13 updated; use quadratic width (fwhmA,resolution) for emline; suggested by Ryan.
- 20210708@11:30 updated; depending on the other parameters, the parameters fwhmA, redz, and toverhd are no longer compulsory. The last two default to a value of zero; fwhmA is requested for 'emline'. Housekeeping.
- 20210630@10:23 updated; affects only the input file version of the code; just changed defaults for looping.
- 20210629@18:21 updated; includes a subdirectory with plots; minor bugs and housekeeping.
- 20210628@12:32 updated; scale flux algorithm conditioned to mag/Flambda and continuum/emline input.
- 20210626@18:21 updated; computes and plots exposure time for a given input S/N. KN SEDs available for polar and equatorial views of the same model.
- 20210625@12:06 updated after some bugs
- 20210624@14:00 new version

The code is running and functional:

- computes S/N given an input exposure time
- computes exposure time for a given input S/N
- all OSIRIS gratings
- three choices of moon illumination
- a long list of SEDs
- point source or extended.
- point source computation carried out in full seeing profile (well, actually in $\pm 2\sigma$; this is a hidden parameter and can be changed in the code)
- extended source computation carried out in an arbitrary squared spatial area
- airmass
- redshift $(1+z)$ wavelength correction
- breadth of wavelength stretch where S/N is computed (used only if it is $>$ dispersion of chosen grating)

Needs further work on these points:

- Full sky spectrum (ideally ESO SkyCalc).
- Many more SEDs are available, and will be implemented as requested.
- A longslit mode is implemented and working, but not yet given as an option. It works if you dig into the code.
- On chip binning.
- Seeing encircled energy not yet implemented in extended-box computation.

A graphical user interface (GUI), implemented by David Jones, is the version provided by default.

The distribution tar also contains a version of the code that can be run in two different modes that facilitate looping in some variables. See below.

Please, keep finding bugs and giving suggestions.

The input parameters are these:

```
fluxtype = continuum # 'continuum' 'emline'
fluxval = 20 # 22 1e-18 # either mag (point source) or Flam (extended), integrated or per arcsec2
grating = R1000R #
'R300B','R300R','R500B','R500R','R1000B','R1000R','R2000B','R2500U','R2500V','R2500R','R2500I' #
wvinflux = 7000 # # wavelength at which fluxval is provided
fwhmA = 5 # # width in Angstroms over which the emline flux is given
sedtemplate = ones # 'blackbody 5778' 'ones' ... # either of these two implemented options or an arbitrary file
name found in the seds subdirectory
redz = 0.0 # redshift (1+z) to be applied to input SED wavelength range
moon = dark # 'dark' 'gray'/'grey' 'bright'
airmass = 1. # #
compute = SN # 'SN' 'texpo' # texpo : compute exposure time given S/N # SN : compute S/N given exposure time
texpoSN = 1800 # 10 1800 # target SN if texpo given, or target Texpo if SN given
toverhd = 300 # NOT for MAAT; ONLY for longSLIT mode computations # overhead time, e.g. locating target into
slit
psf = extended # 'pointsource' 'extended' # geometry of target
seeing = 0.8 # if 'pointsource'. Note that default 'full' integration over psf is within  $\pm 2 \cdot \text{sigma}(\text{psf})$ 
area = 1 # if 'extended' side (arcsec) of square box for computation
breadth = 0 # spectral breadth (range in Å) where S/N is computed # defaults to 0 (uses spectral dispersion
element 'disp'); >disp means spectral range where S/N/Å is provided
```

- To run the non-GUI version of the code with input parameters read from a file (parameters in any order):

```
python ETCosiris.py any_file_name.txt
```

where any_file_name.txt format is as in the input parameter list just above these lines (info after # is ignored).
There are some input file examples in subdirecotry input_file_examples.

- To run the non-GUI version of the code with input parameters read from the command line (parameters in any order):

```
python ETCosiris.py -f continuum -v 20 -g R1000R -r 7000 -p 5 -s ones -z 0 -m dark -a 1.0 -c SN -t 1800 -o 300 -w 1 -i 1 -e extended -b 0
```

- To run the GUI version of the code:

```
python maatetc_gui.py
```

- For each case, two outputs are provided:

(i) an ascii file (name is appended with the current date+time YYYYMMDDHHMMSS: SN_20220221174846.txt Texpo_20220221174846.txt), with one header line followed by four columns:
- for S/N output: wavelength input_spectrum_flux output_spectrum_flux S/N
- for Texpo output: wavelength input_spectrum_flux output_spectrum_flux Texpo

(ii) a graphical output of (S/N or Texpo) as a function of wavelength, and the input and output spectra.

