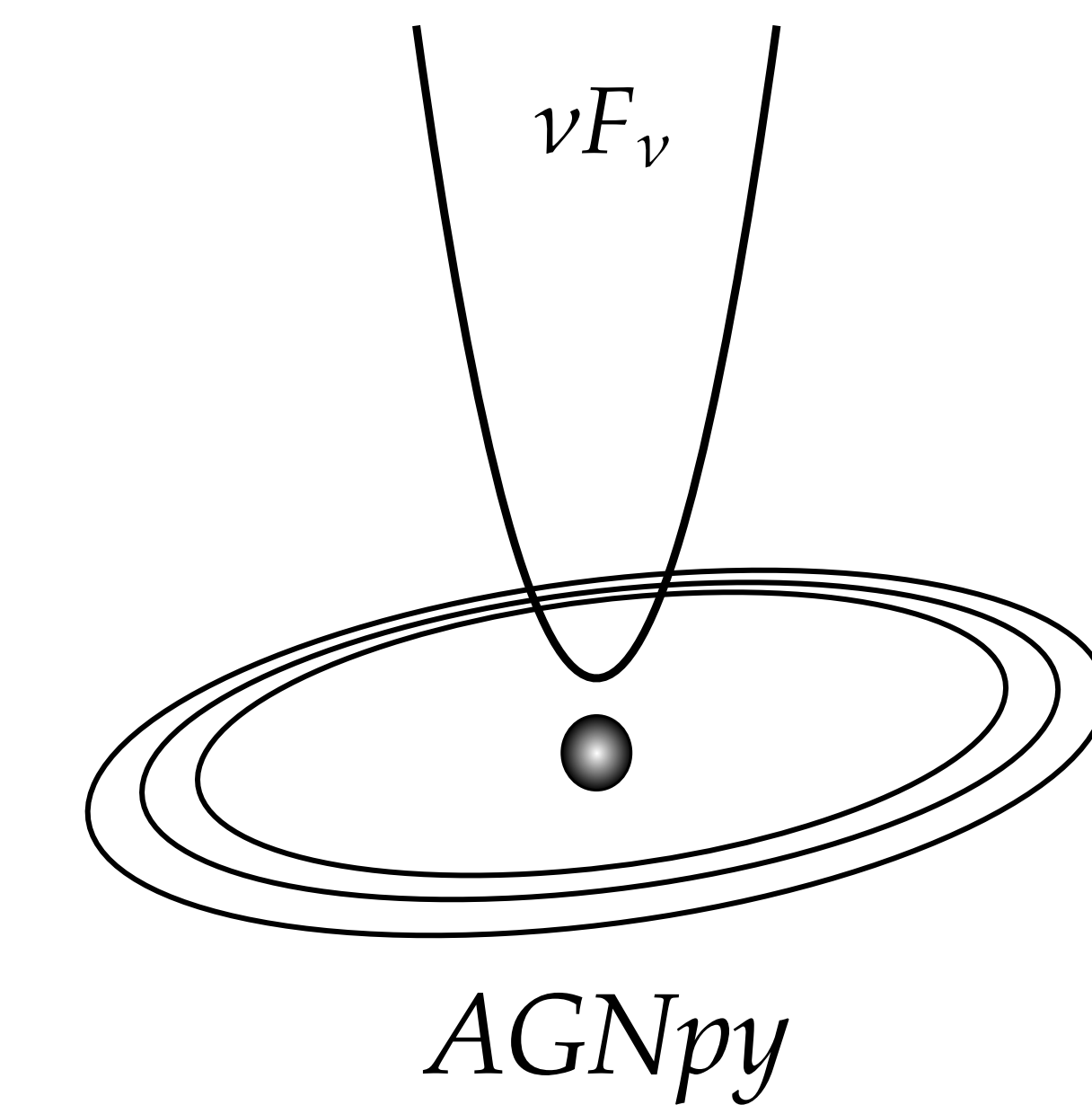


agnpy: An open-source python package modelling the radiative processes of jetted active galactic nuclei

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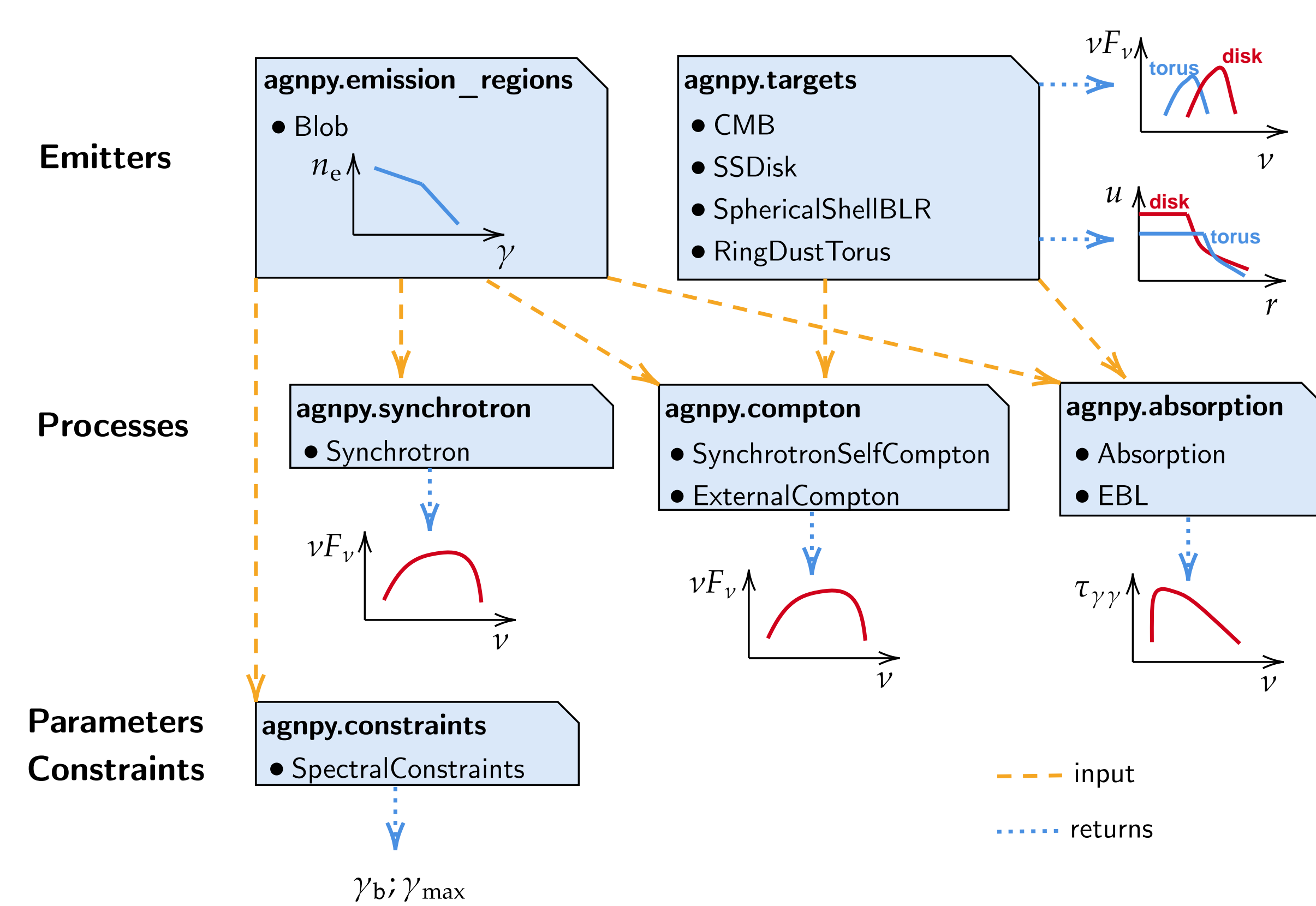
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Introduction

In recent years, jetted AGN have been studied in extensive multi-wavelength campaigns. The amount of data gathered calls for the modelling effort to be open to a wide number of astrophysicists. We present agnpy [1, 2], a python package modelling the radiative processes of relativistic particles accelerated in the jets of AGN. agnpy includes classes representing the AGN thermal and line emitters and computes the $\gamma\gamma$ absorption produced in their photon fields. The package is built on [numpy](#) and [astropy](#) and is affiliated with the latter. [[GitHub](#), [Docs](#)]

Package description

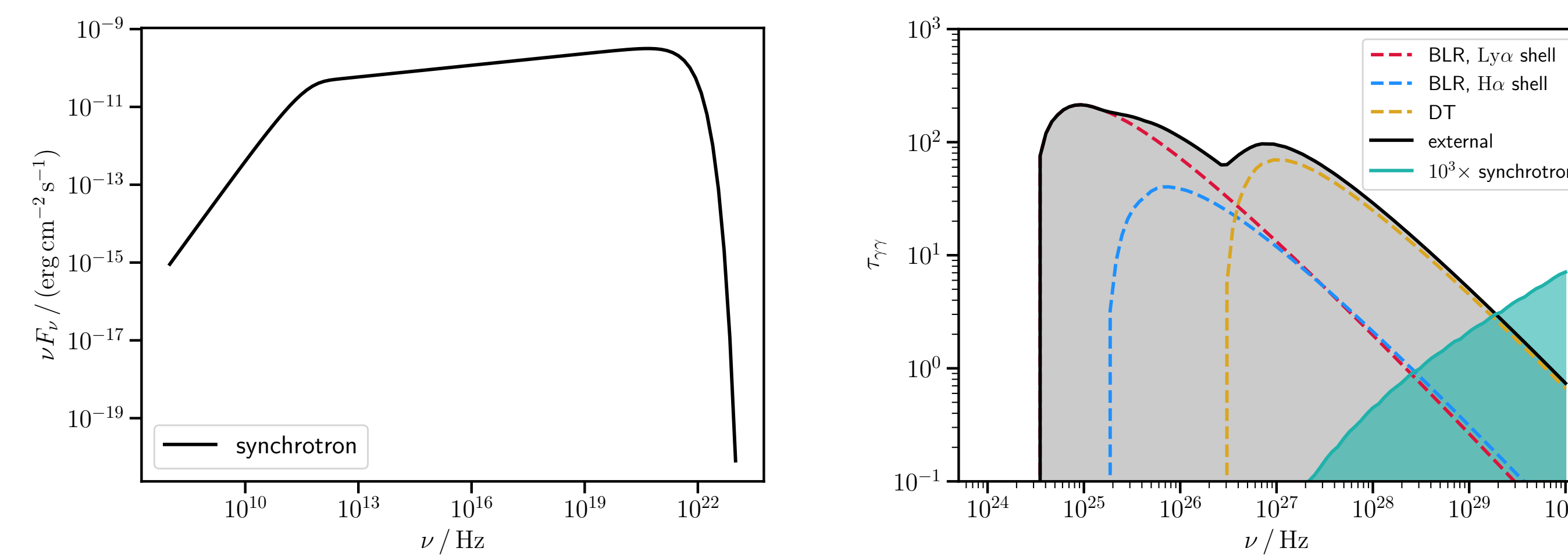


- **Emitters:**
 - non-thermal (blob), containing the e^\pm energy distribution,
 - thermal / line (disk, broad line region, dust torus, CMB);
- **radiative processes:**
 - synchrotron,
 - inverse Compton (synchrotron self-Compton, external Compton),
 - $\gamma\gamma$ absorption;
- **self-consistent modelling:**
 - constraining γ_b and γ_{max} .

Applications

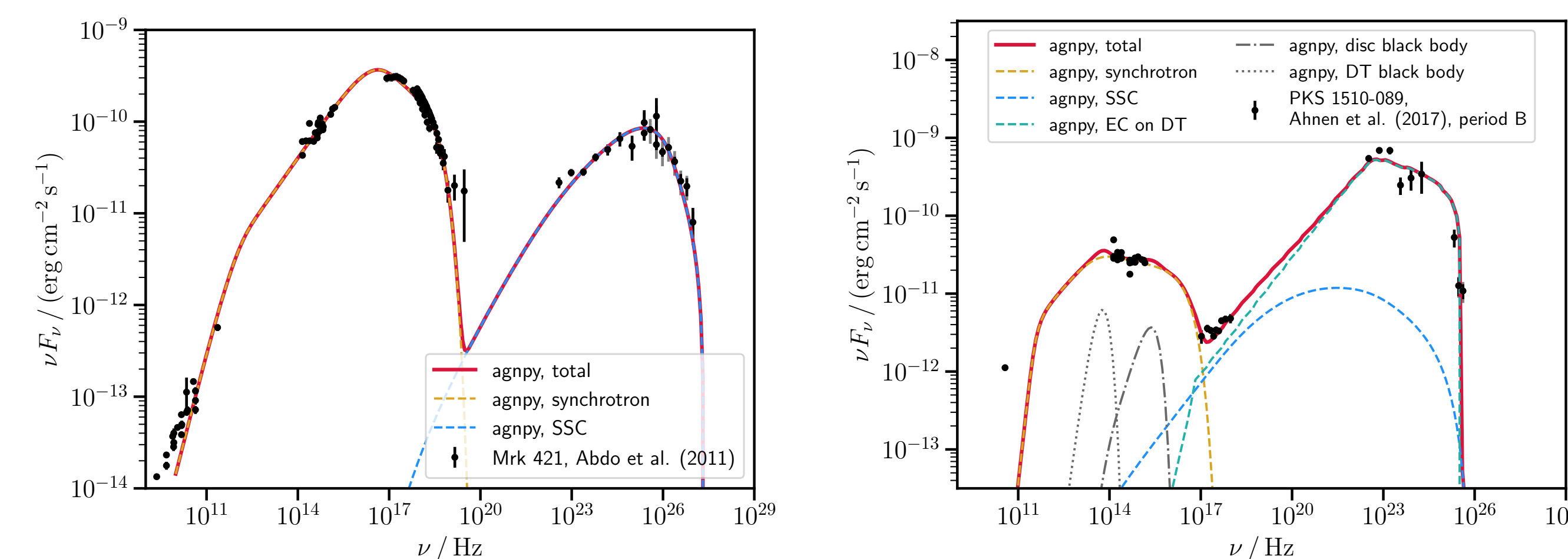
Model radiative processes

With few lines of python the user can evaluate the SED for a specific radiative process (left). The $\gamma\gamma$ absorption in several photon fields (right) can be evaluated.



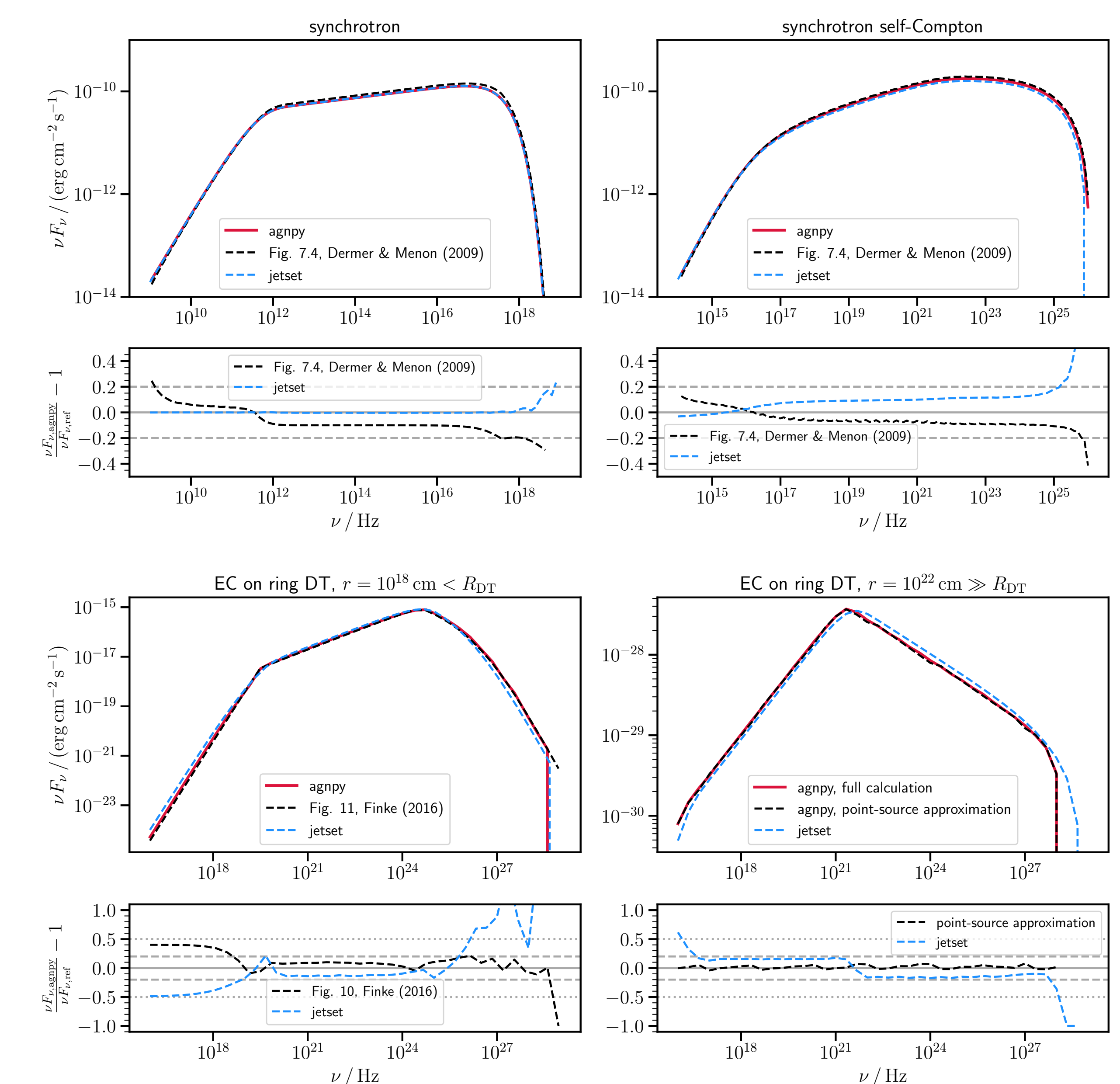
Fit a MWL SED

agnpy contains a [Gammapy](#) wrapper. The functions computing SEDs can be wrapped by other fitting packages (e.g. [sherpa](#)). As an example, we fit the MWL SED of Mrk421 (left) and PKS1510-089 (right) with both packages.



Validation

agnpy is thoroughly validated against bibliographic references and against other modelling software achieving an agreement between 10% (same physical assumptions) and 50% (different physical assumptions).



References / Acknowledging

- [1] Nigro C. et al.; *agnpy: An open-source python package modelling the radiative processes of jetted active galactic nuclei*; *A&A*, 660, id.A18, (2022).
- [2] Nigro C. et al.; *agnpy: modelling Active Galactic Nuclei radiative processes with python*; <https://doi.org/10.5281/zenodo.4055175>.