

Discussion GRB, Rubin et FINK

Simulation de courbes de lumière d'afterglows



**SORBONNE
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17/11/22

Boulodrome pipeline

The screenshot shows the GitHub interface for the repository 'cpellouin / boulodrome'. At the top, there is a navigation bar with 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. Below this, the repository name is shown with 'Private' status. On the right, there are buttons for 'Watch' (1), 'Fork' (1), and 'Star' (0). A secondary navigation bar includes 'Code', 'Issues', 'Pull requests', 'Actions', 'Projects', 'Security', and 'Insights'. The main content area features a file browser for the 'main' branch, showing a list of files with their commit messages and dates. To the right, there are sections for 'About', 'Releases', 'Packages', and 'Languages'. The 'About' section notes that no description, website, or topics are provided. The 'Releases' section states that no releases have been published. The 'Packages' section also indicates no packages are published. The 'Languages' section shows that the repository is 100% Python.

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[main](#) 🌿 2 branches 🏷️ 0 tags [Go to file](#) [Add file](#) [Code](#)

cpellouin Merged integration at nu and in band, renamed files 9fd1eda on Mar 1 🕒 9 commits

.DS_Store	Merged integration at nu and in band, renamed files	last month
README.md	Initial commit	5 months ago
data_170817.py	file handling and launching script added	2 months ago
data_plotting.py	Merged integration at nu and in band, renamed files	last month
double_jet.py	Initial commit (boulodrome v.1.0)	5 months ago
dyn_rad_shock.py	Merged integration at nu and in band, renamed files	last month
dynamics.py	Added IC (Boulodrome v2.0)	3 months ago
geometry.py	file handling and launching script added	2 months ago
gw170817_afterglow_data_full.txt	Added IC (Boulodrome v2.0)	3 months ago
integration_at_nu_1.py	Merged integration at nu and in band, renamed files	last month
integration_at_nu_for_kn.py	Merged integration at nu and in band, renamed files	last month
integration_in_band_1.py	Merged integration at nu and in band, renamed files	last month
integration_in_band_2.py	Initial commit (boulodrome v.1.0)	5 months ago
integration_nu_band.py	Merged integration at nu and in band, renamed files	last month
klein_nishina.py	Added IC (Boulodrome v2.0)	3 months ago

About
No description, website, or topics provided.

[📖 Readme](#)
☆ 0 stars
👁️ 1 watching
🍴 1 fork

Releases
No releases published
[Create a new release](#)

Packages
No packages published
[Publish your first package](#)

Languages

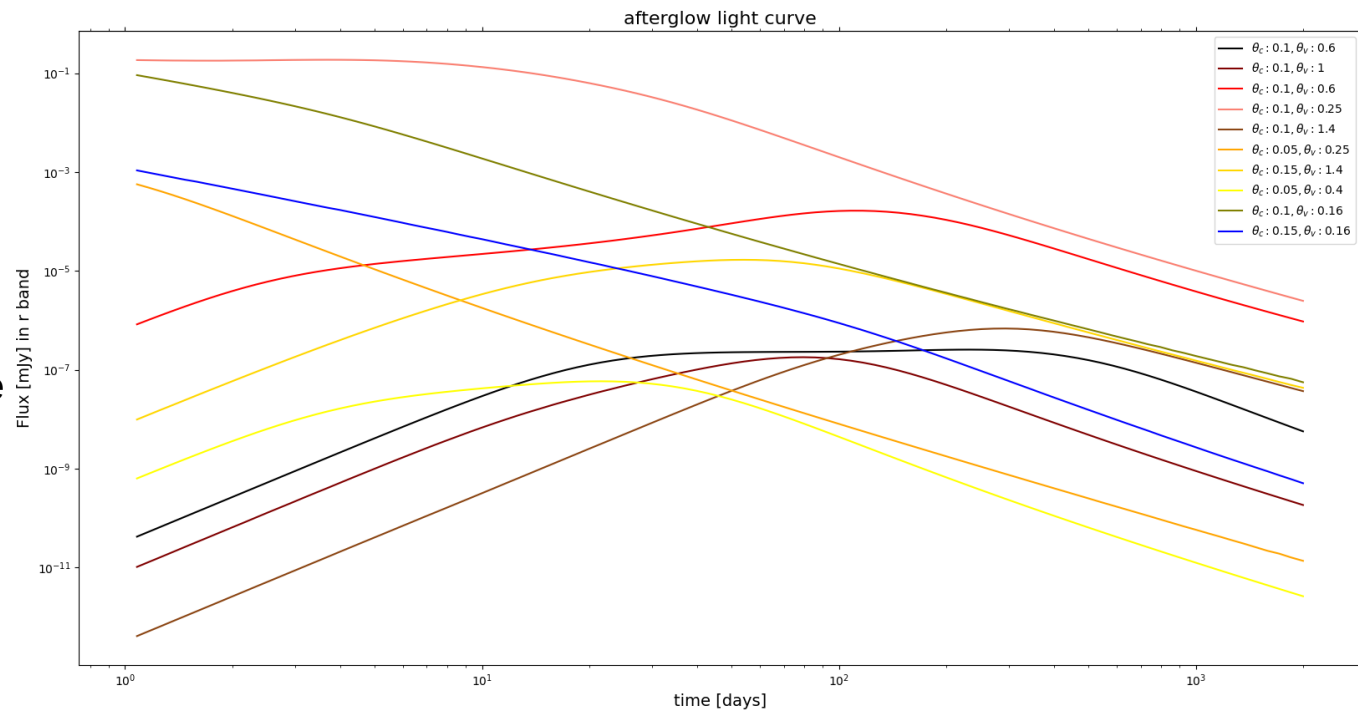
- Python 100.0%

Boulodrome pipeline

Build a template bank with this code to implement a match filtering test in FINK:

Objectives/parameters:

- Synchrotron only
- ZTF g,r,i bands + MXT
- Time sampling coherent with ZTF cadence
- Efficient sampling of the parameter space



Boulodrome pipeline

Long GRB template bank parameters:

Table 3. Parameters values used in the bank

Parameter	Symbol	Range
Jet parameters		
Isotropic energy	E_{iso}	1e+50,3.1623e+50,1e+51,3.1623e+51,1e+52,3.1623e+52, 1e+53,3.1623e+53,1e+54,3.1623e+54,1e+55
Lorentz factor at $t = 0$	Γ_0	100
density of the ambient medium	n_{ext}	1e-1,1,1e1,1e2,1e3
Fraction of the energy which accelerates the electrons	ϵ_E	0.1
Fraction of the energy which generates the magnetic field	ϵ_B	1e-4,1e-3,1e-2,1e-1
Slope of the electrons Lorentz factors profile	p	2.2,2.5,2.8
Opening angle of the core of the jet	θ_{jet}	0.05,0.1,0.15,0.2
Viewing angle	θ_{obs}	0.0001,0.06,0.11,0.16,0.25,0.30,0.40,0.50,0.60,0.70,0.80,1,1.2,1.4
fraction of electrons accelerated at the shock	ζ	1.0
Lateral profile		core + powerlaw
	a	2.5,4.5
	b	2.5,4.5
Number of rings	N_{ring}	20
Distance in Mpc	D	40
Frequency bands		[g,r,i,MXT]
Observation time (observer frame)	T_{obs}	10 secondes to 2000 days
Number of points on the light curve	N_{tobs}	200

147 840 light curves

Boulodrome pipeline

Short GRB template bank parameters:

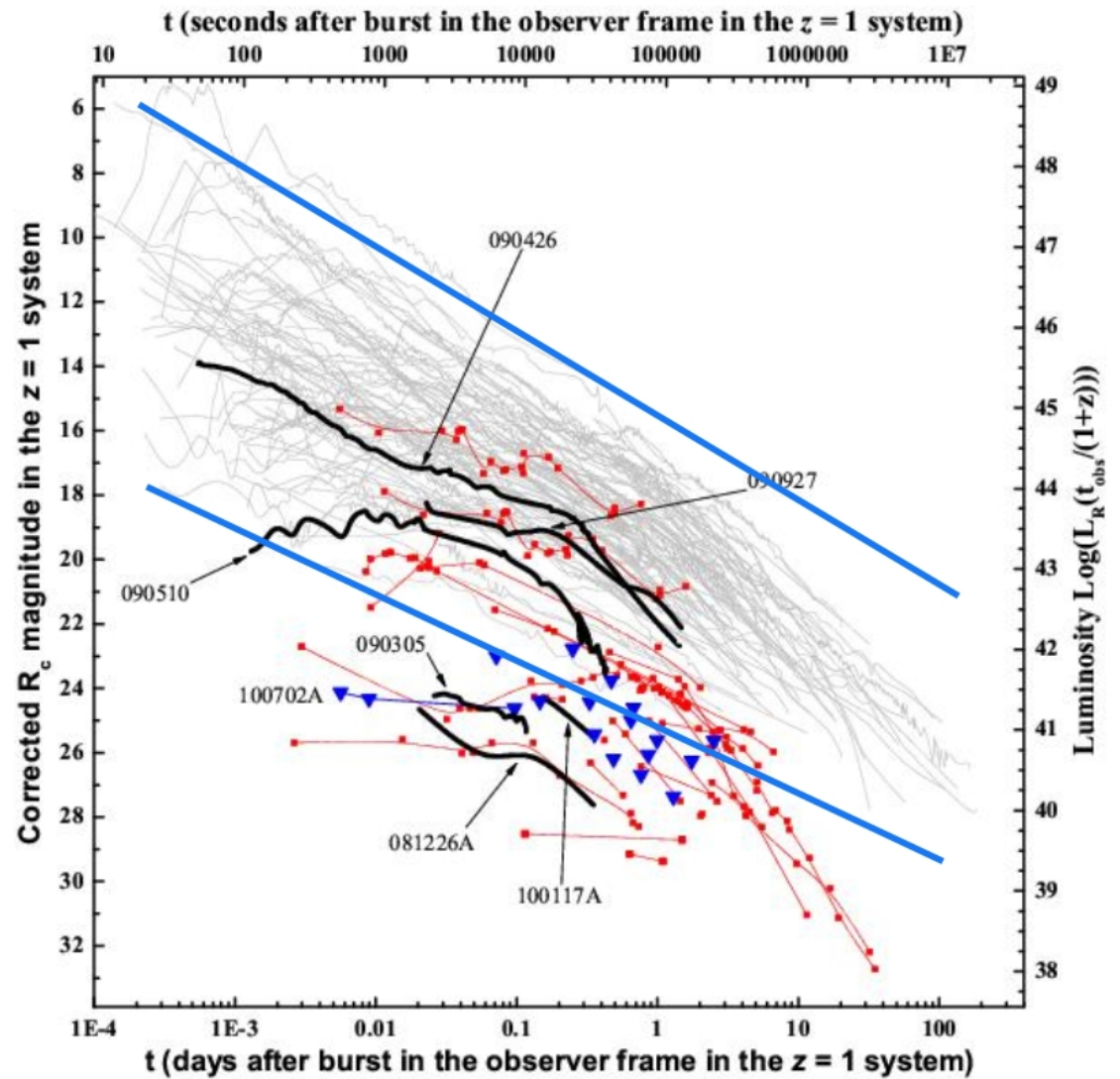
Table 3. Parameters values used in the bank

Parameter	Symbol	Range
Jet parameters		
Isotropic energy	E_{iso}	1e+50,3.1623e+50,1e+51,3.1623e+51,1e+52,3.1623e+52,1e+53
Lorentz factor at $t = 0$	Γ_0	100
density of the ambient medium	n_{ext}	1e-4,1e-3,1e-2,1e-1,1,1e1
Fraction of the energy which accelerates the electrons	ϵ_E	0.1
Fraction of the energy which generates the magnetic field	ϵ_B	1e-4,1e-3,1e-2,1e-1
Slope of the electrons Lorentz factors profile	p	2.2,2.5,2.8
Opening angle of the core of the jet	θ_{jet}	0.05,0.1,0.15
Viewing angle	θ_{obs}	0.0001,0.06,0.11,0.16,0.25,0.30,0.40,0.50,0.60,0.70,0.80,1,1.2,1.4
fraction of electrons accelerated at the shock	ζ	1.0
Lateral profile		
	a	2.5,4.5
	b	2.5,4.5
Number of rings	N_{ring}	20
Distance in Mpc	D	40
Frequency bands		[g,r,i,MXT]
Observation time (observer frame)	T_{obs}	10 secondes to 2000 days
Number of points on the light curve	N_{tobs}	200

84 672 light curves

Boulodrome pipeline

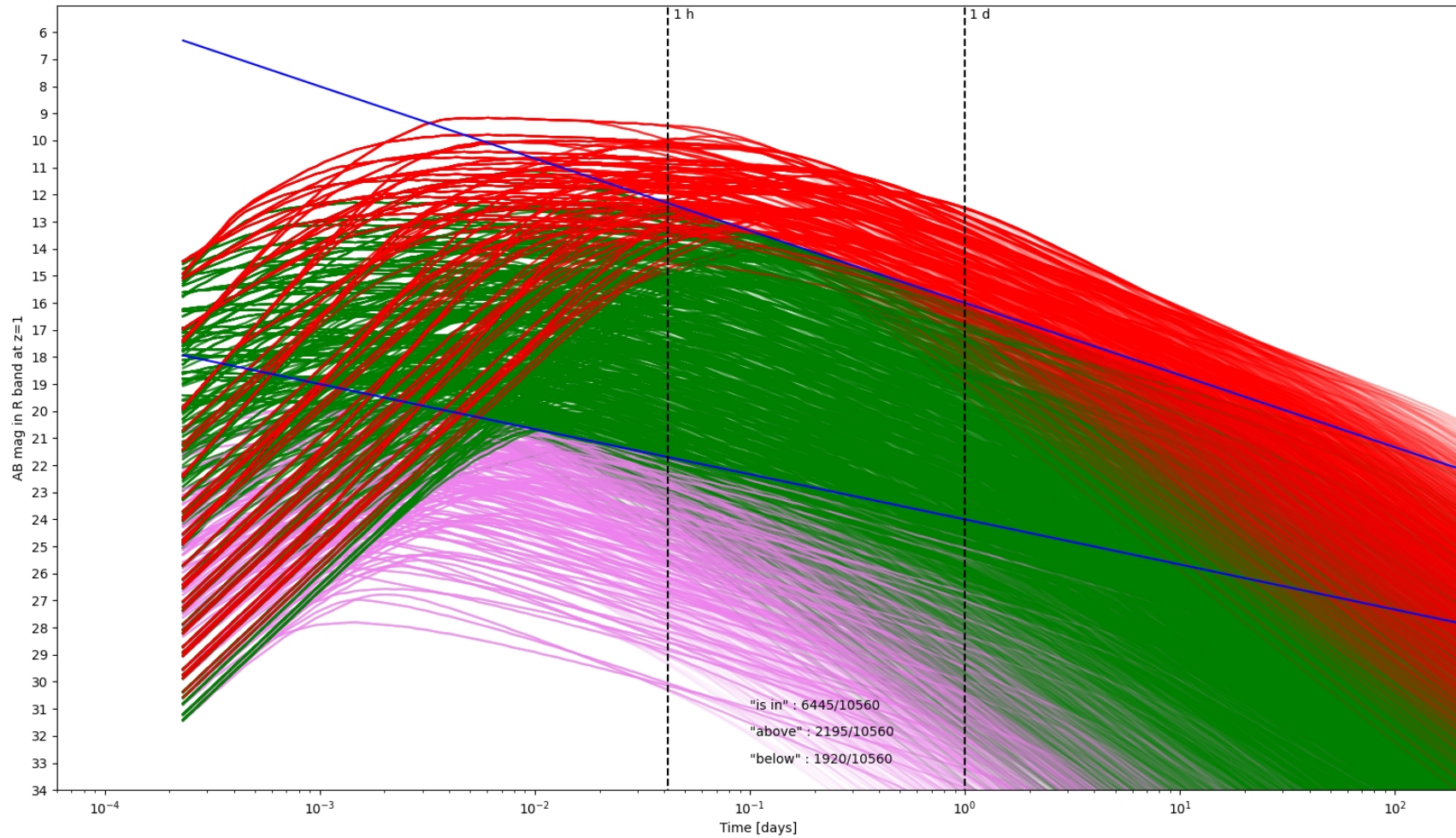
Compatibility with observed afterglow :



(Nicuesa Guelbenzu et al. 2012)

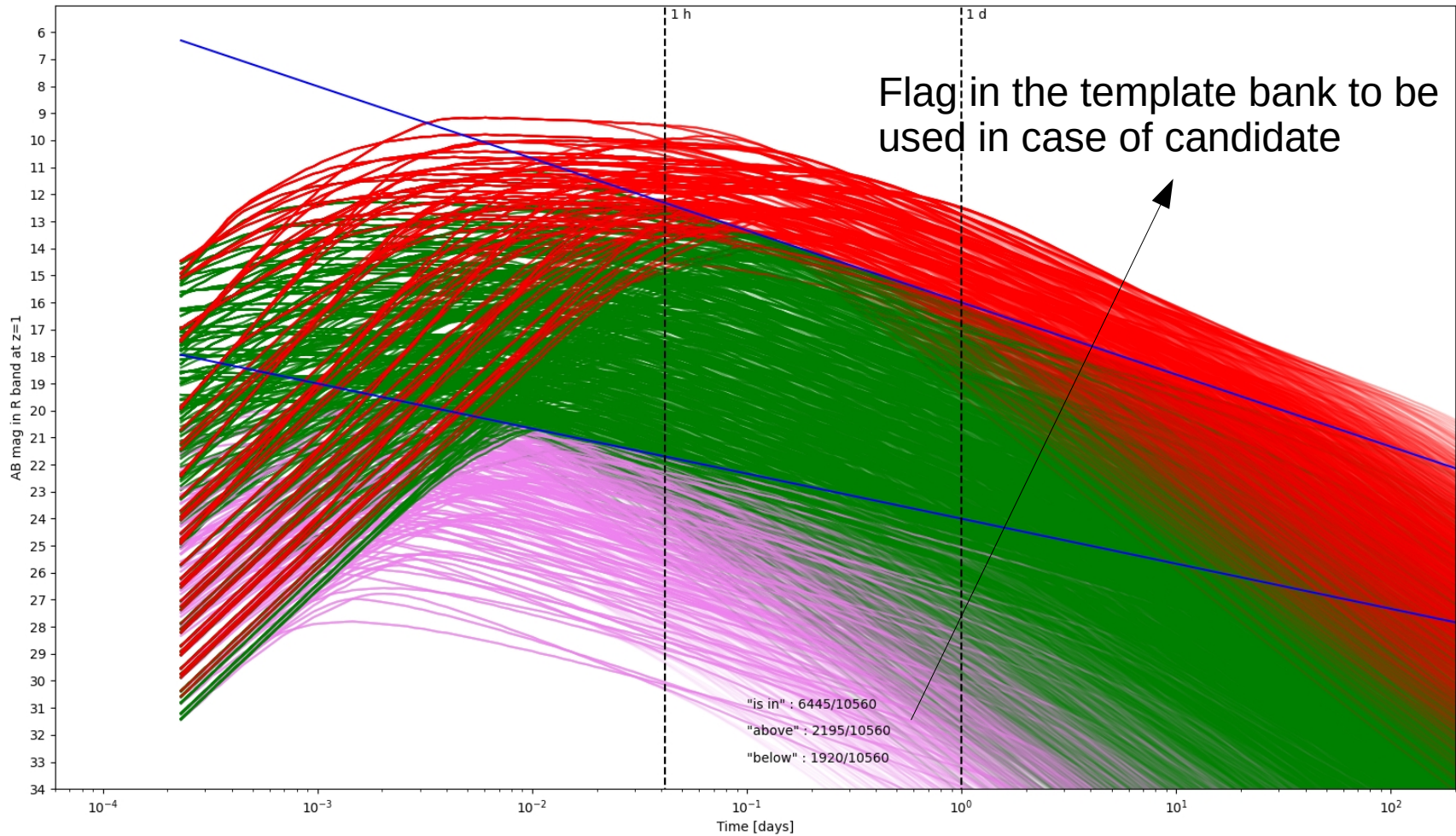
Boulodrome pipeline

Compatibility with observed onaxis afterglow :



Boulodrome pipeline

Compatibility with observed onaxis afterglow :

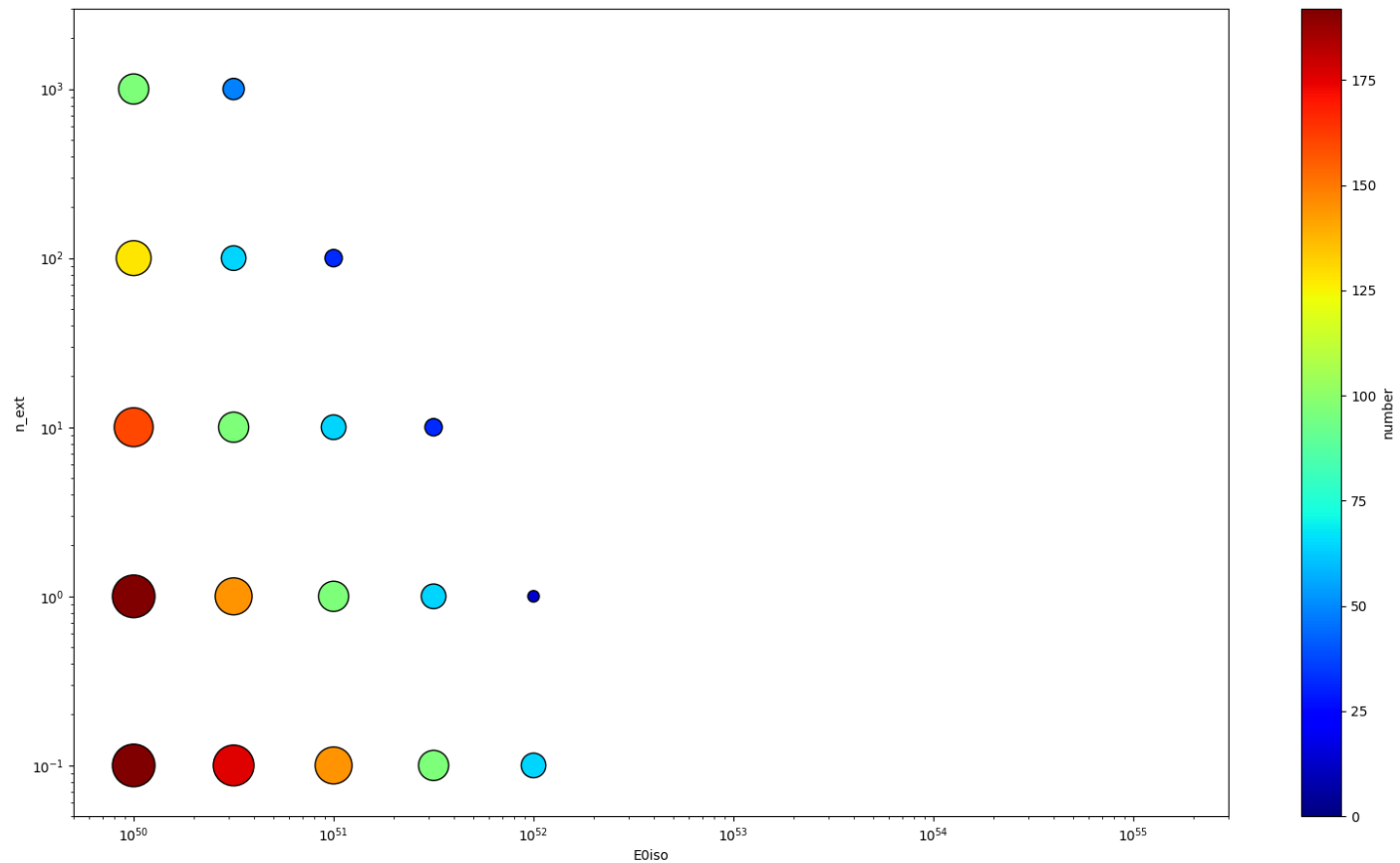


Boulodrome pipeline

Compatibility with observed onaxis afterglow :

Check parameters leading the classification
Example of E_{iso} / n_{ext}

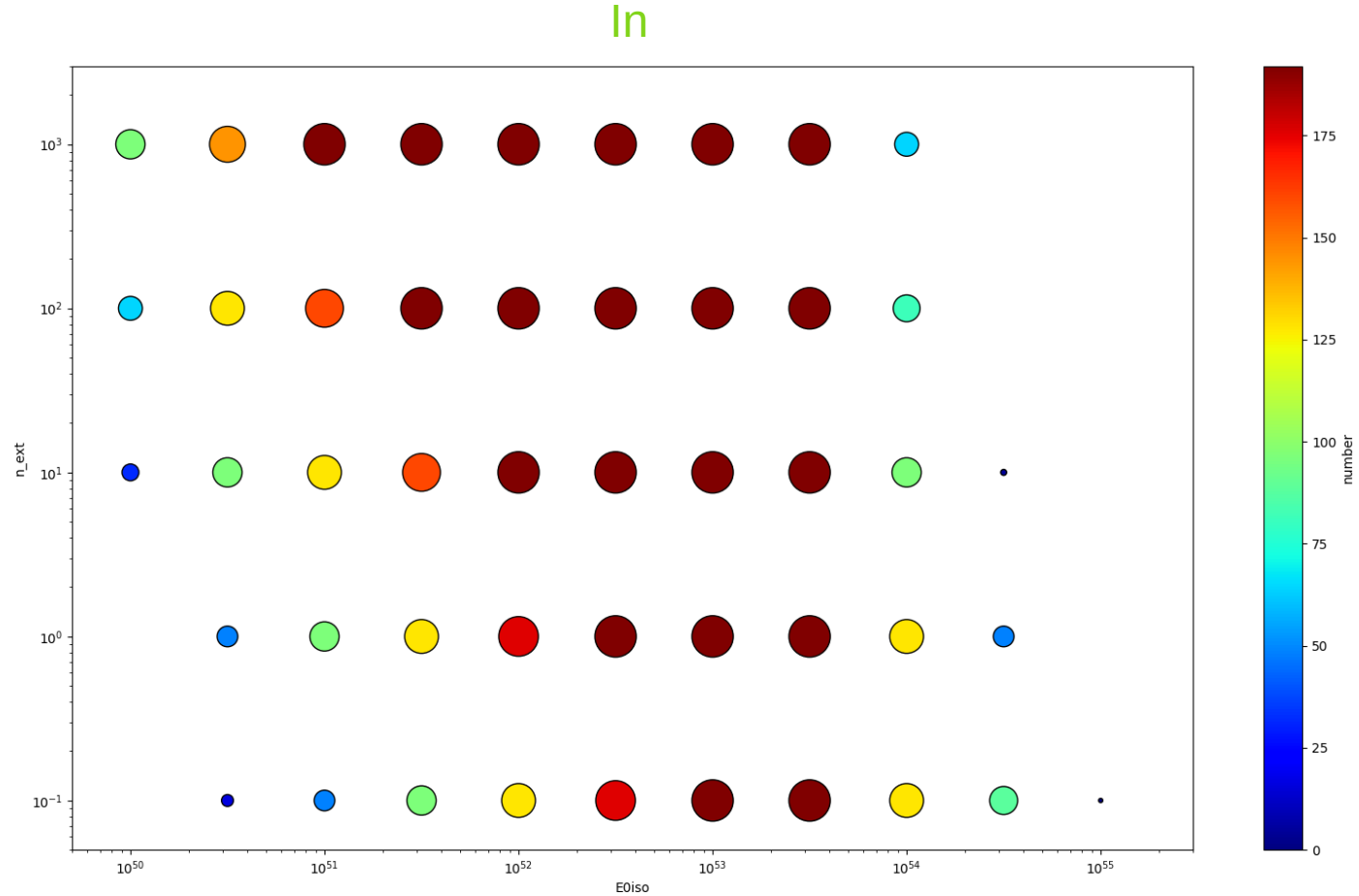
Below



Boulodrome pipeline

Compatibility with observed onaxis afterglow :

Check parameters leading the classification
Example of $E_{\text{iso}} / n_{\text{ext}}$

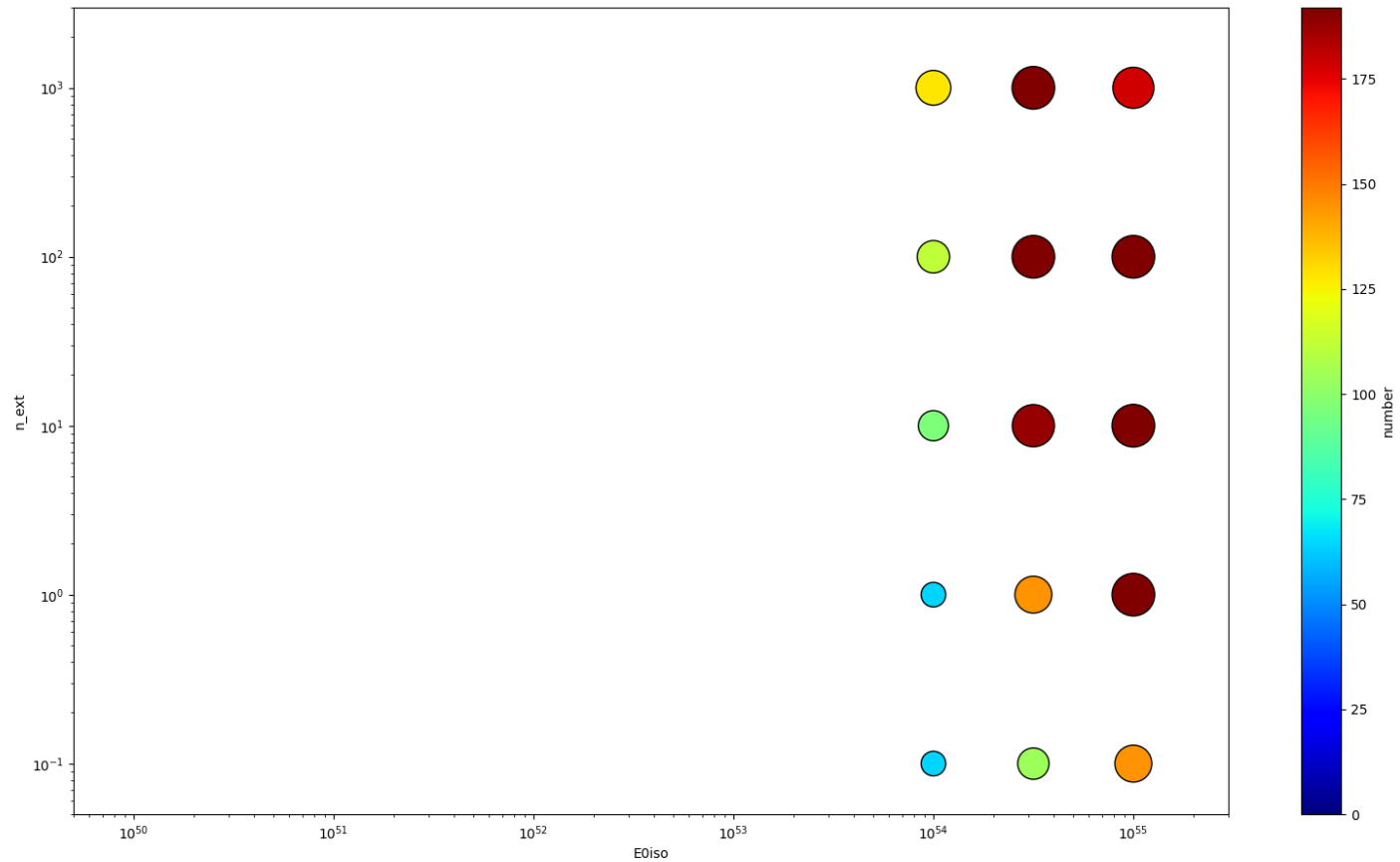


Boulodrome pipeline

Compatibility with observed onaxis afterglow :

Check parameters leading the classification
Example of E_{iso} / n_{ext}

Above



Boulodrome pipeline

Compatibility with observed onaxis afterglow :

Concrete implementation of the fink filter still need to be defined :

- ML training with the template bank ?
- Match filtering ?
- Slope + color ?
- Host galaxy ?
- combination of that ?

