Laboratoire d'Annecy-le-Vieux de Physique des Particules

Réunion 5 mai 2017

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Content

- Results on GRB 060602B
- Fake Event Injection
- Transient Methods
- Analysis check / Ctools simulation check
- Stage L3

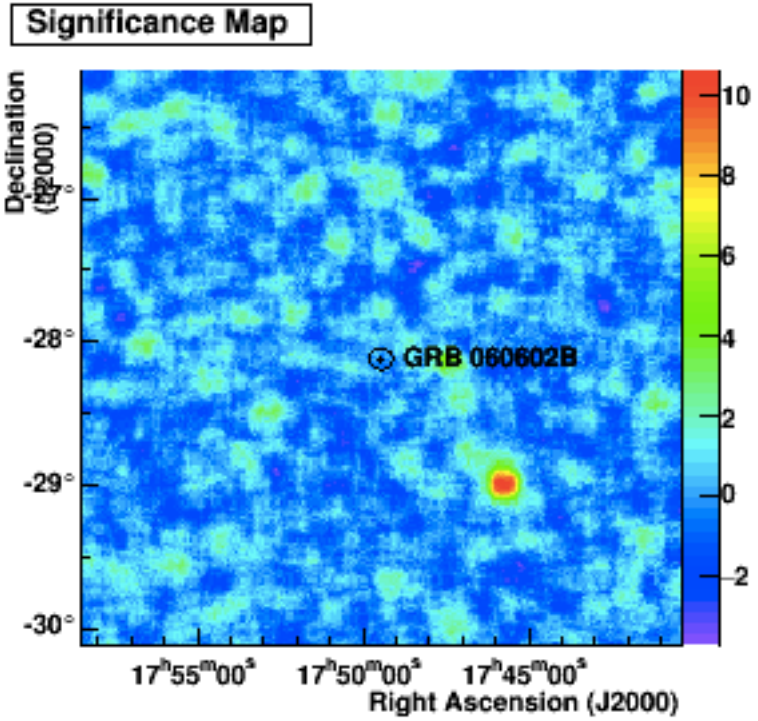
arXiv:0809.2334

Swift detection
At 23:54:33.9 UT on 2006 June 2

Runs: 32585, 32586, , 32559, 32660, 32663, 32664, 32665, 32666, 32667, 32668, 32669, 32670, 32678, 32679, 32681, 32692, 32693, 32694, 32695, 32765, 32766

1.7 hour pre-burst, 9 s prompt, and 3.2 hour afterglow phases + others later

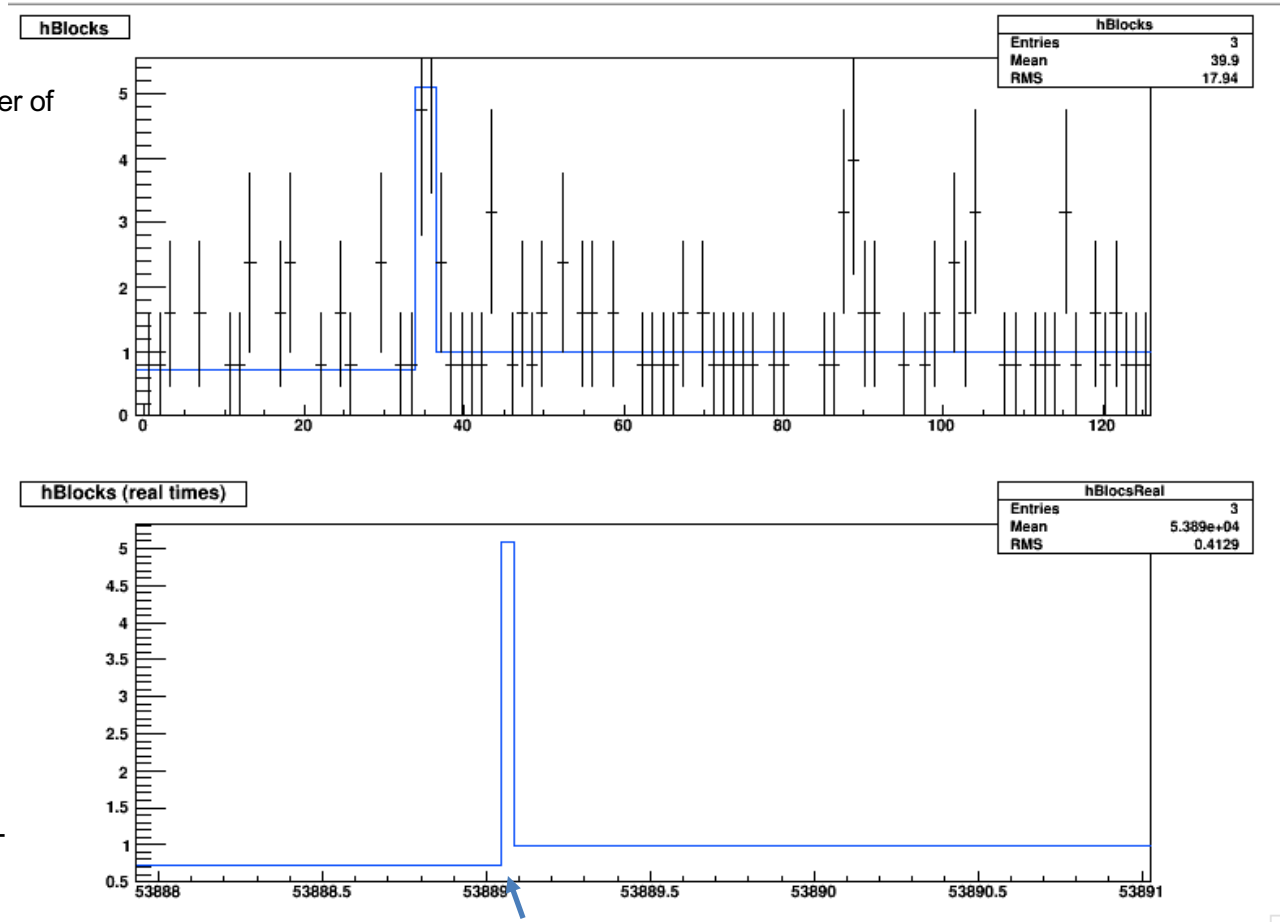
Stereo Std



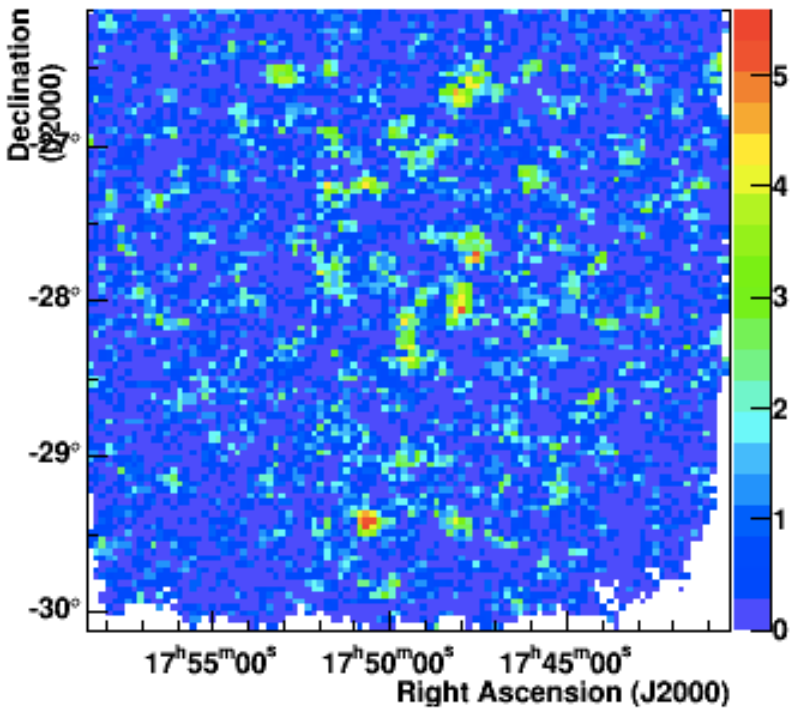
Exp-test

Exp-Test significance: 2.03

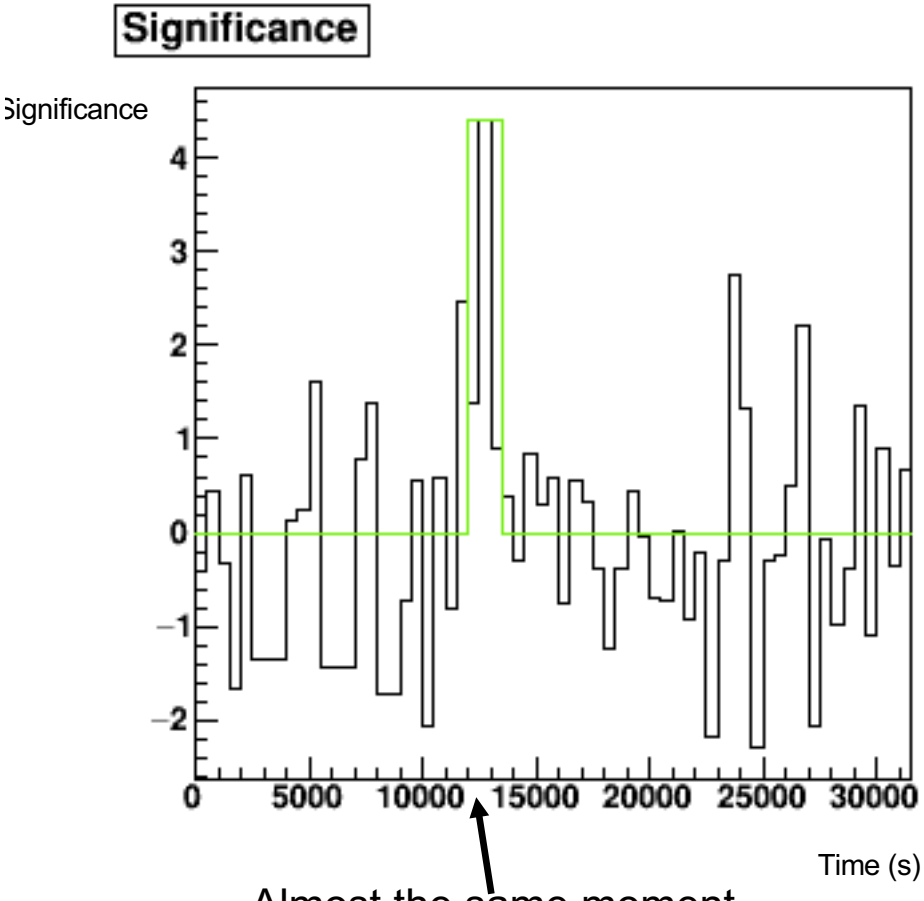
Bayesian Block



ON-OFF



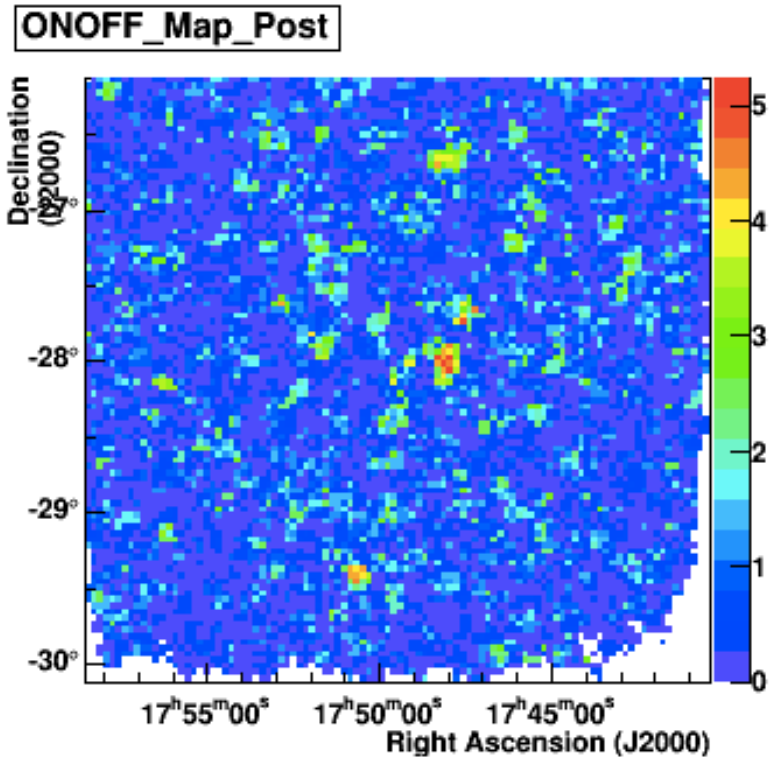
dT = 500s



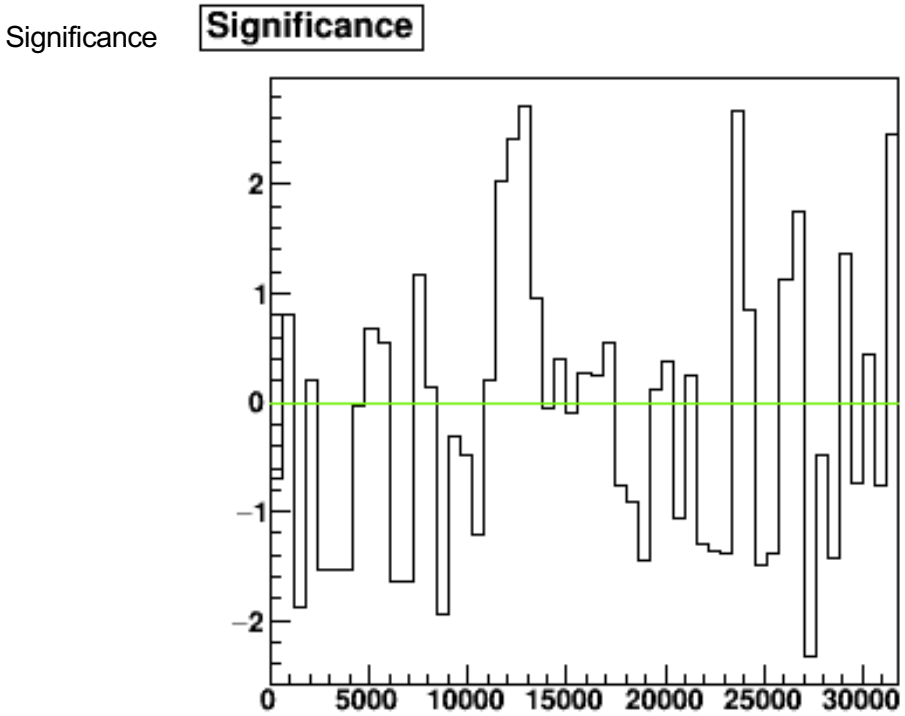
Maximum significance : 4.40
Maximum significance post-trials : 3.39

Almost the same moment as BB results

ON-OFF (2)



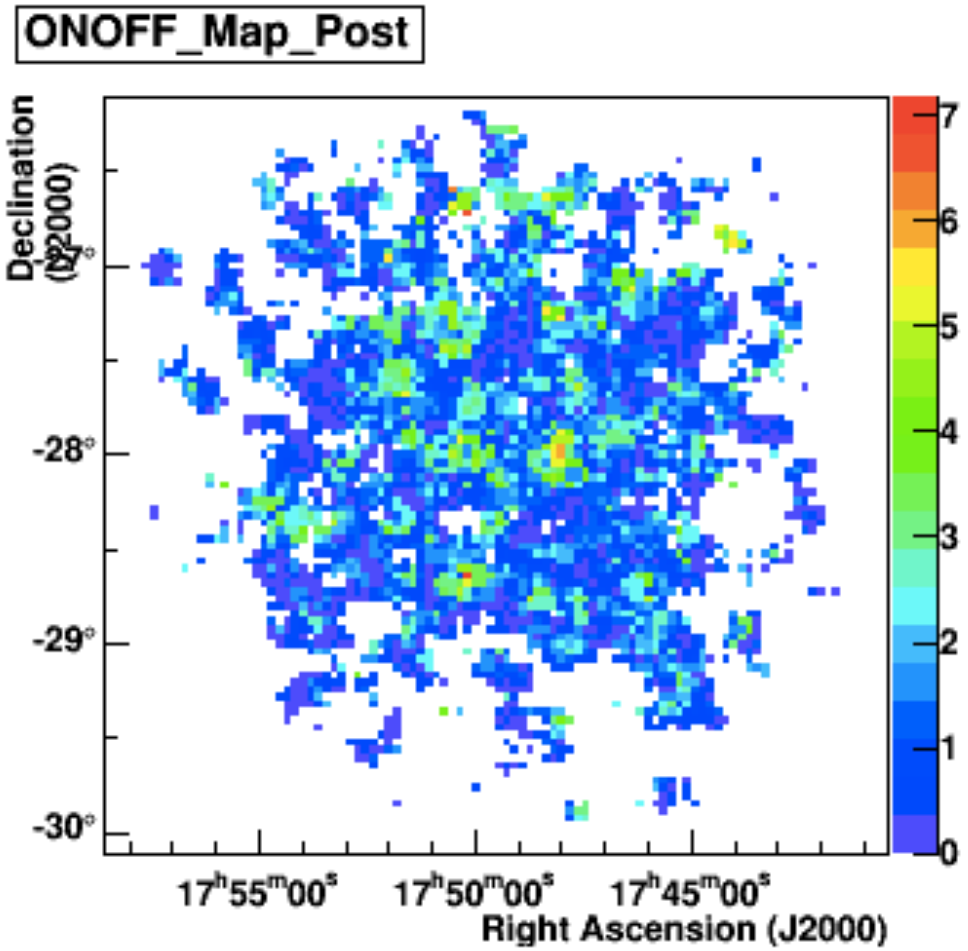
dT = 600s



Offset : 0.25 deg

Maximum significance : 3.70115
Maximum significance post-trials : 2.70429

Runs : 32866-70 (just before and after the alert)



- Camera center
  - ✓ Bayesian Block
  - ✓ ✗ ON-OFF
  - ✗ Exp-test
  - ✗ CuSum

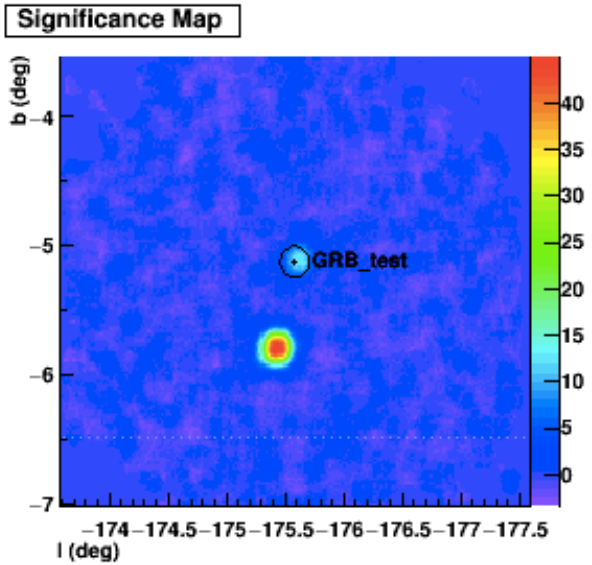
} Can not be considered as a signal

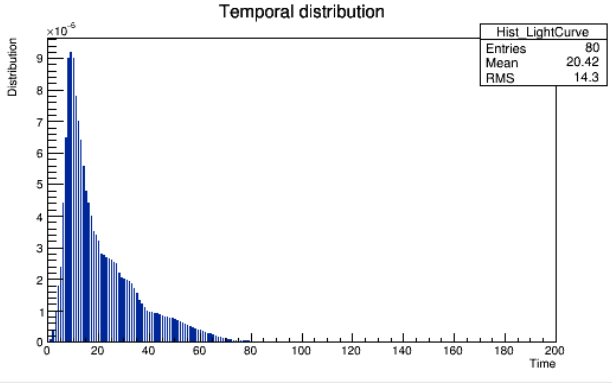
- Small hot spot 0.25 deg from camera center (seems to be nothing). But seems to disappear if we use another dT.

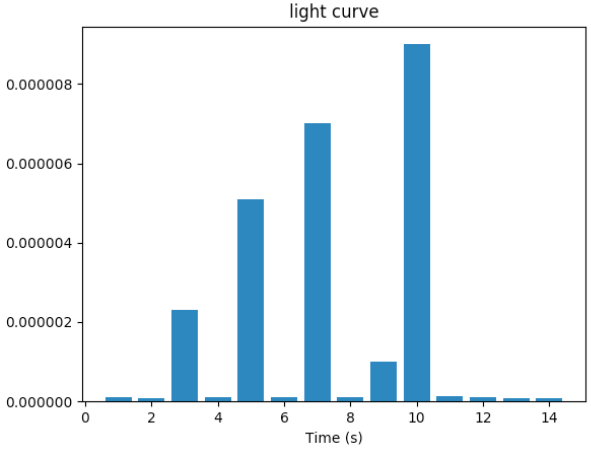
Goal: compare Transient and Classic methods in GRB case

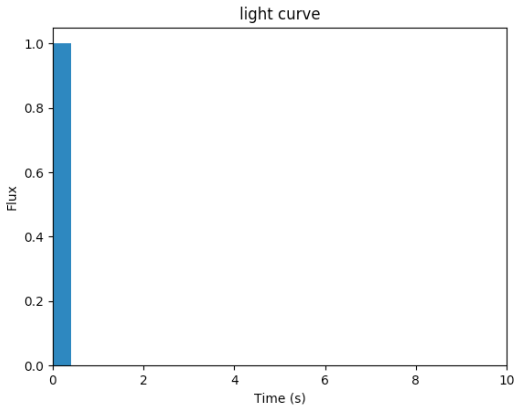
ParisAnalysis v32
Combined
DST Prod8
Run 101321 (Crab)

3 light curves





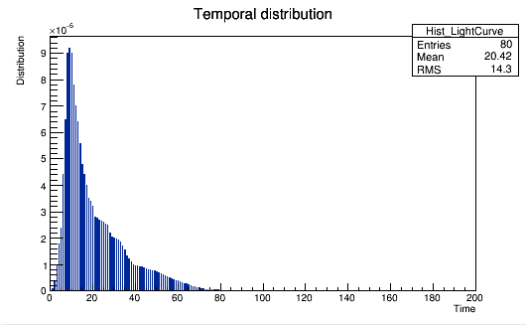


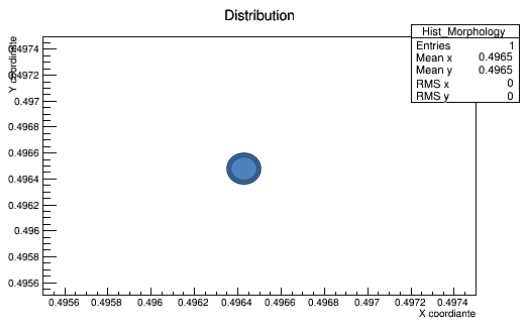


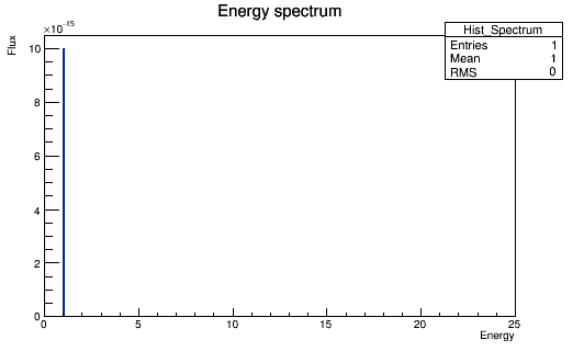
https://hess-confluence.desy.de/confluence/display/HESS/Search+for+Transients+-+Fake+Event+Injection

Goal: Inject Fake Event in dst

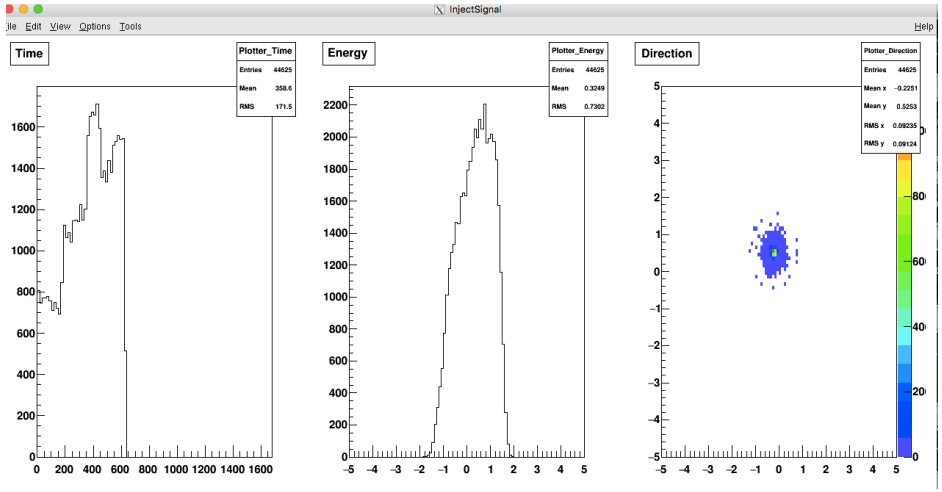
Input: root file







Output: root file (new dst)



Classic method:

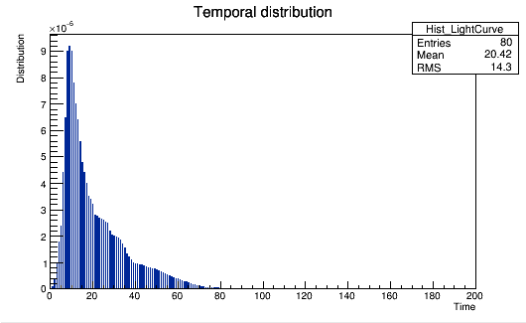
LI&Ma

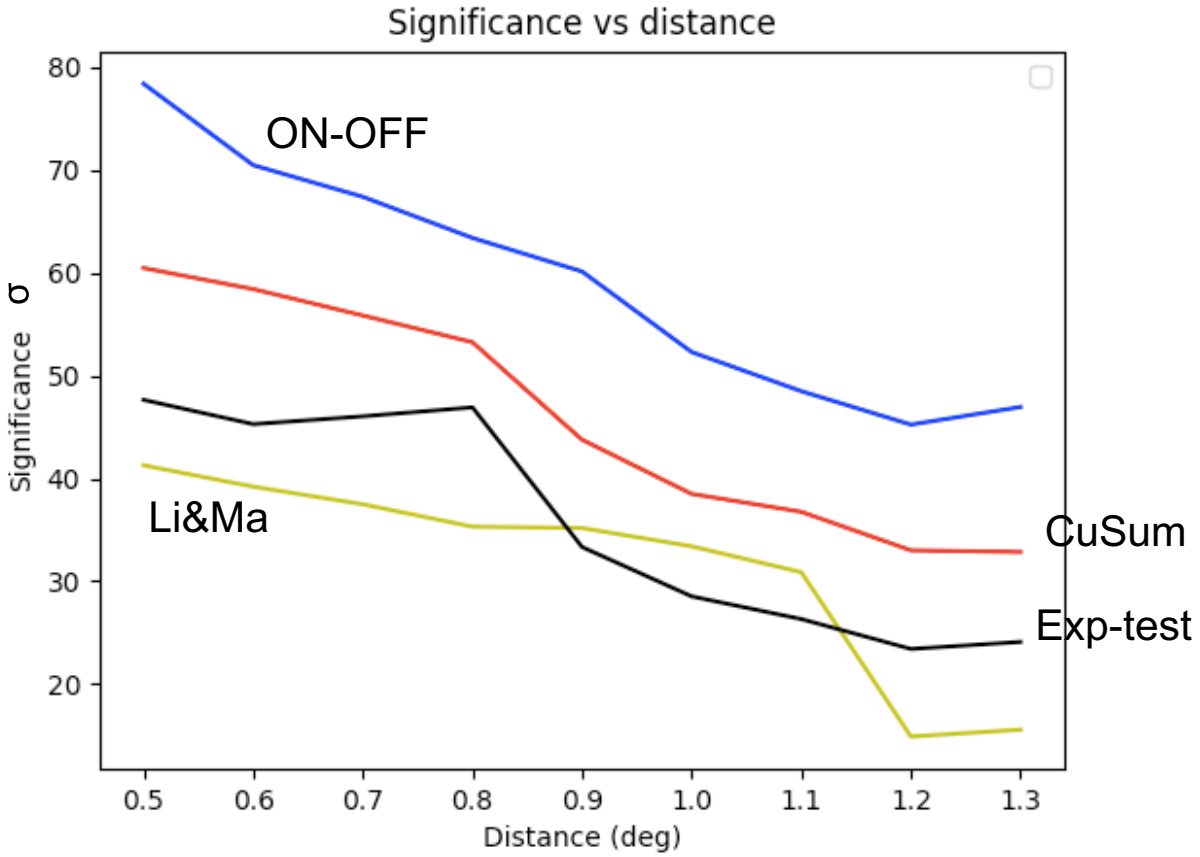
Transient methods:

Exp-test
CuSum
ON-OFF

Significance of detection	Significance of variability
Li&Ma	CuSum
ON-OFF	Exp-test

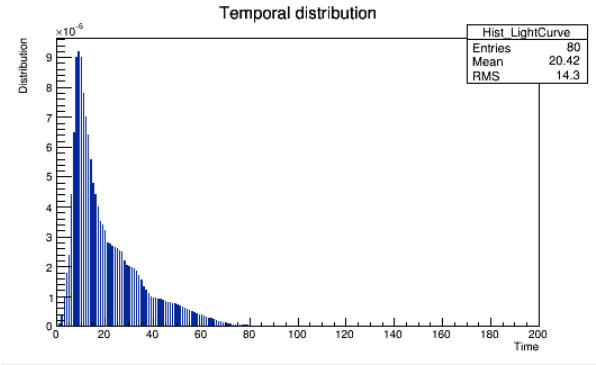
Distance from camera center

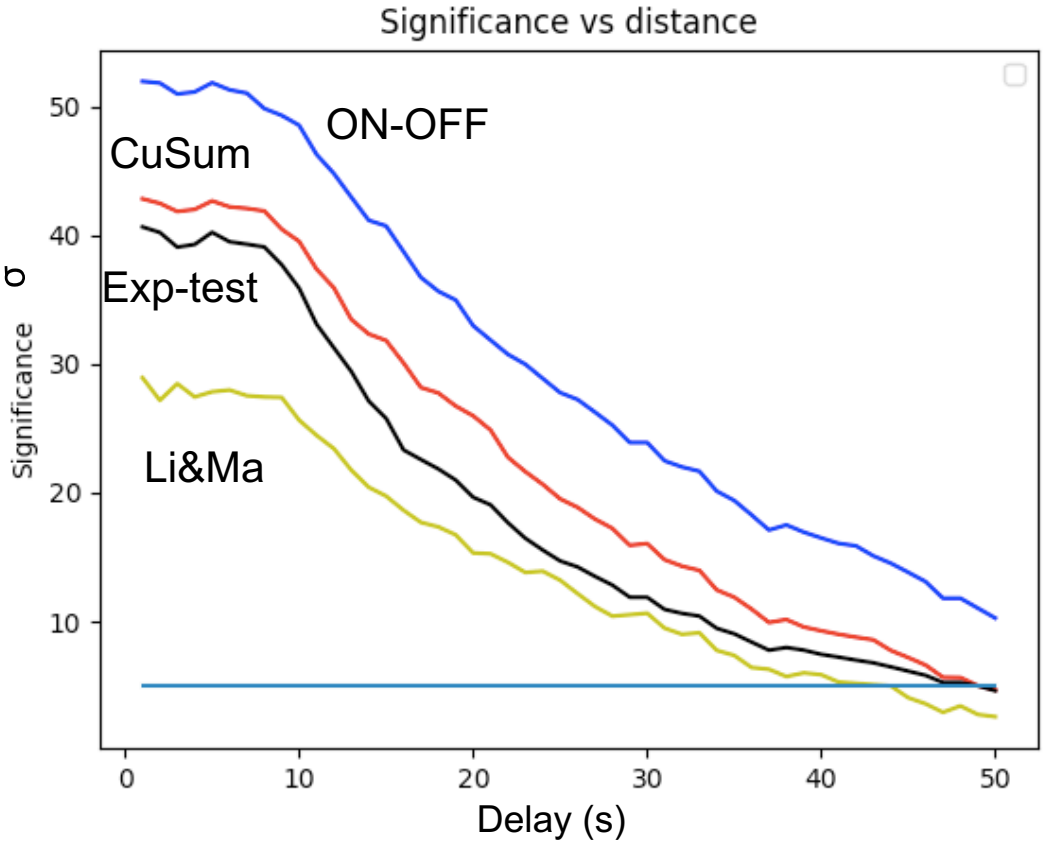




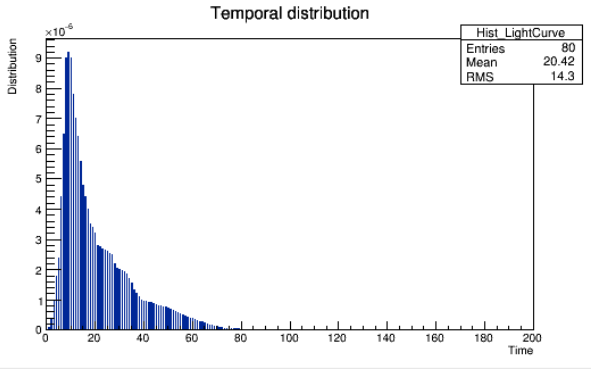
Acceptance ??

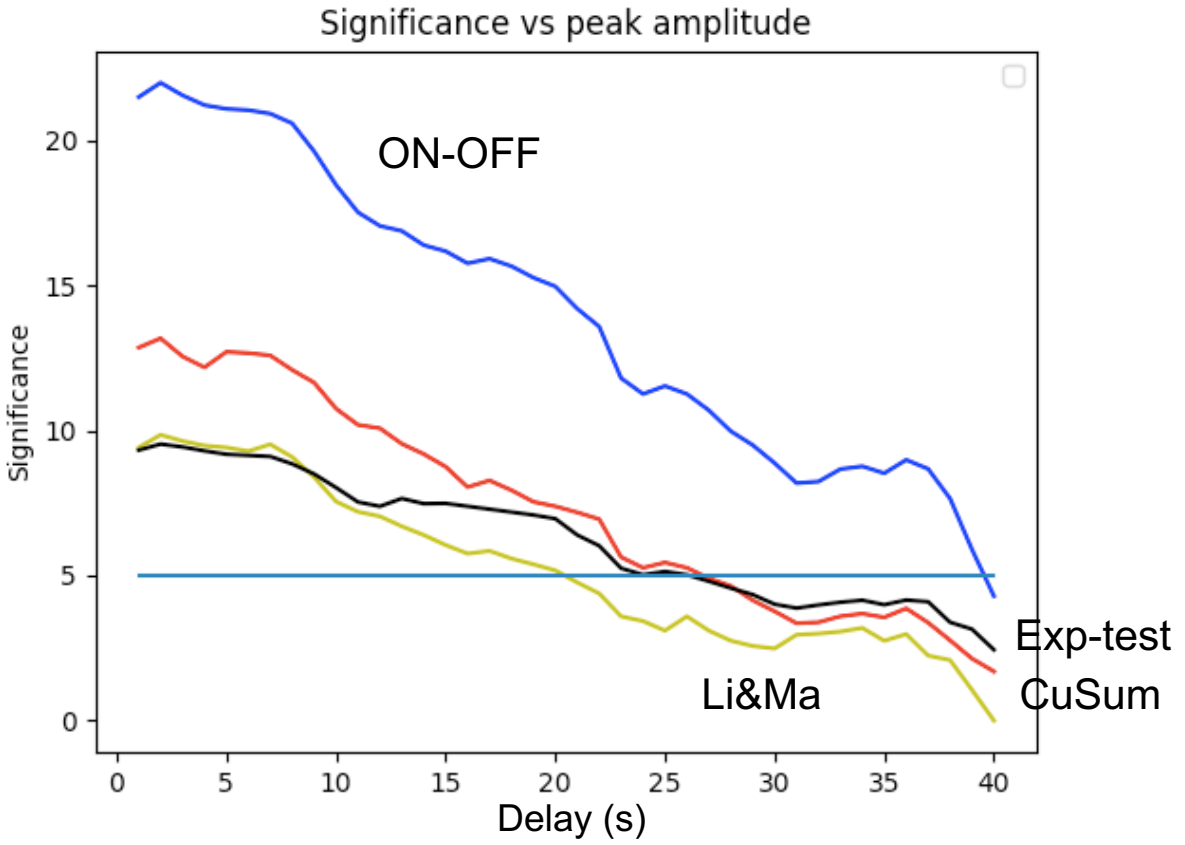
Delay of observation



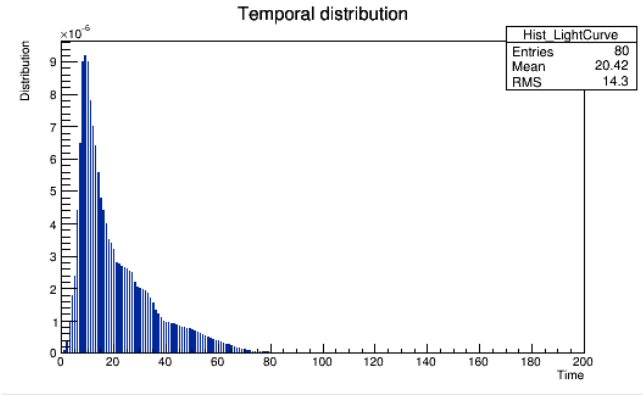


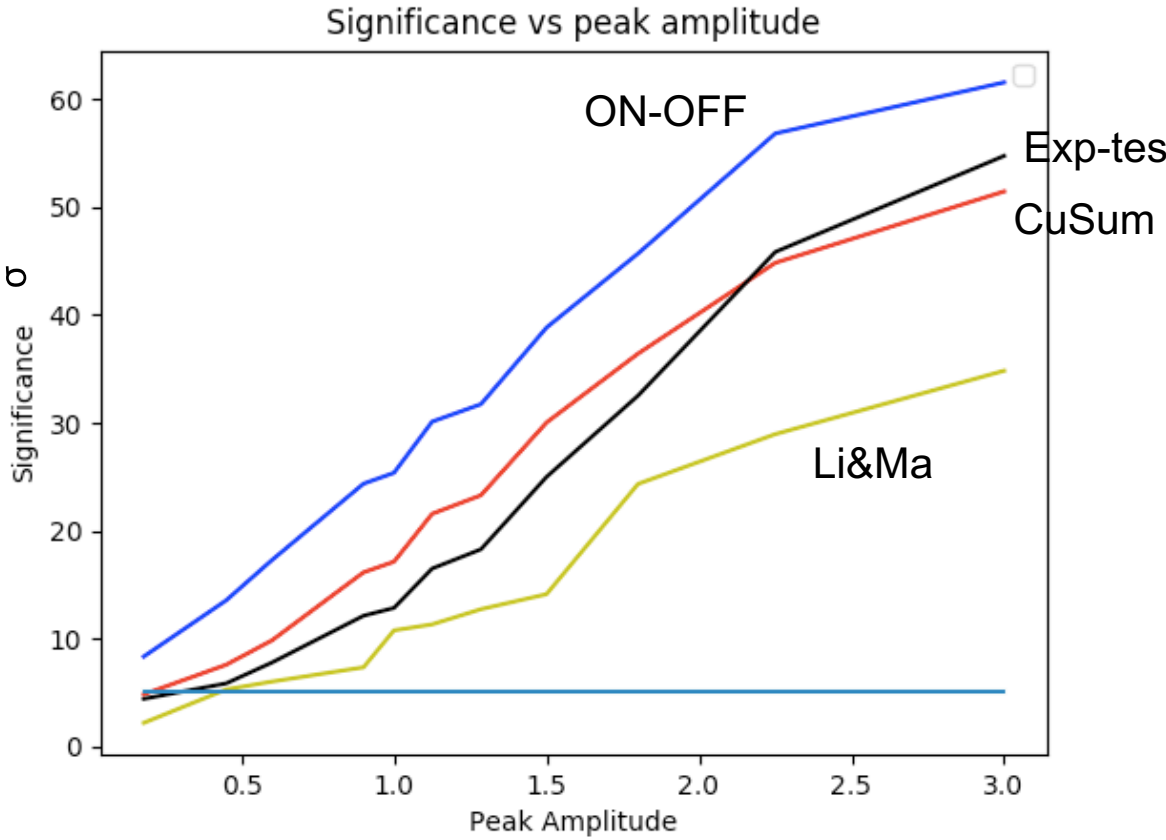
Same as before but Amplitude/10



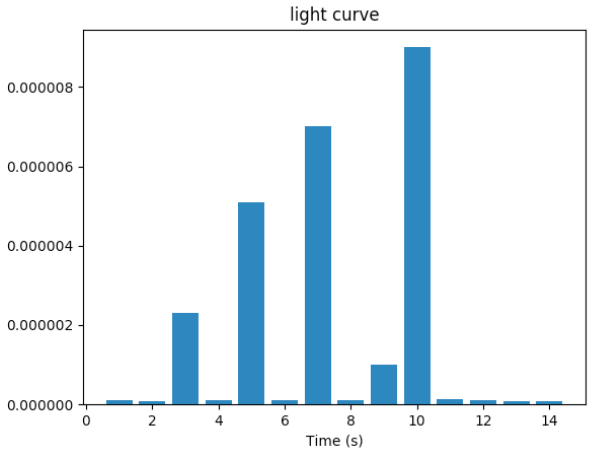


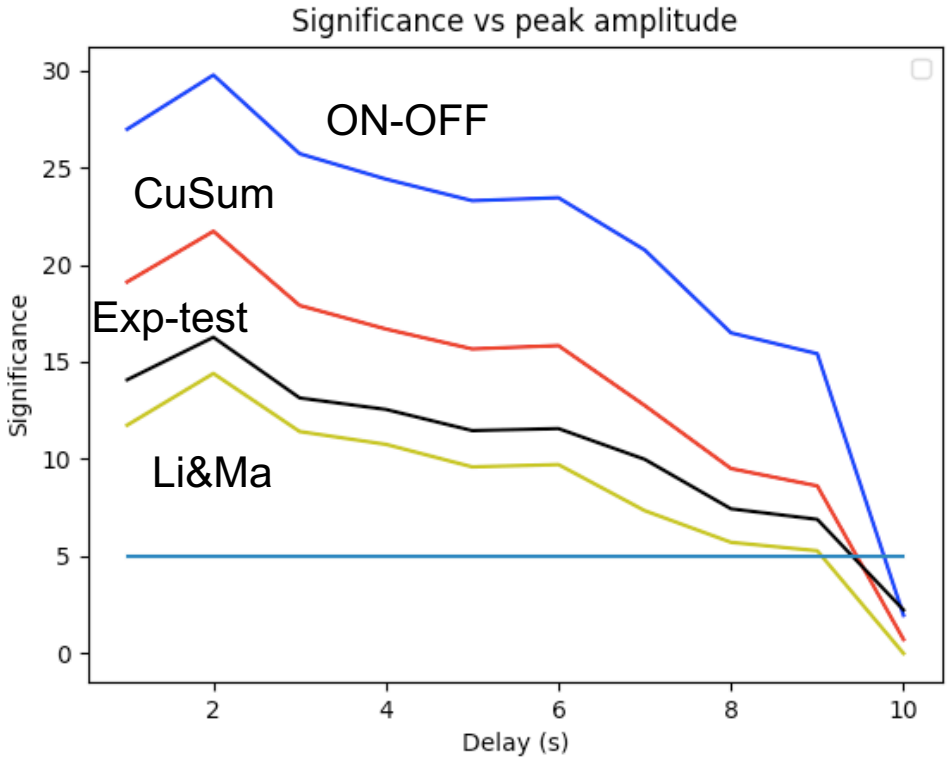
Amplitude of max





Delay of observation





- ON-OFF seems promissing (much better than Li&Ma)
- Share these results with François for the publication
- Doing the same for Ctools (methods not checked yet)
- Other tests ?????
- Question: What ParisAnalysis does ? (Cuts,…)

Goals:

Check my methods implemented in python

- Apply my methods and the HESS methods to the same data set for all the methods.

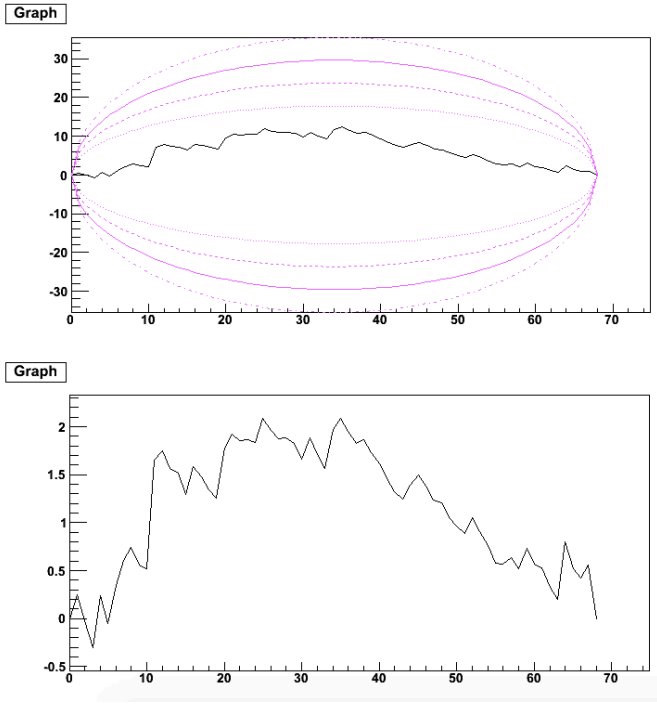
Having a « test » on simulation in ctools

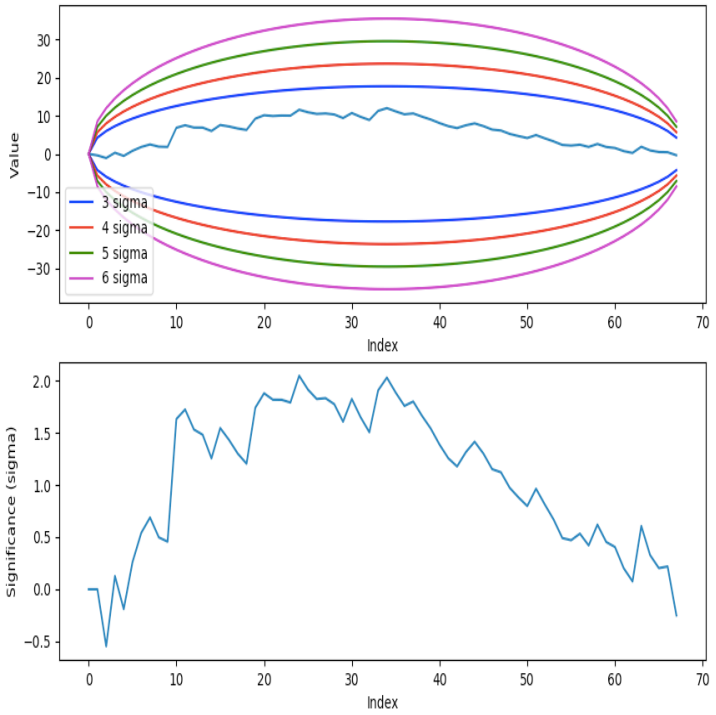
- Inject the same light curves and spectra in Fake Event Injection and in ctools simulation (Using the same HESS IRFs)

Compare my methods (python) to the HESS soft methods

✓ Exp-test (Running Exp-test, Running Running Exp-test)

± ✓ CuSum



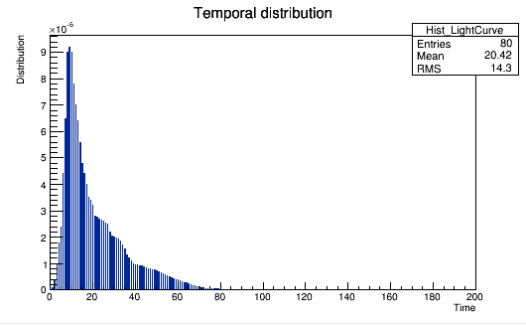


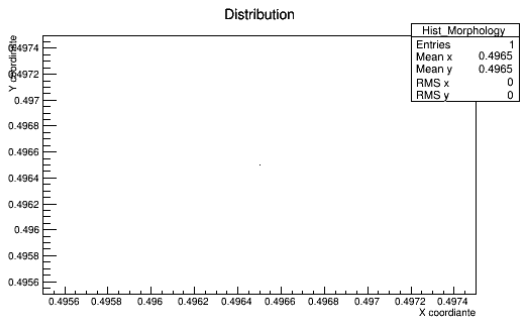
? ON-OFF

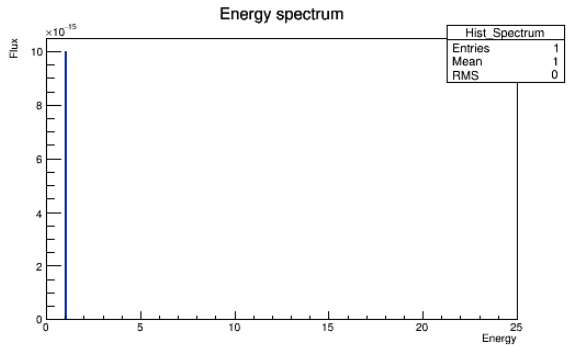
✖ Bayesian Block

Acceptance calculation ?????

Analysis check / Ctools simulation check







Using HESS IRFs

	Fake Events Injection	Ctools simulation	Ctools simulation (Norme X 2000)
Number of events (source)	519	5	653

PRELIMINARY

Fake Event Injector : Events are injected AFTER using HESS IRFs

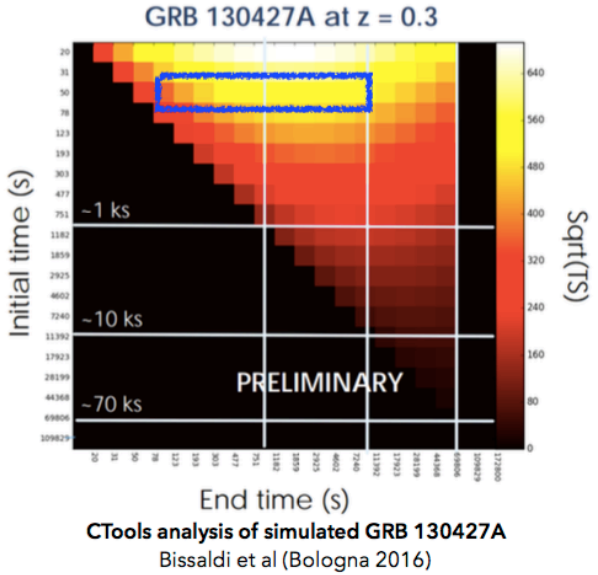
Ctools simulation: Events are simulated BEFORE using HESS IRFs

12 Juin – 6 ou 7 semaines

But du stage : Estimer la détectabilité de GRB en fonction de plusieurs paramètres (délai d'observation, amplitude du signal …) (comme je l'ai fait avec HESS)

Simulation de GRB avec ctools

Light curves and spectra



CTools analysis of simulated GRB 130427A
Bissaldi et al (Bologna 2016)

Points abordés durant le stage:

- Astronomie gamma et détection Tcherenkov
- Sursauts gamma
- Méthodes d'analyse statistiques
- Simulations
- Conclure par rapport aux objectifs d'observation de CTA

But optionnel: Comparer les résultats à ceux obtenus avec HESS

Vous pouvez aller manger…….(et moi dormir)