

Comparison of the Online- and the Standard-Analysis for H.E.S.S.

ecap

ERLANGEN CENTRE
FOR ASTROPARTICLE
PHYSICS

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Astroteilchenschule

Obertrubach-Bärnfels, 09.10.2009

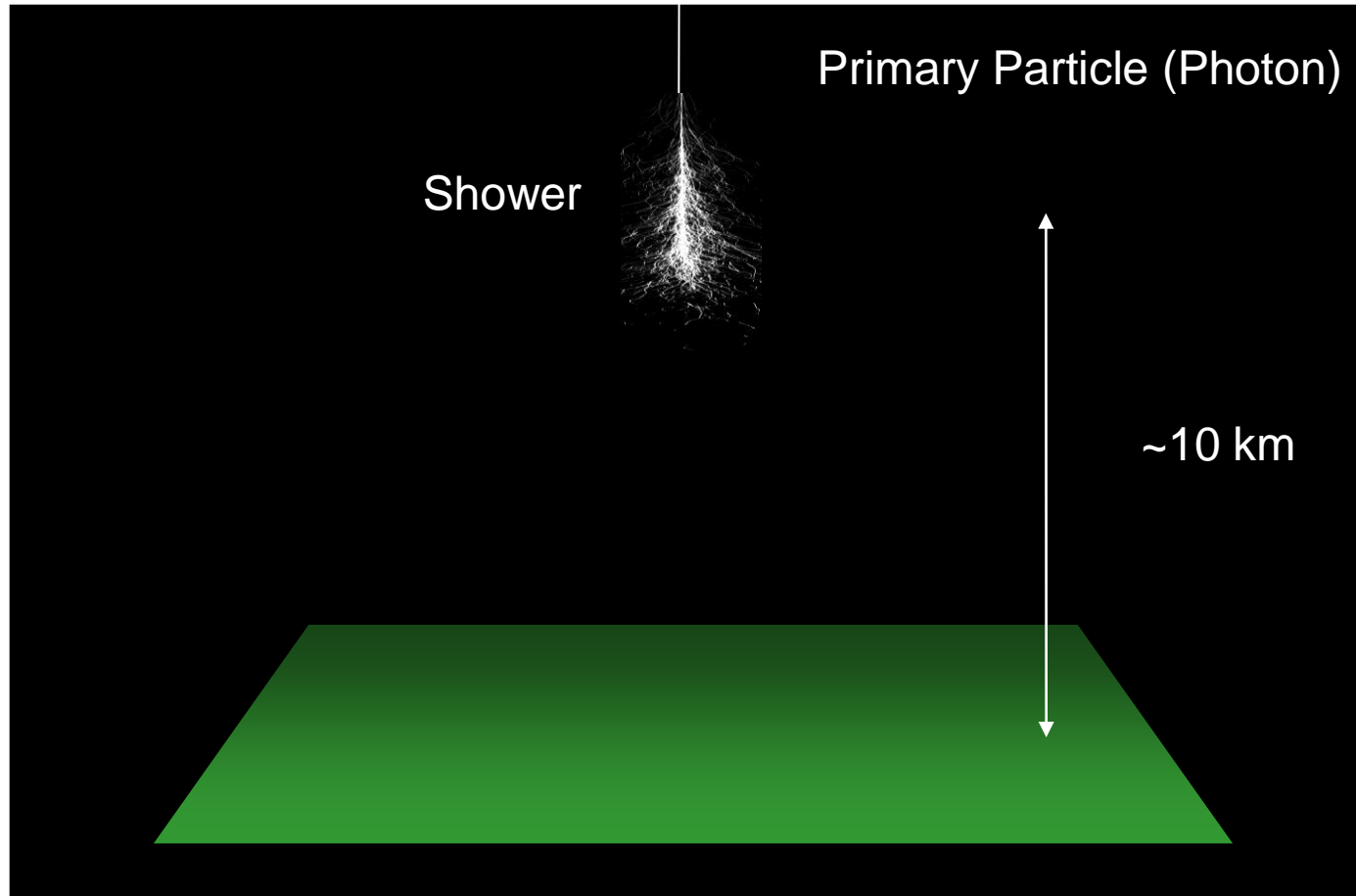
Friedrich-Alexander-Universität
Erlangen-Nürnberg



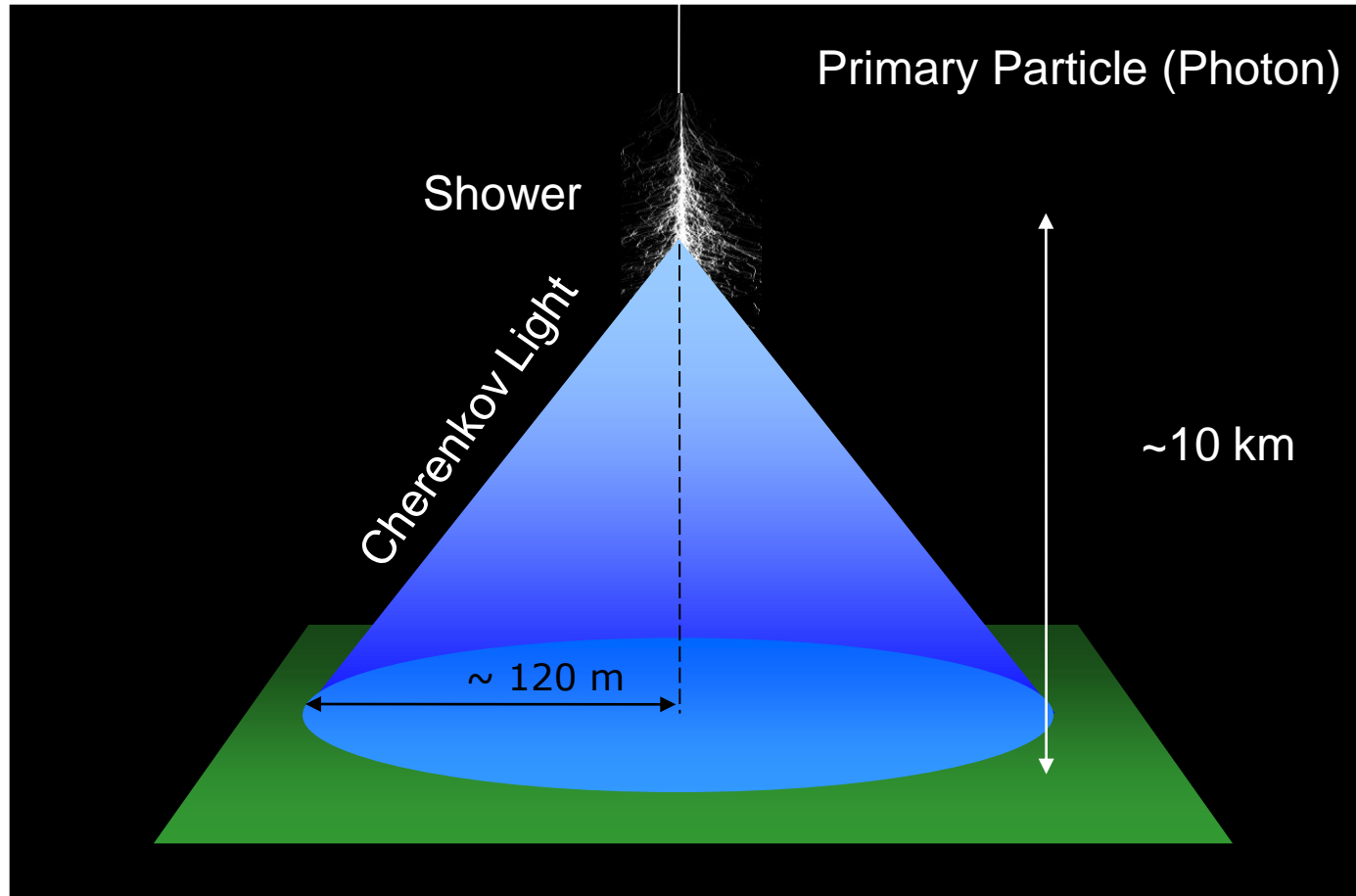
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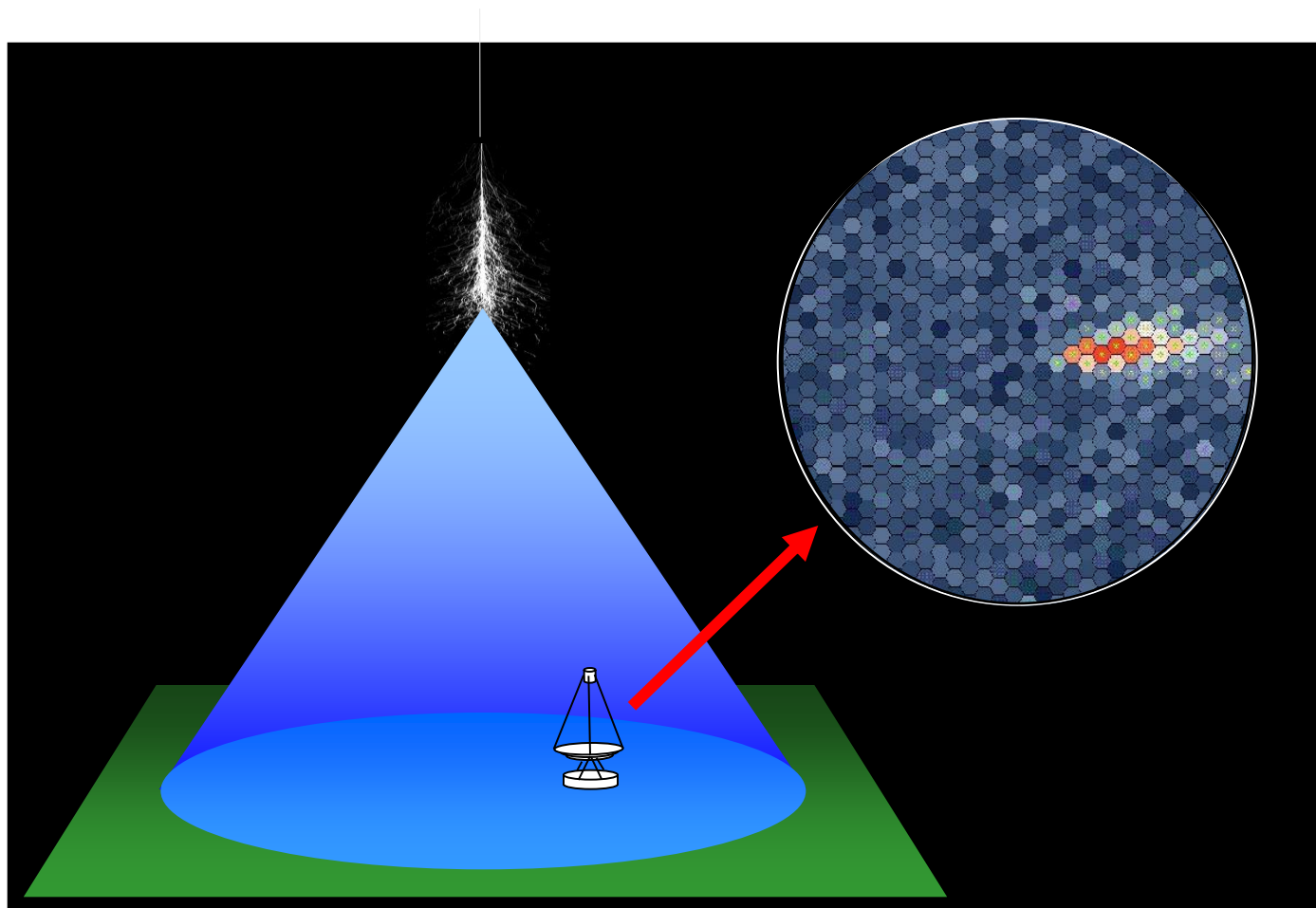
Detection of VHE Gamma Rays



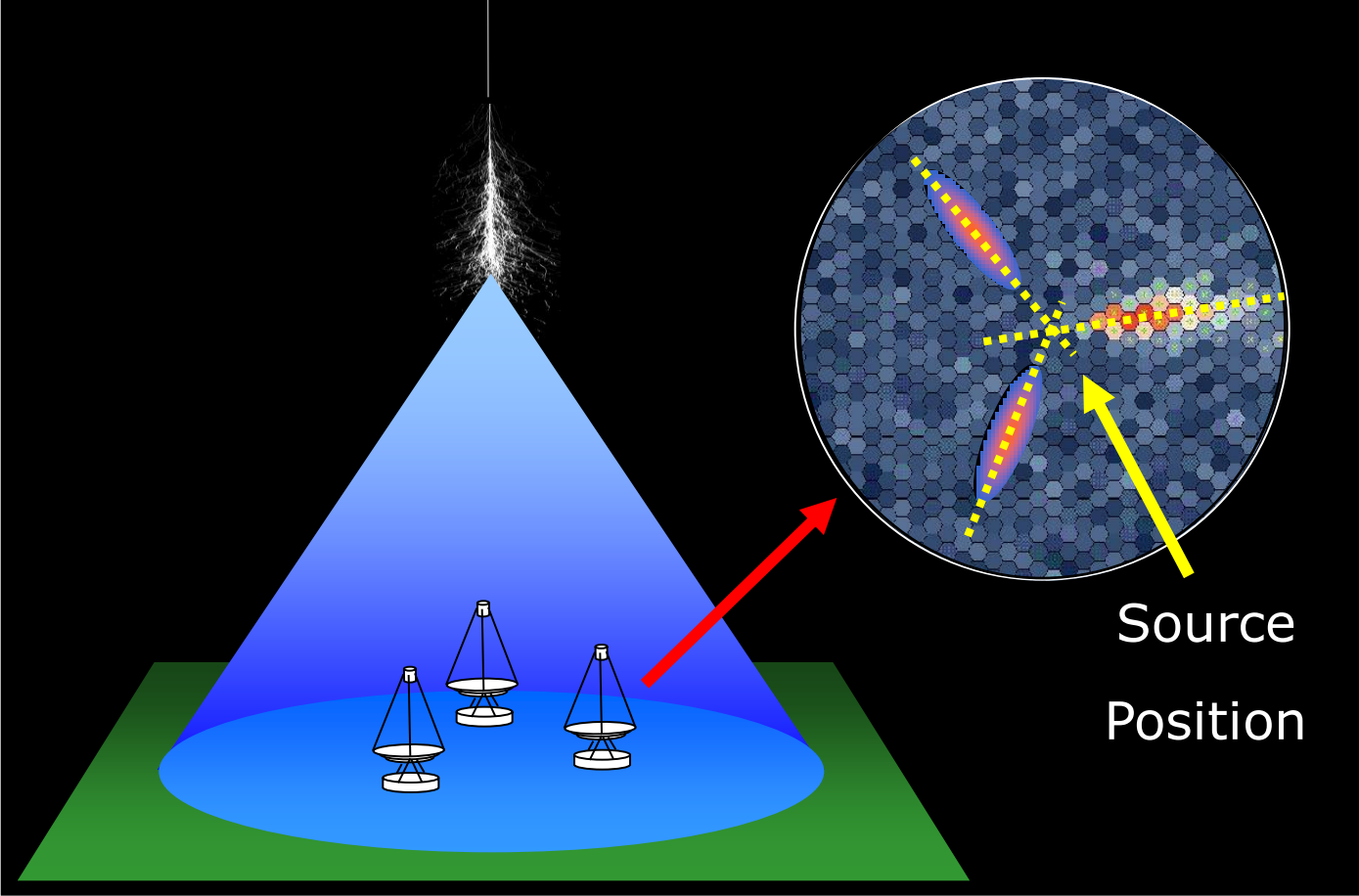
Detection of VHE Gamma Rays



Detection of VHE Gamma Rays



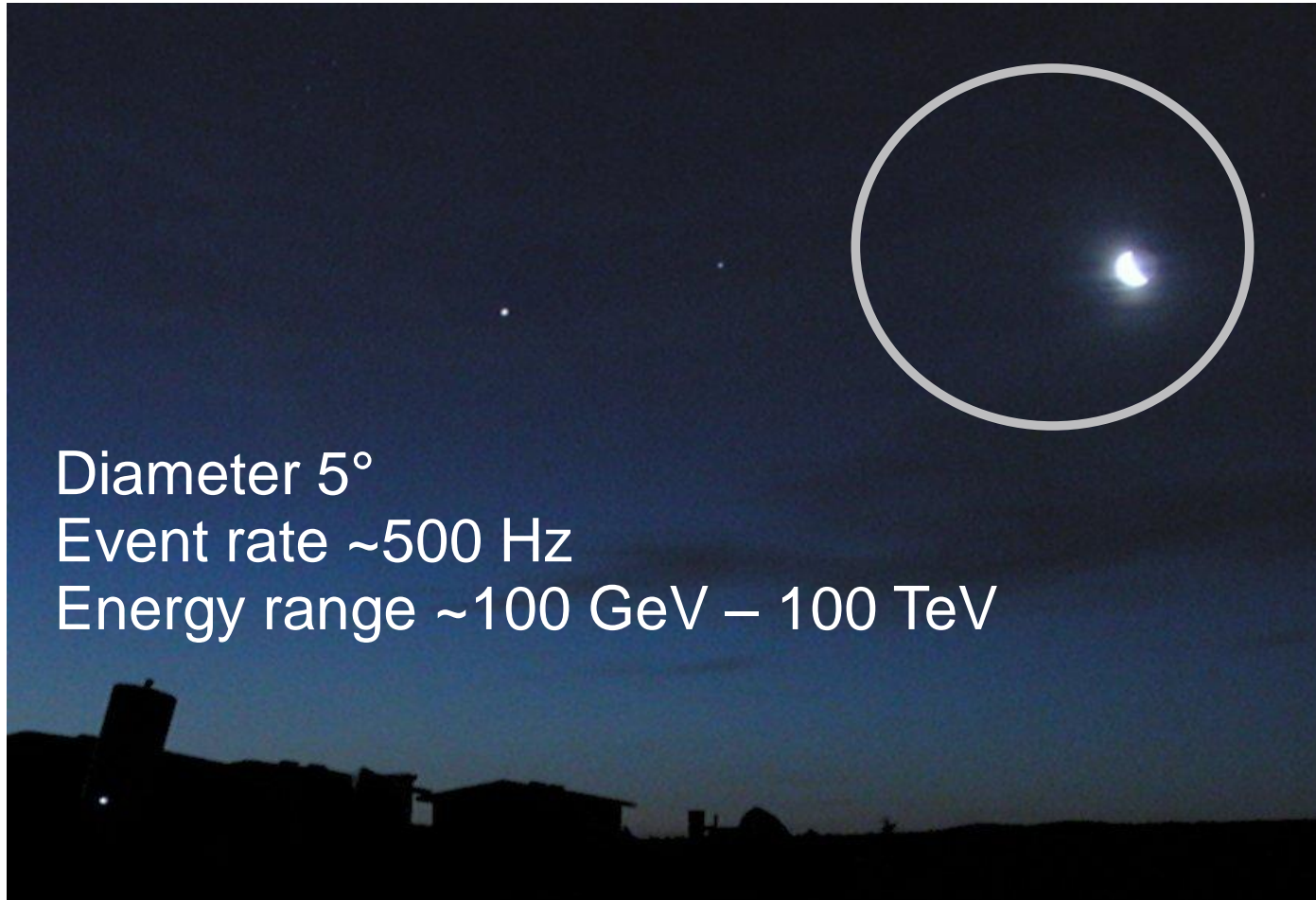
Detection of VHE Gamma Rays



The High Energy Stereoscopic System



Large Field-of-view



Diameter 5°

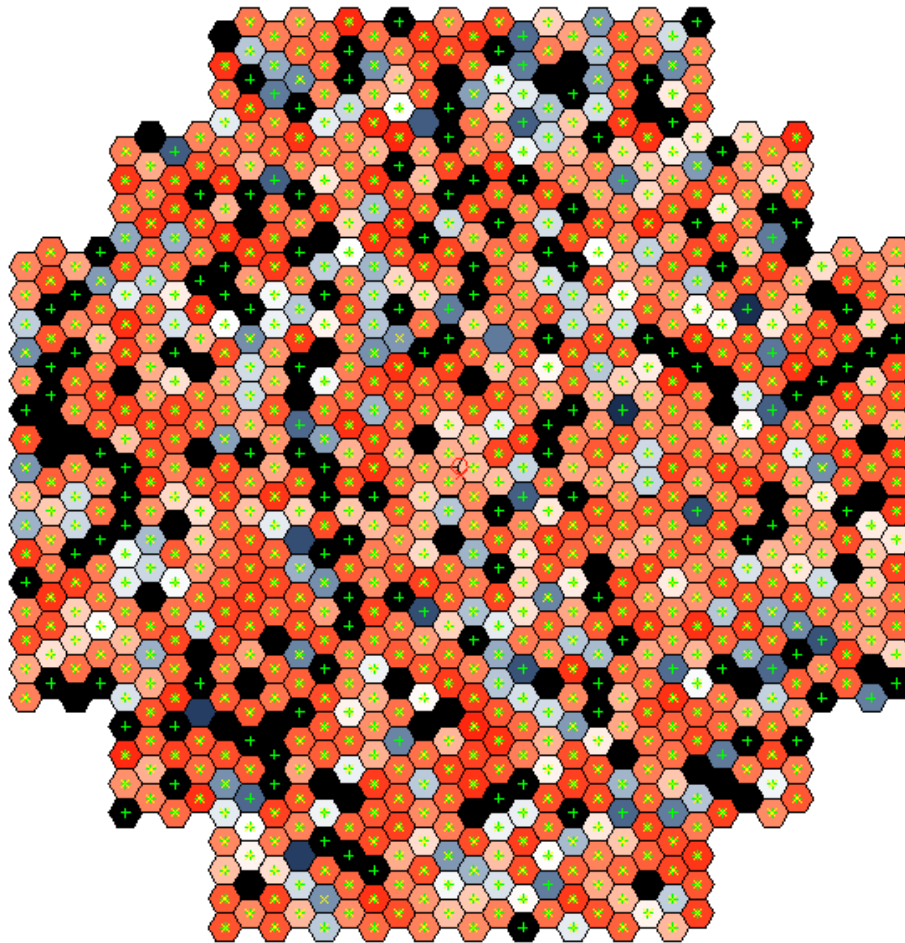
Event rate ~ 500 Hz

Energy range ~ 100 GeV – 100 TeV



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Most important camera feature: Extremely short exposure time



1/10000 s
(100 μ s)



1/100000 s
(10 μ s)

1/1000000 s
(1 μ s)

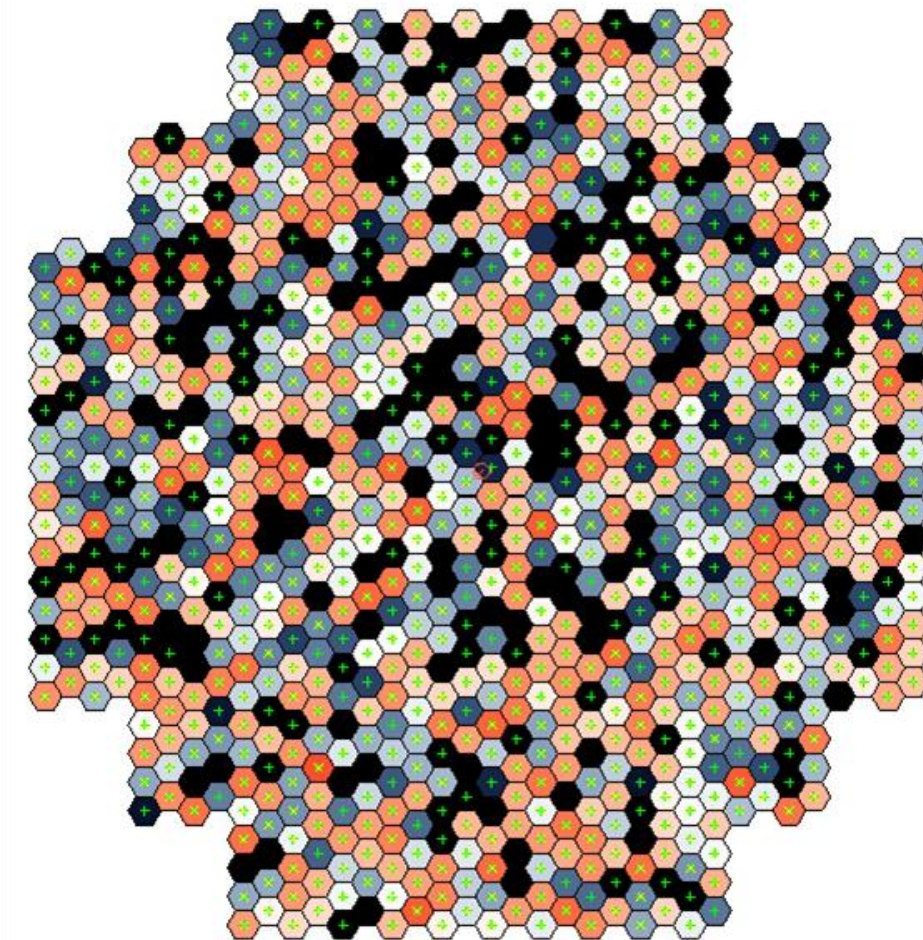
1/10000000 s
(100 ns)

1/100000000 s
(10 ns)



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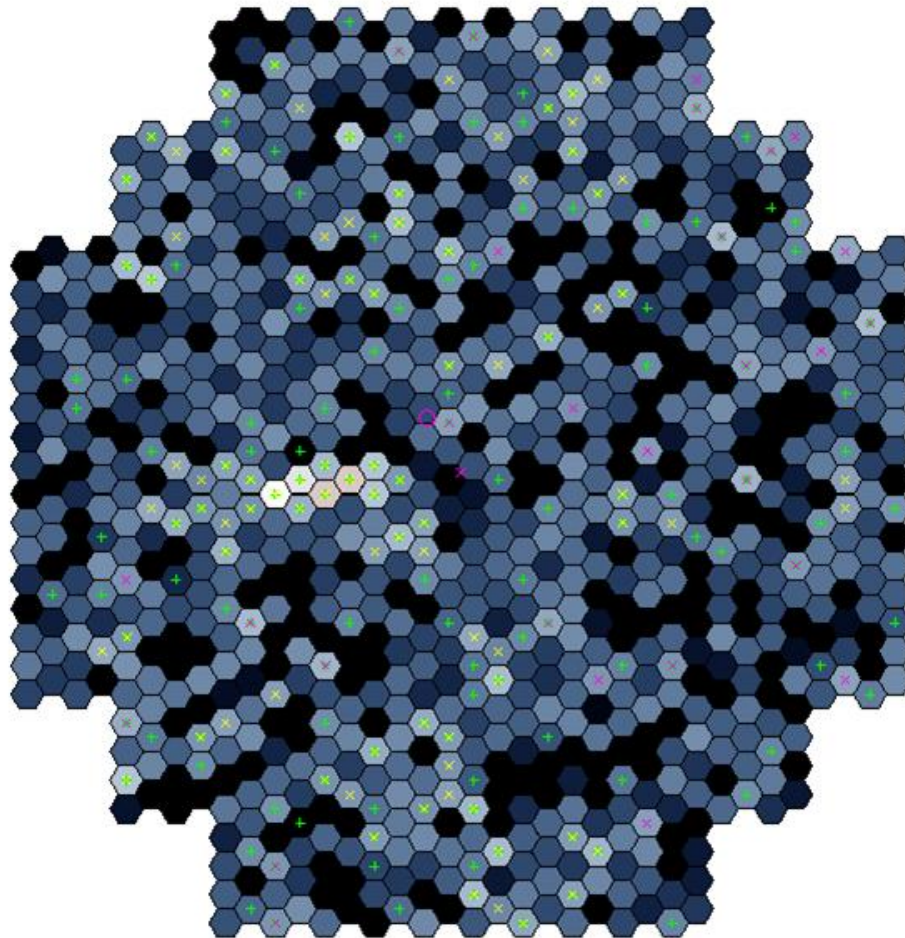


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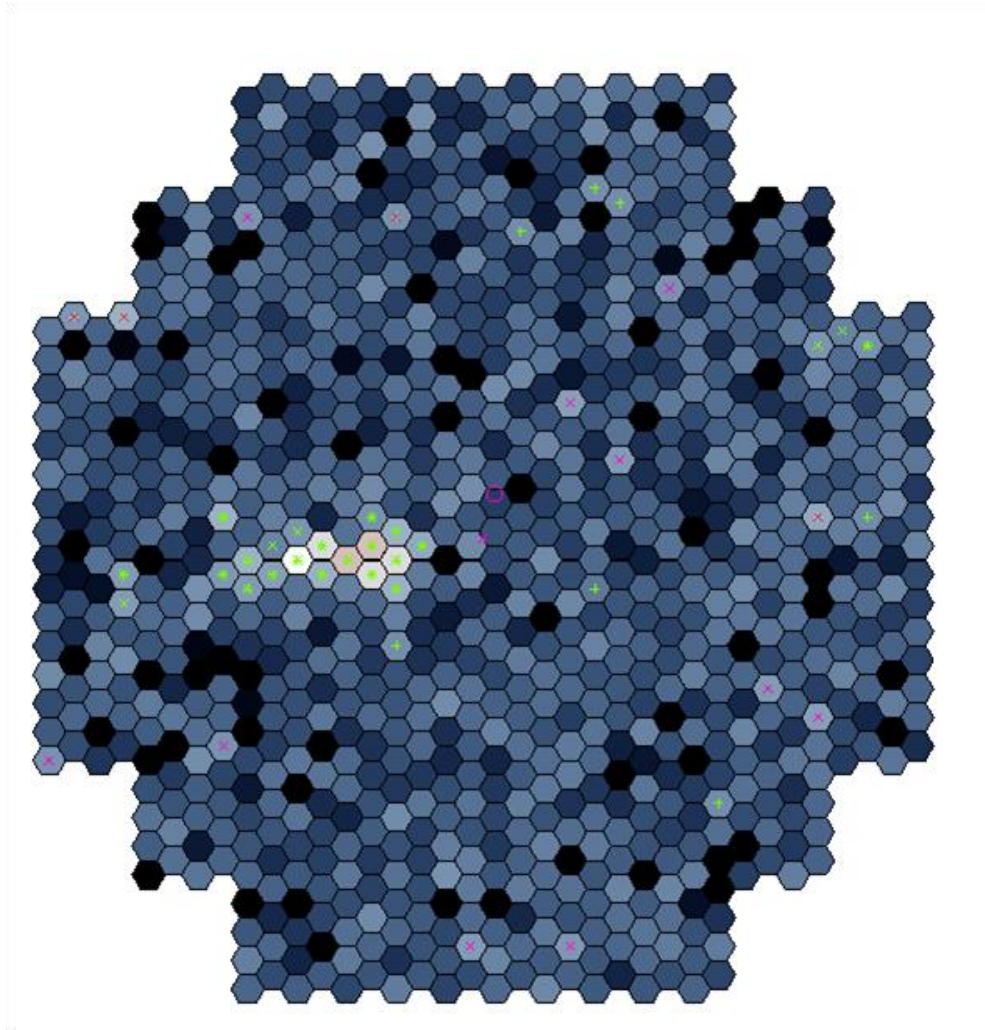
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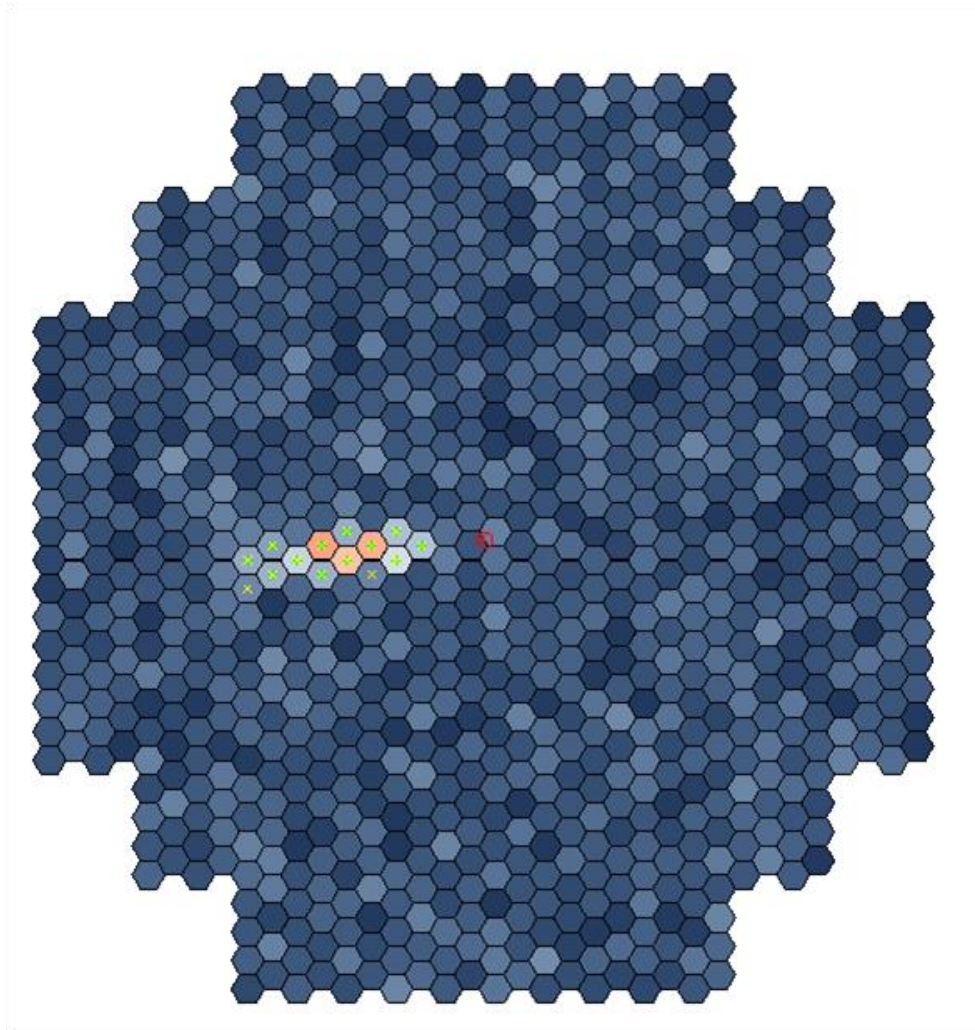
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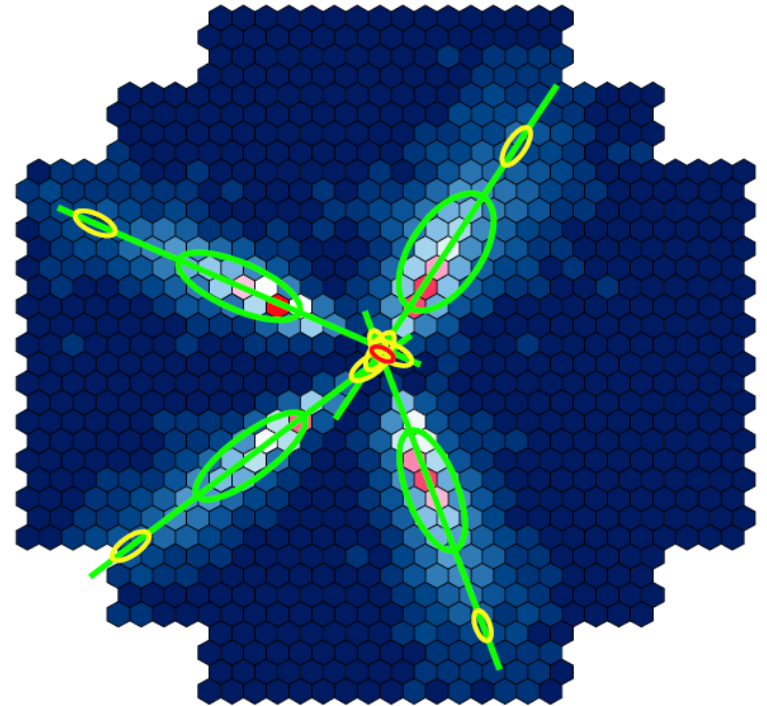
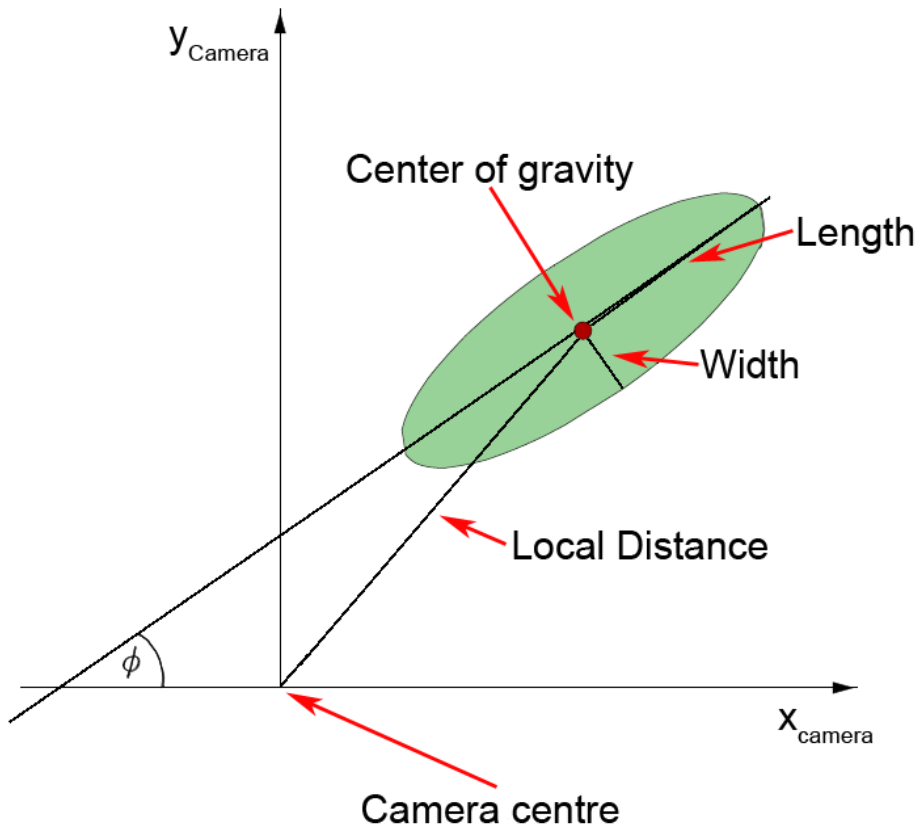
1/100000000 s
(10 ns)



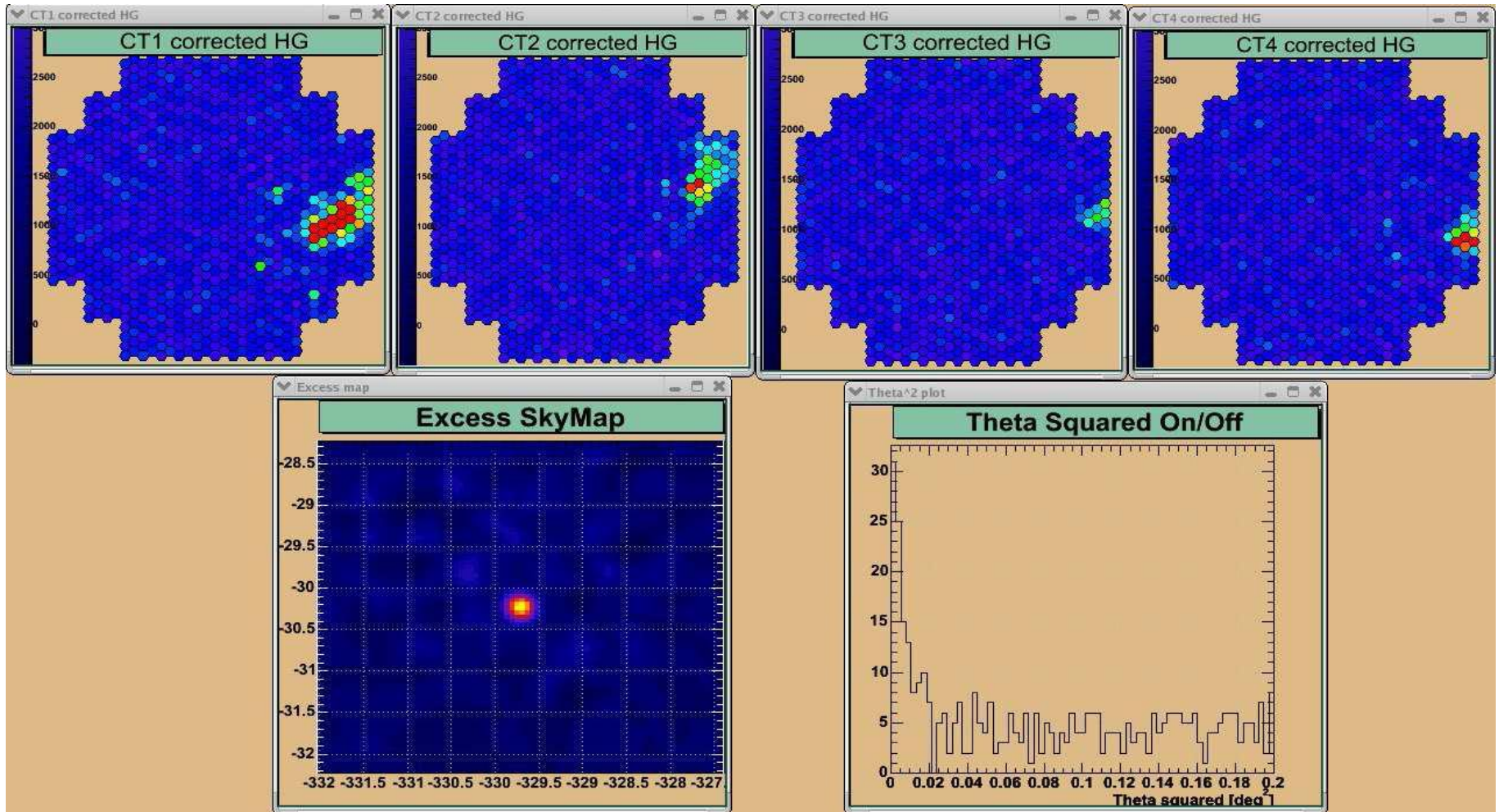
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Hillas-Parameter

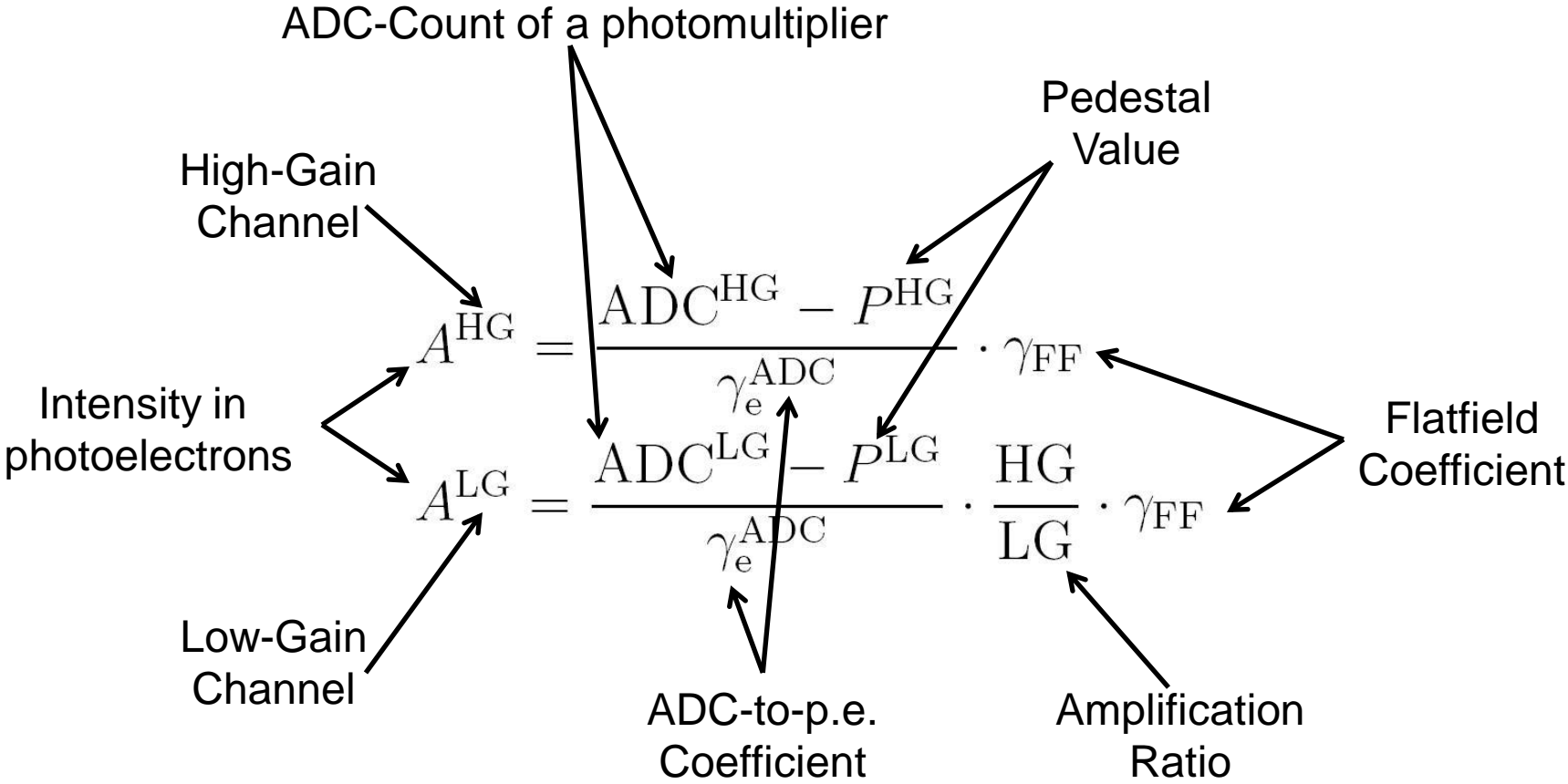
- Identify Primary-Particle
- Reconstruct Energy and Direction



Implementation of the Online-Analysis

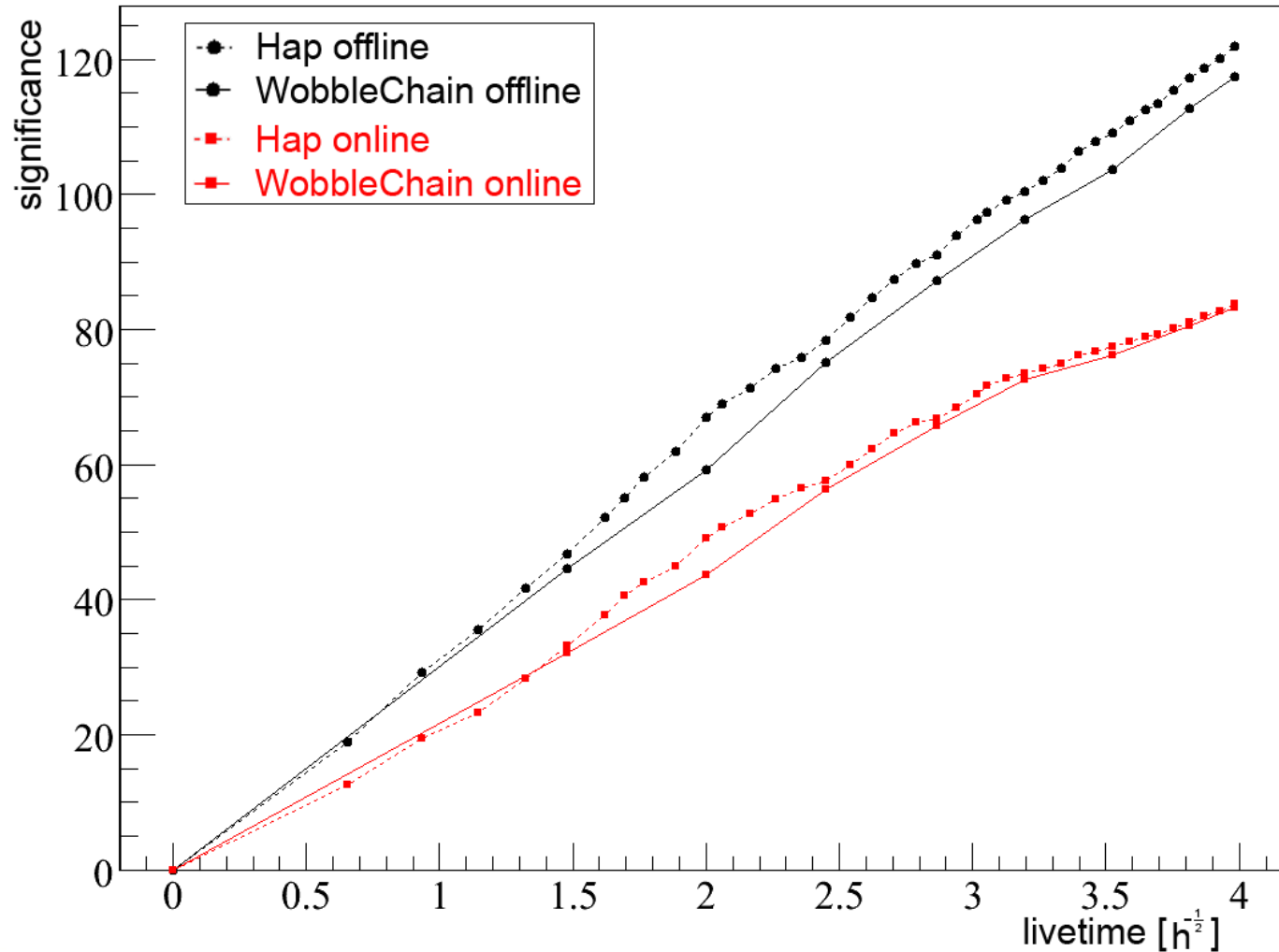


From ADC-Count to Intensity



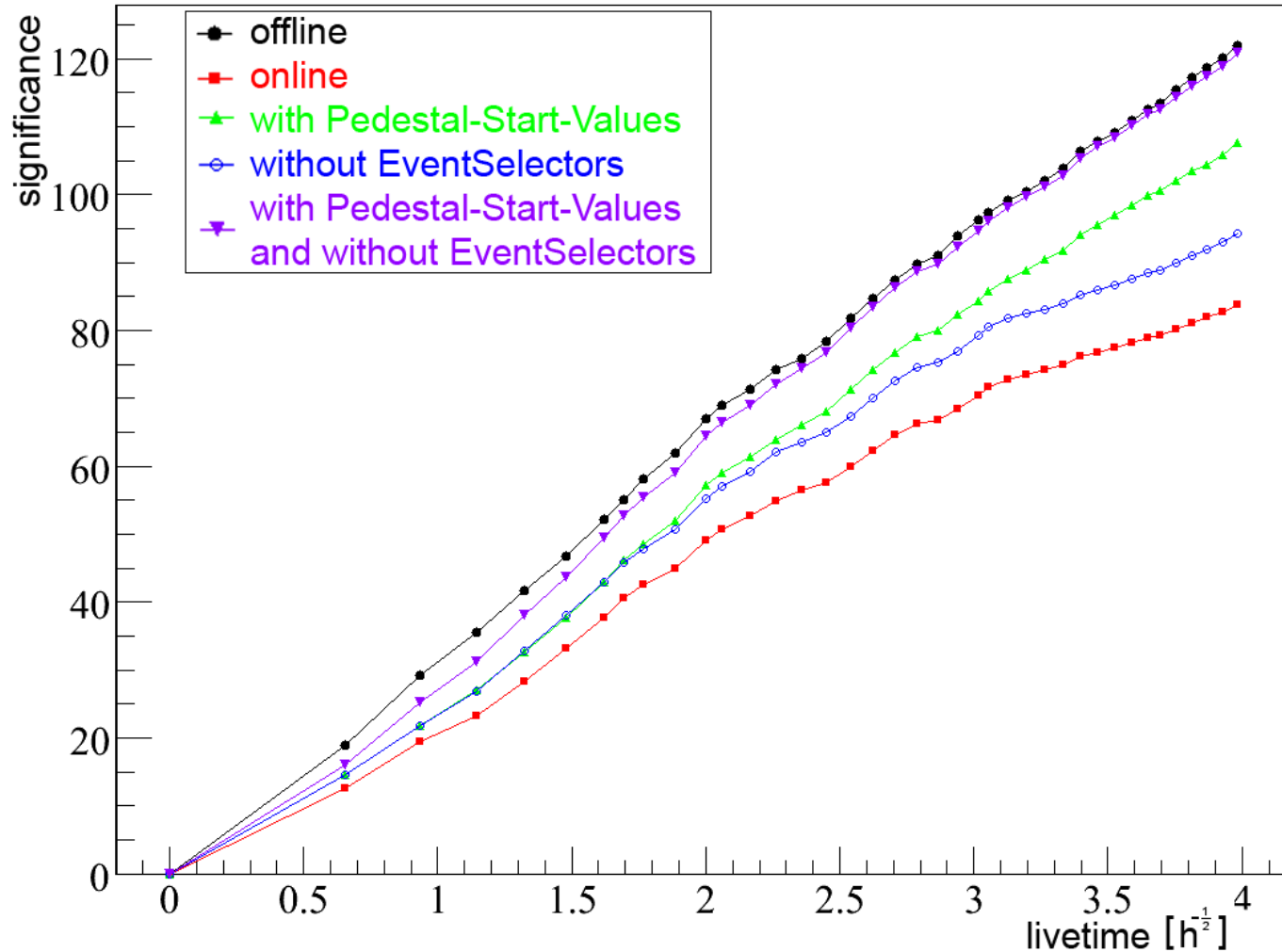
Comparison of Online- and Offline-Results

Crab livetime over significance

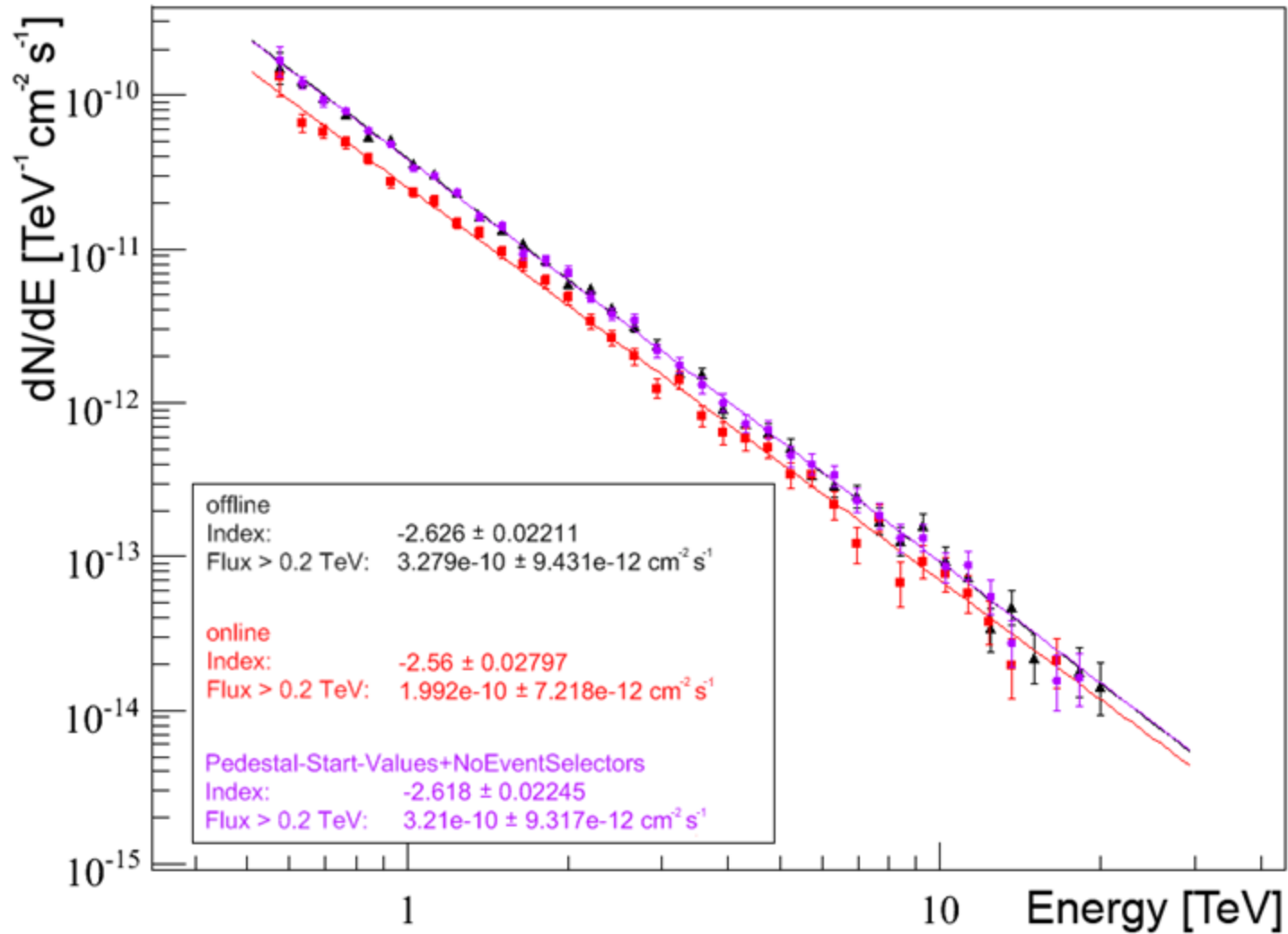


Pedestal-Start-Values and Event-Selectors

Hap Crab livetime over significance



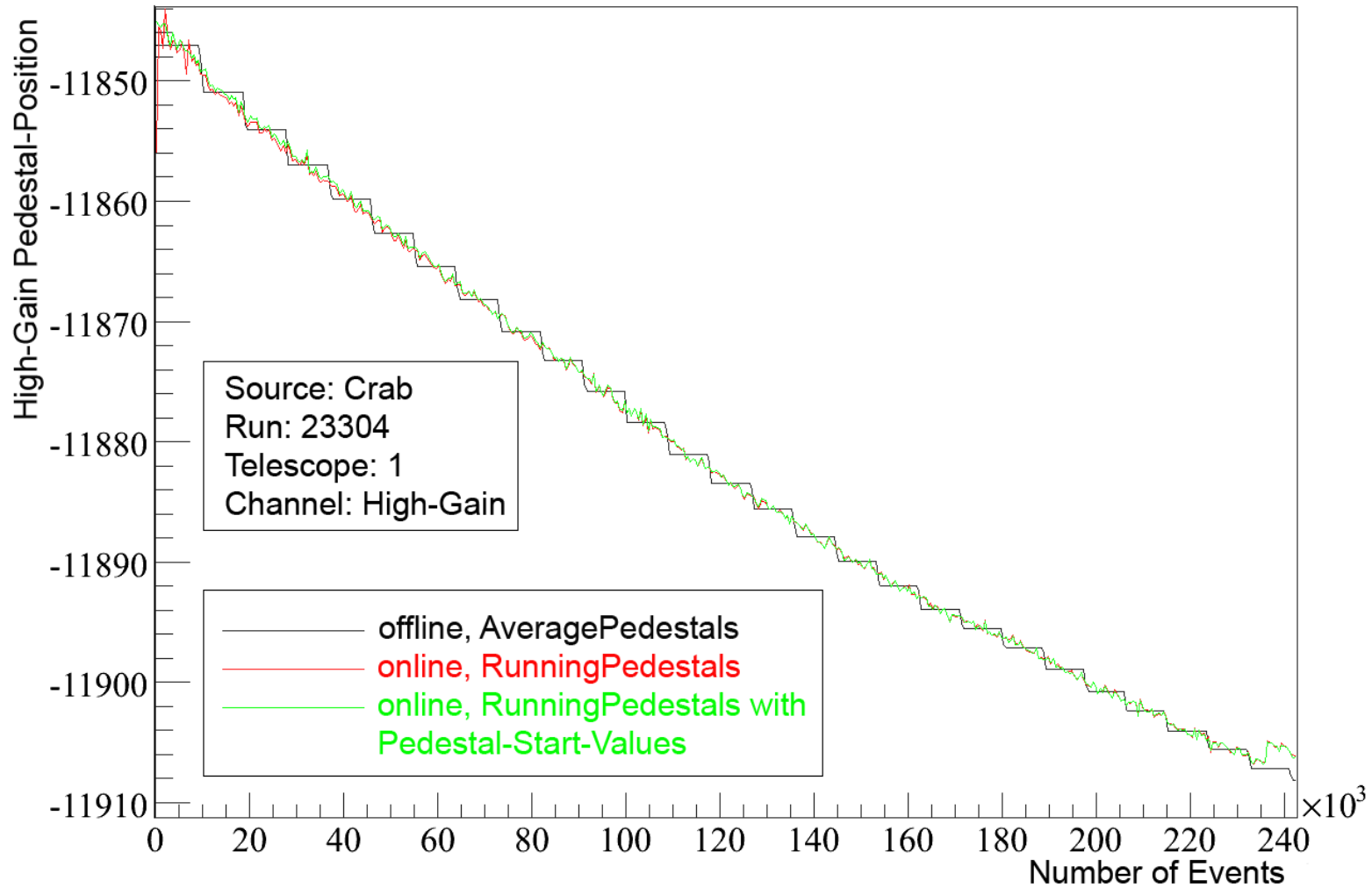
Crab-Spectrum



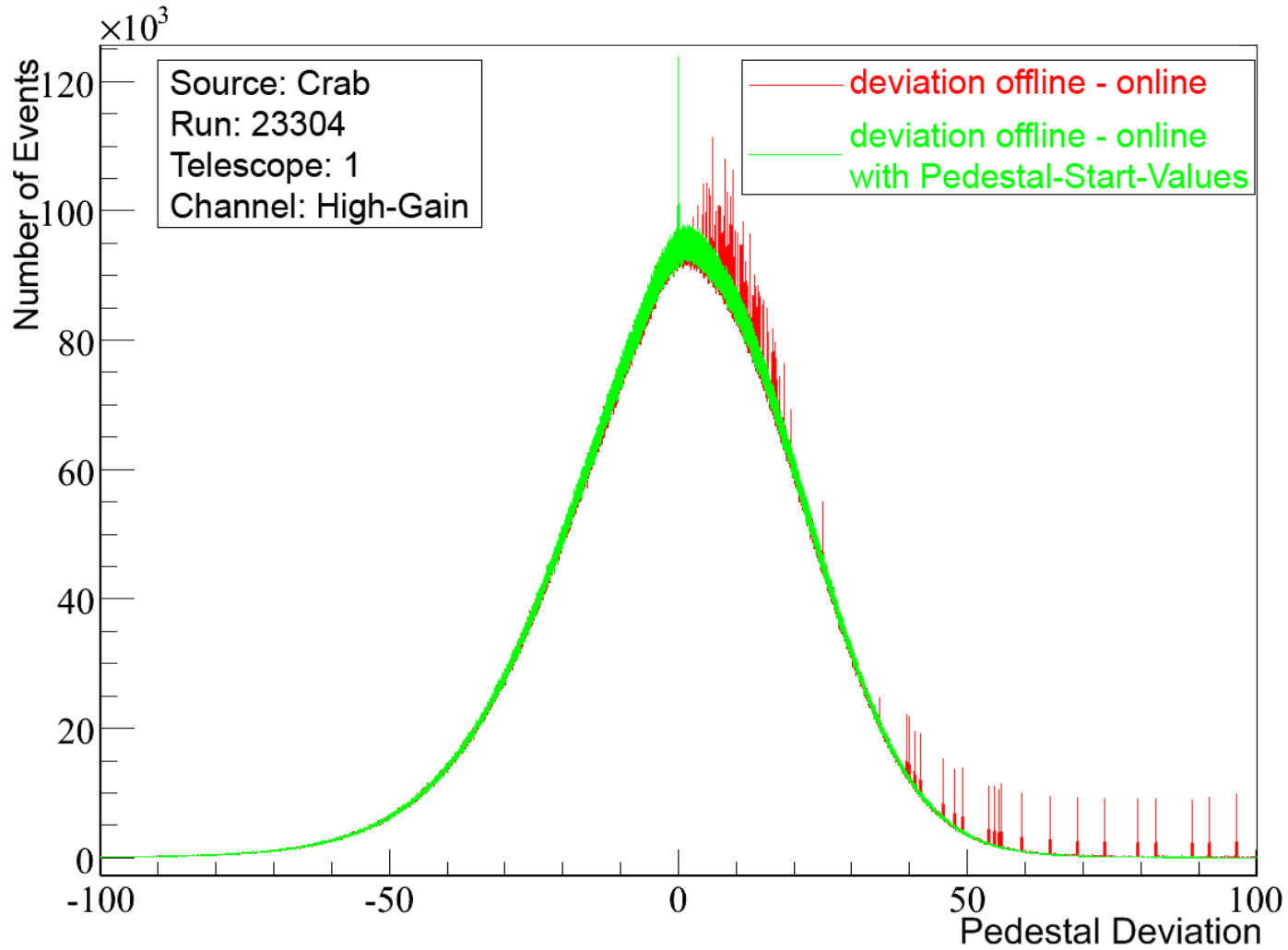
Summary

- Online-Analysis can be almost as sensitive as the Standard-Analysis, if:
 - Pedestal-Start-Values are more accurate
 - Event-Selection-Cuts softened
- If this is done:
 - Nearly same significance online and offline
 - Spectrums match

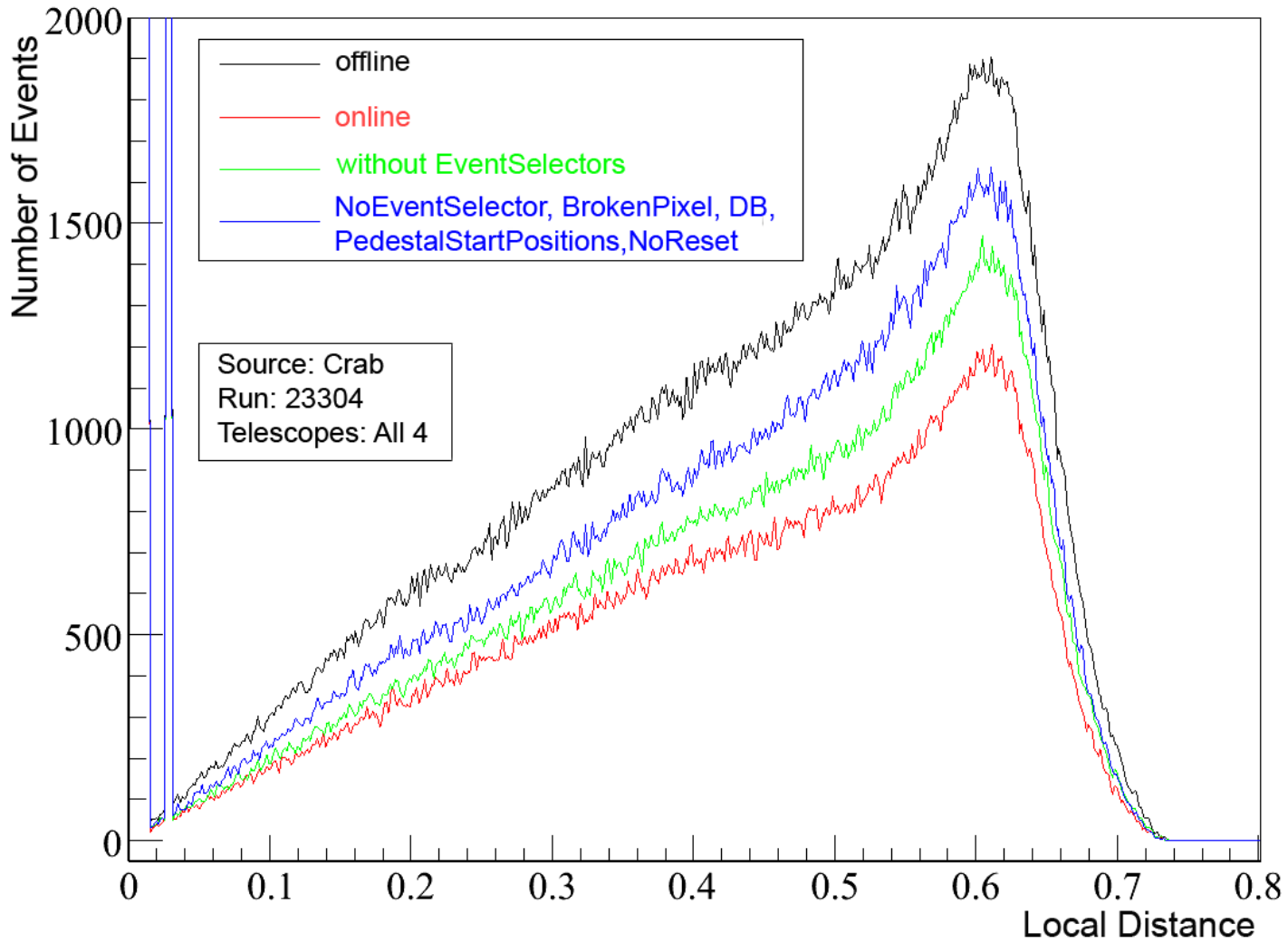
Pedestal-Development



Pedestal-Deviation

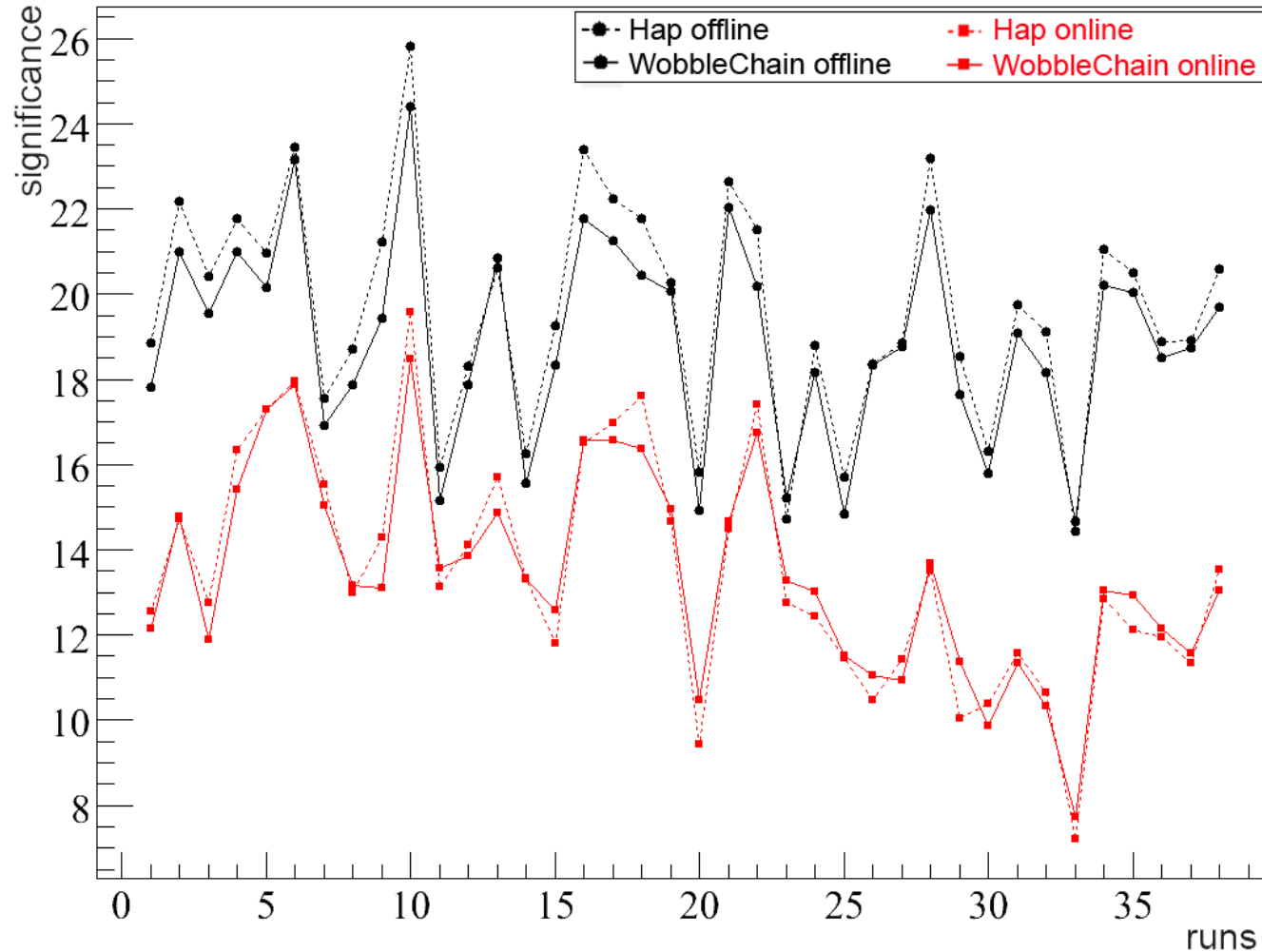


Local-Distance



Comparison of Online- and Offline-Results

Crab run by run significance



The High Energy Stereoscopic System

Weight: 60 t

Mirrors

Diameter: 60 cm

Tot. diameter: 13 m

Focal length: 15 m

Area: 107 m²

Camera

of PMTs: 960

Field-of-view: 5°



