

Search for Gamma Rays with SPASE/AMANDA

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Looking for Muon Poor Events

1. Do SPASE reconstruction
2. Select events heading for AMANDA
3. Check muon content (nch) in AMANDA

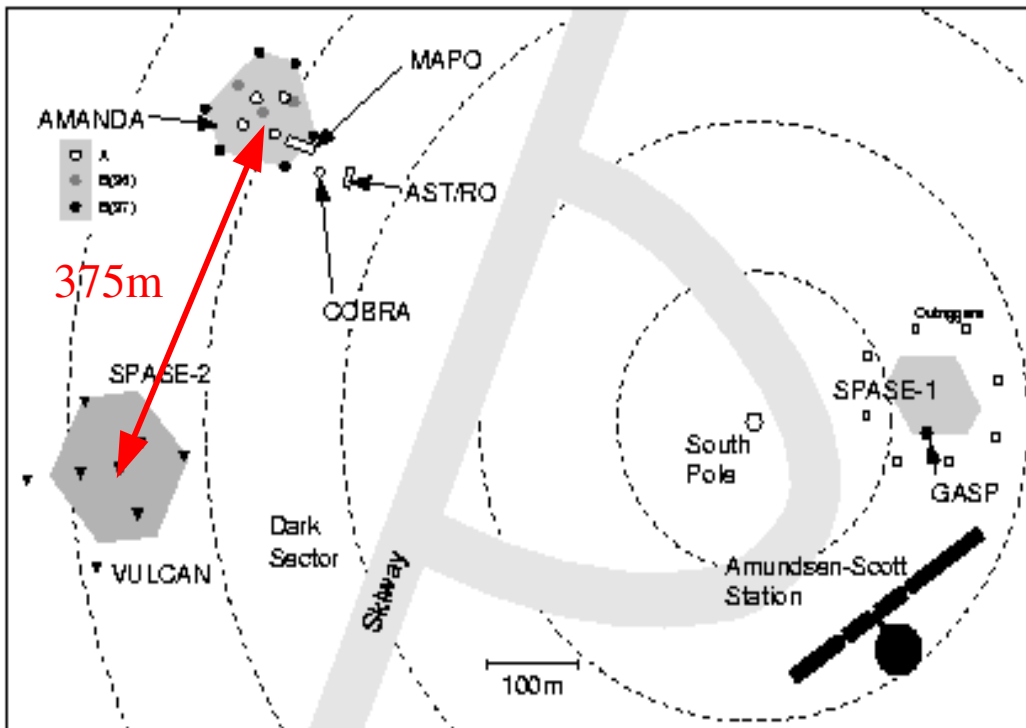
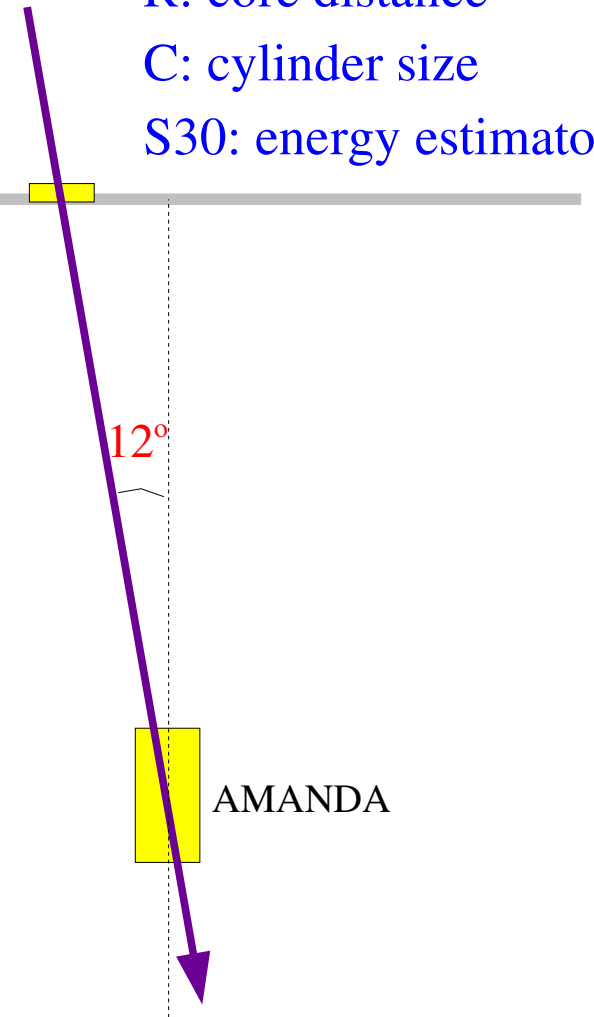
Cuts

R: core distance

C: cylinder size

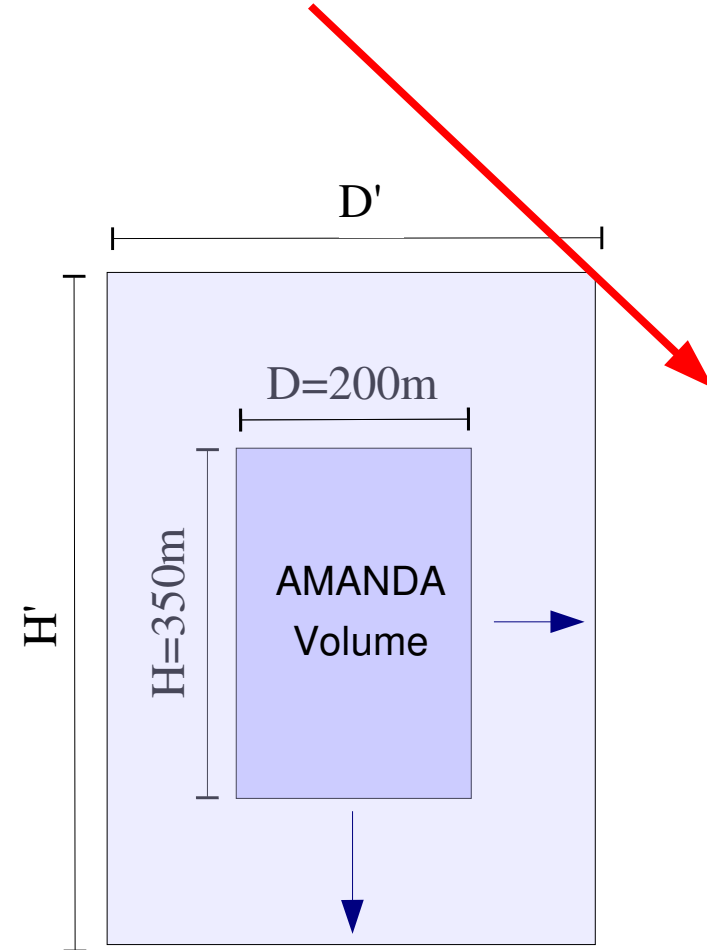
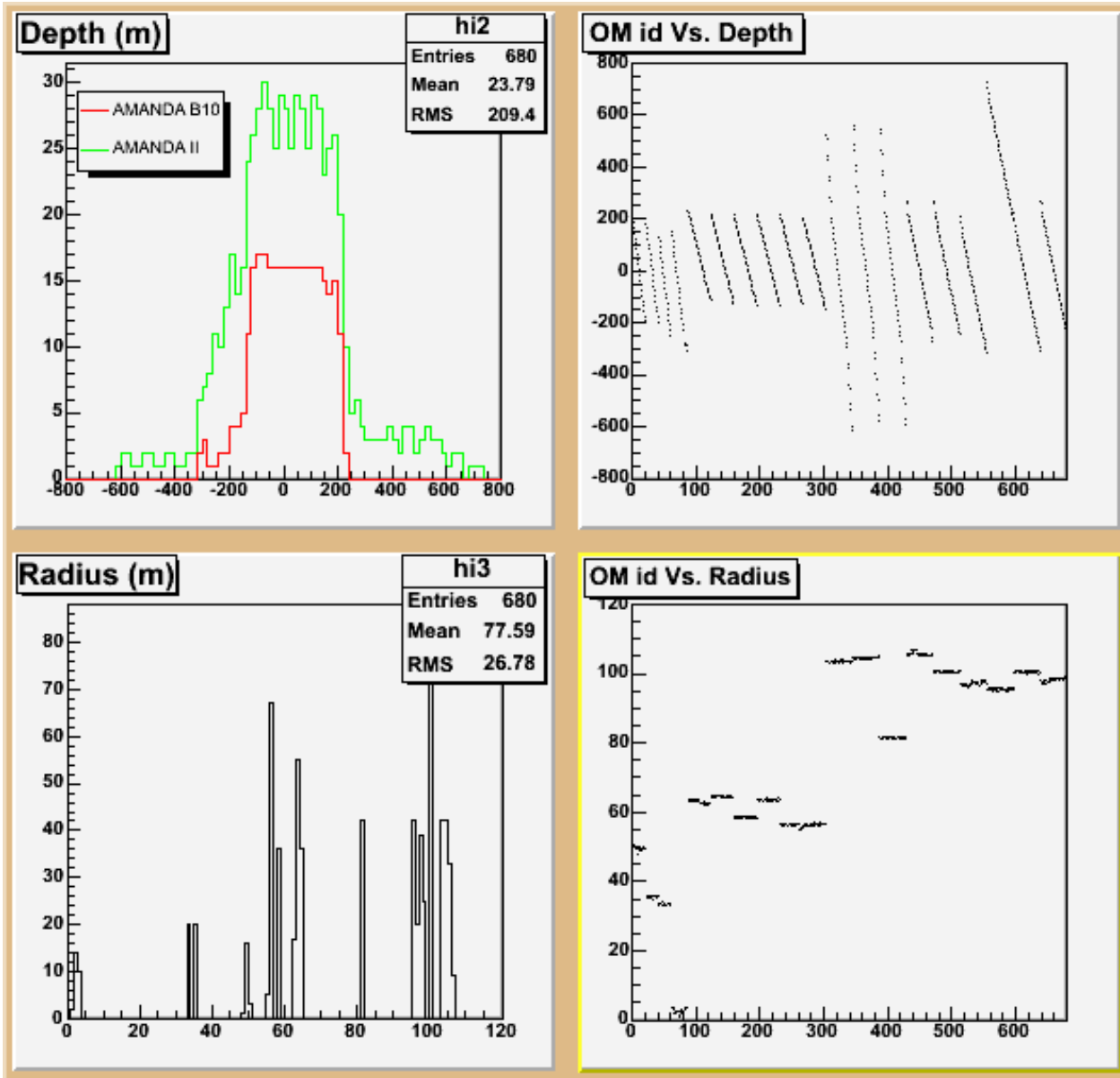
S30: energy estimator

SPASE



Top-view

Cylindrer Size

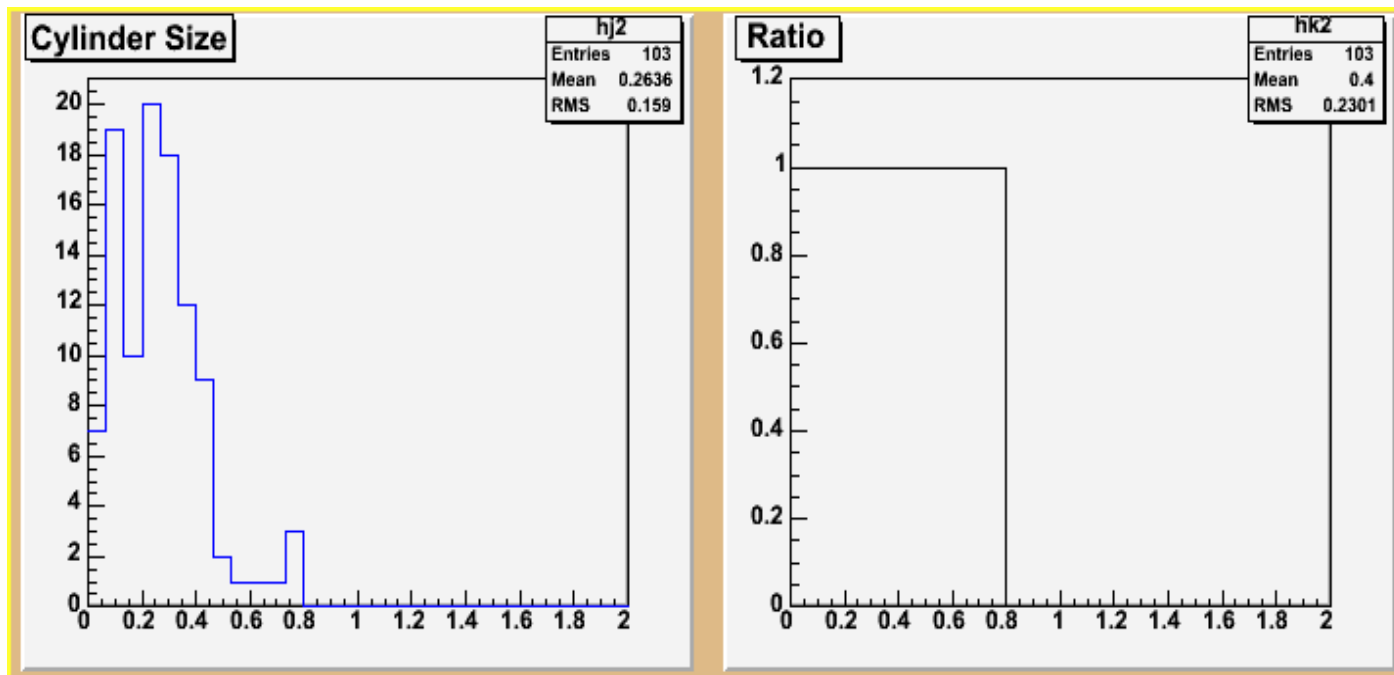


$$D/H = D'/H' = \text{constant}$$

$$C = D'/D = H'/H$$

Efficiency for Hadronic Showers

The old MOCCA generated MC was used



$$R_{\text{core}} < 60\text{m}$$

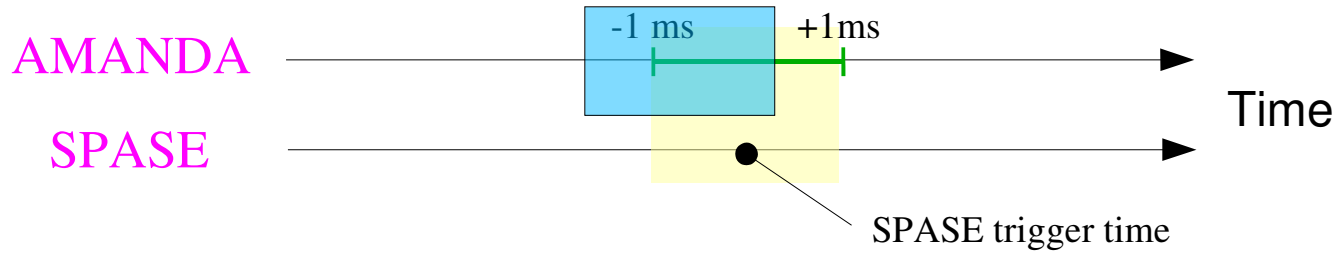
$$C < 0.8$$

$$S30 > 5\text{m}^{-2}$$

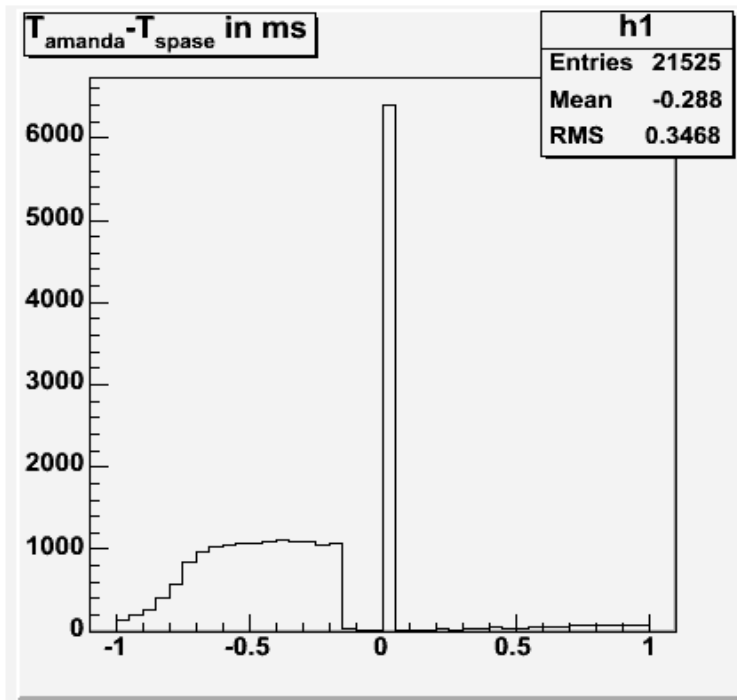
Green line: after cuts

Blue line: additional nch cut (>20)

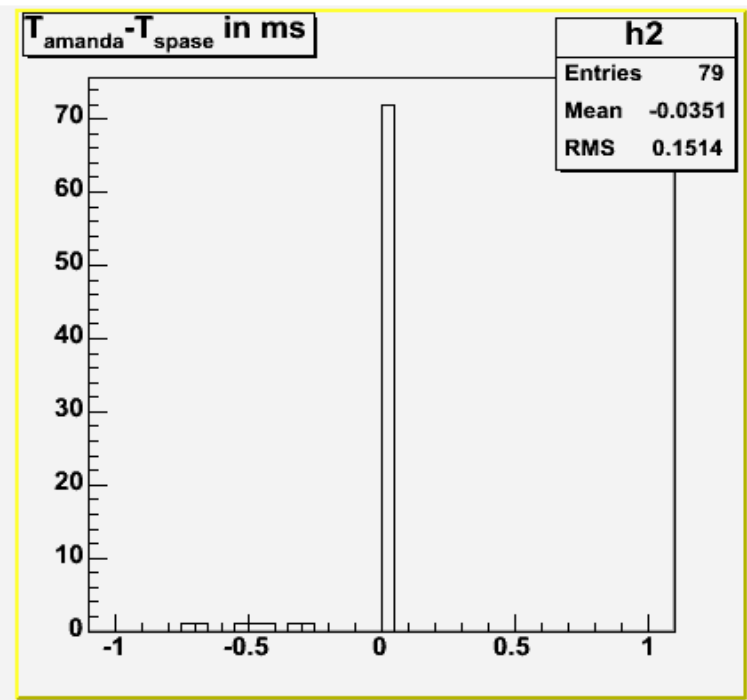
Event Matching



Day112-2002

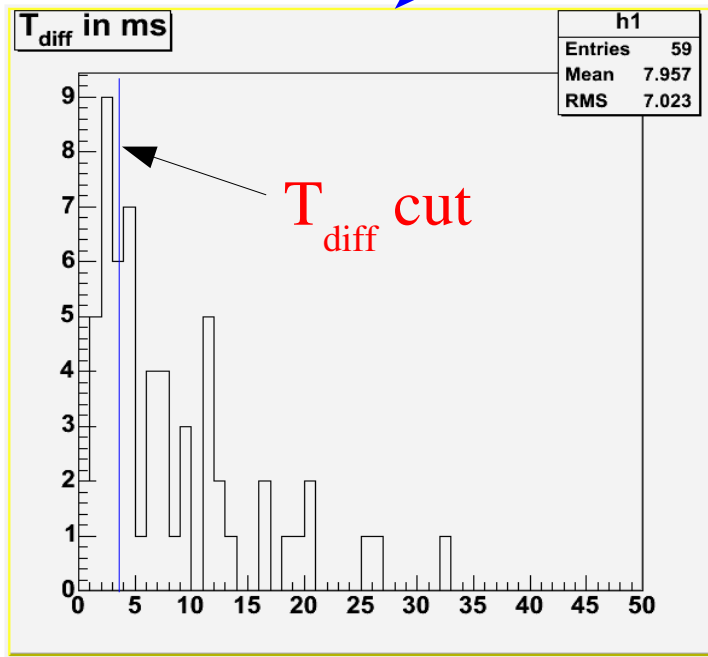
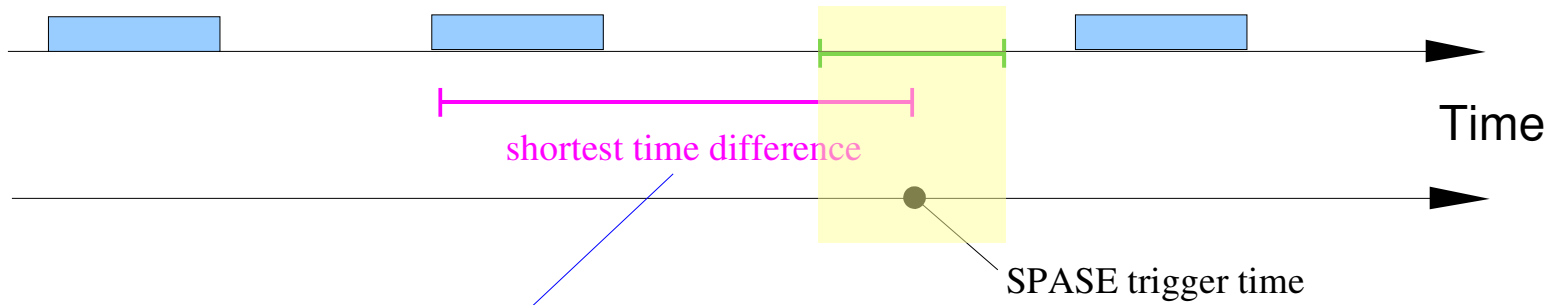


before cuts

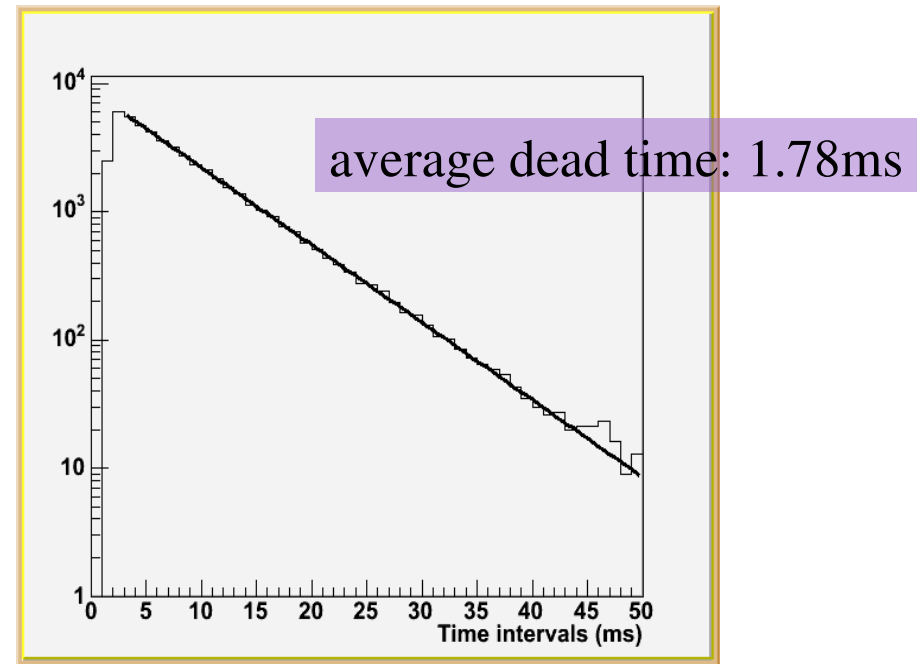


after cuts

AMANDA Dead-time



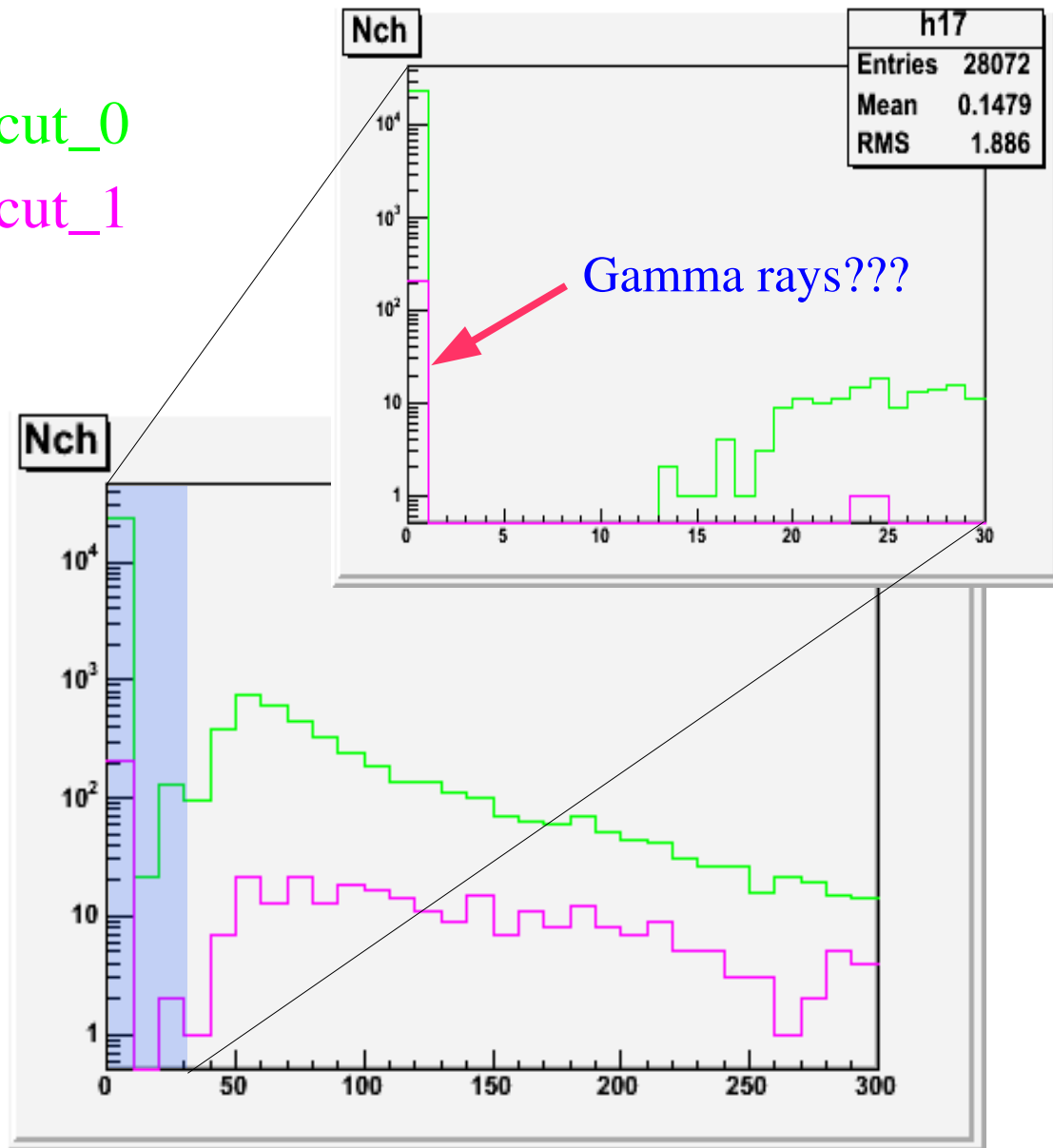
(All unmatched events after cuts)



Time intervals (ms)

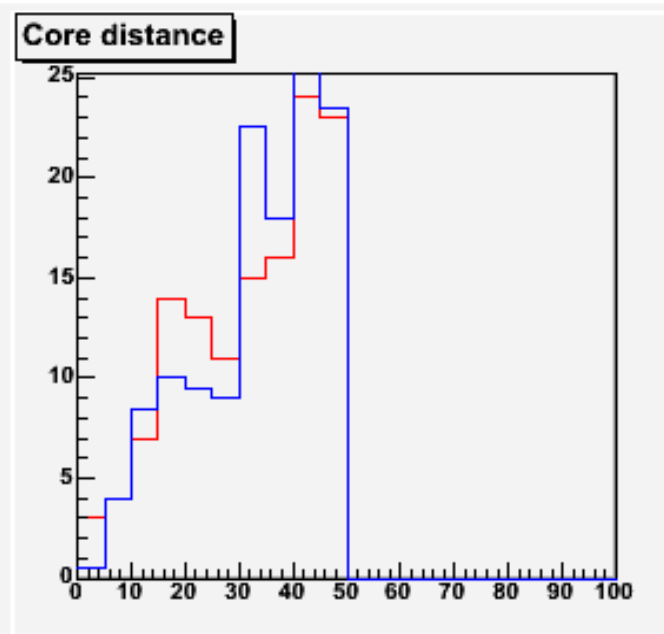
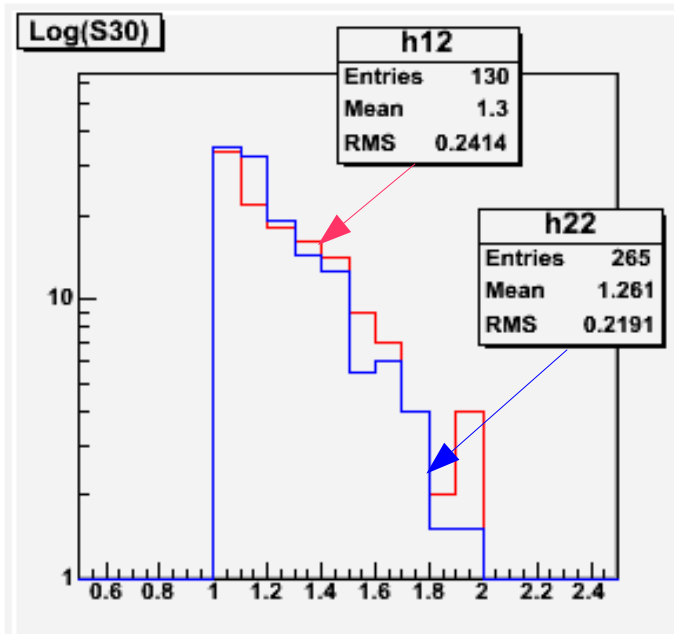
- cut_0

- cut_1

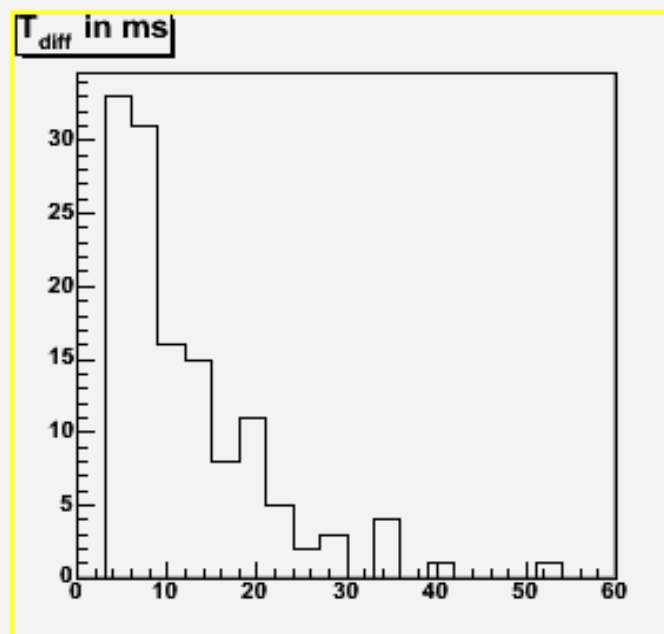
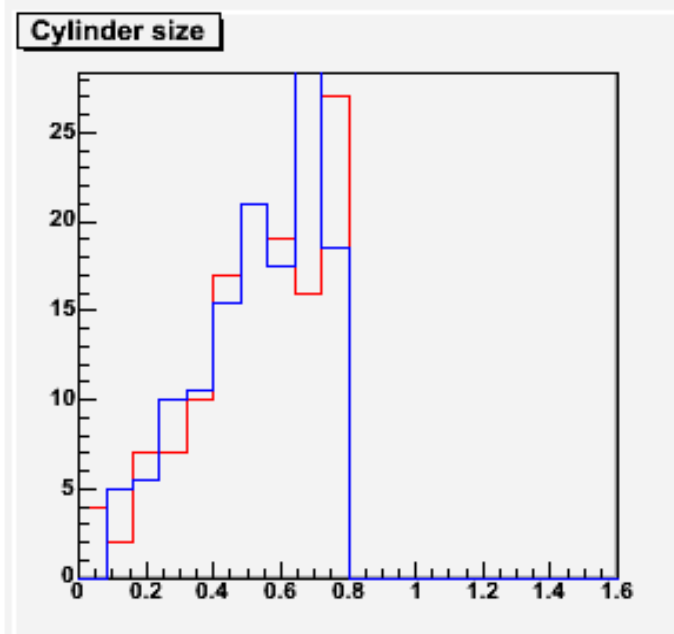


11 day data

	cut_0	cut_1
Rcore	< 60 m	< 50 m
Cylsiz	< 1	< 0.8
S30	> 5	> 10
Tdiff	-	> 3 ms

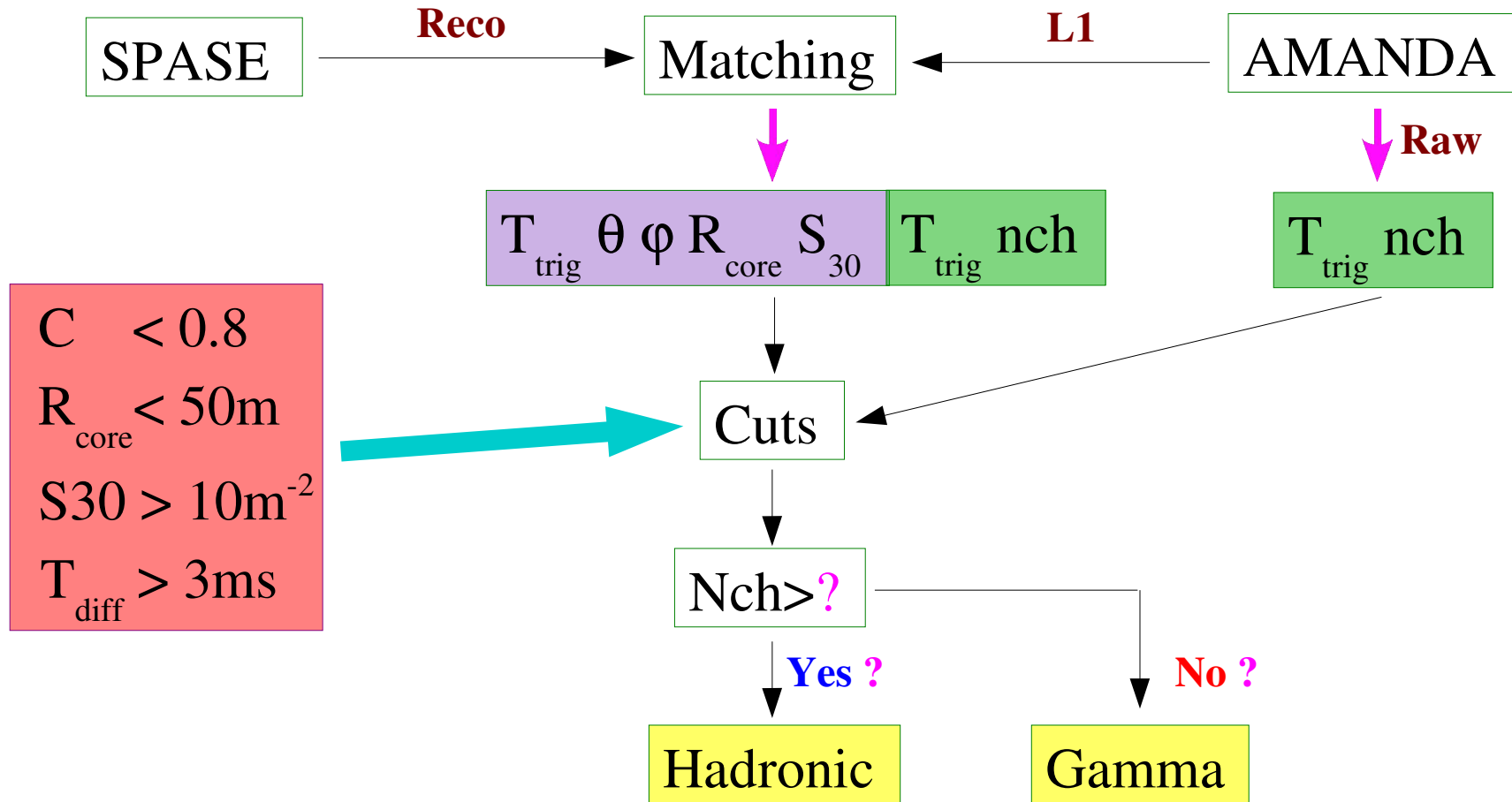


-- Matched
(nch>0)
-- Unmatched
(nch=0)



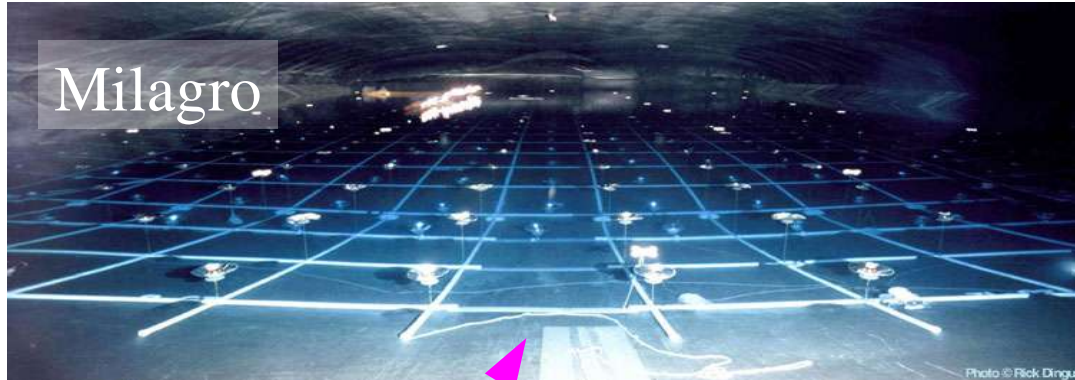
bad files
excluded

Data Processing



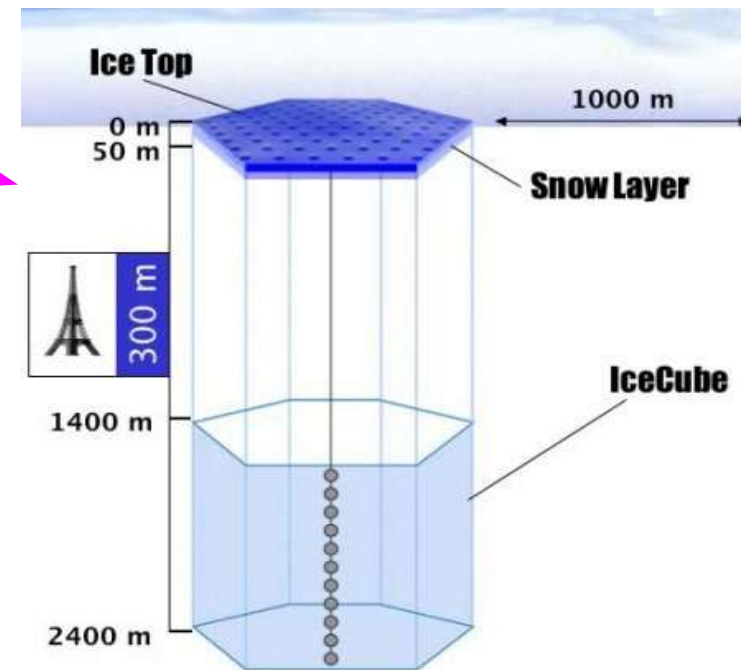
?: simulation study is needed

IceCube as a Gamma Ray Detector



Milagro has a large field of view and high duty cycle.
 Hopefully IceTop/IceCube has good background reject rate.

	Air Cherenkov	Air Shower Array
Energy Threshold	< 200 GeV	> 50 TeV
Background Rejection	> 99.7%	> 50 %
Field of View	~2°	> 45°
Duty Cycle	5-10 %	> 90 %



Quality Cuts

$$R_{\text{core}} < 60\text{m}$$

$$C < 0.8$$

$$S30 > 5\text{m}^{-2}$$

proton and iron showers

