

Solenoid vs toroid: photon reconstruction



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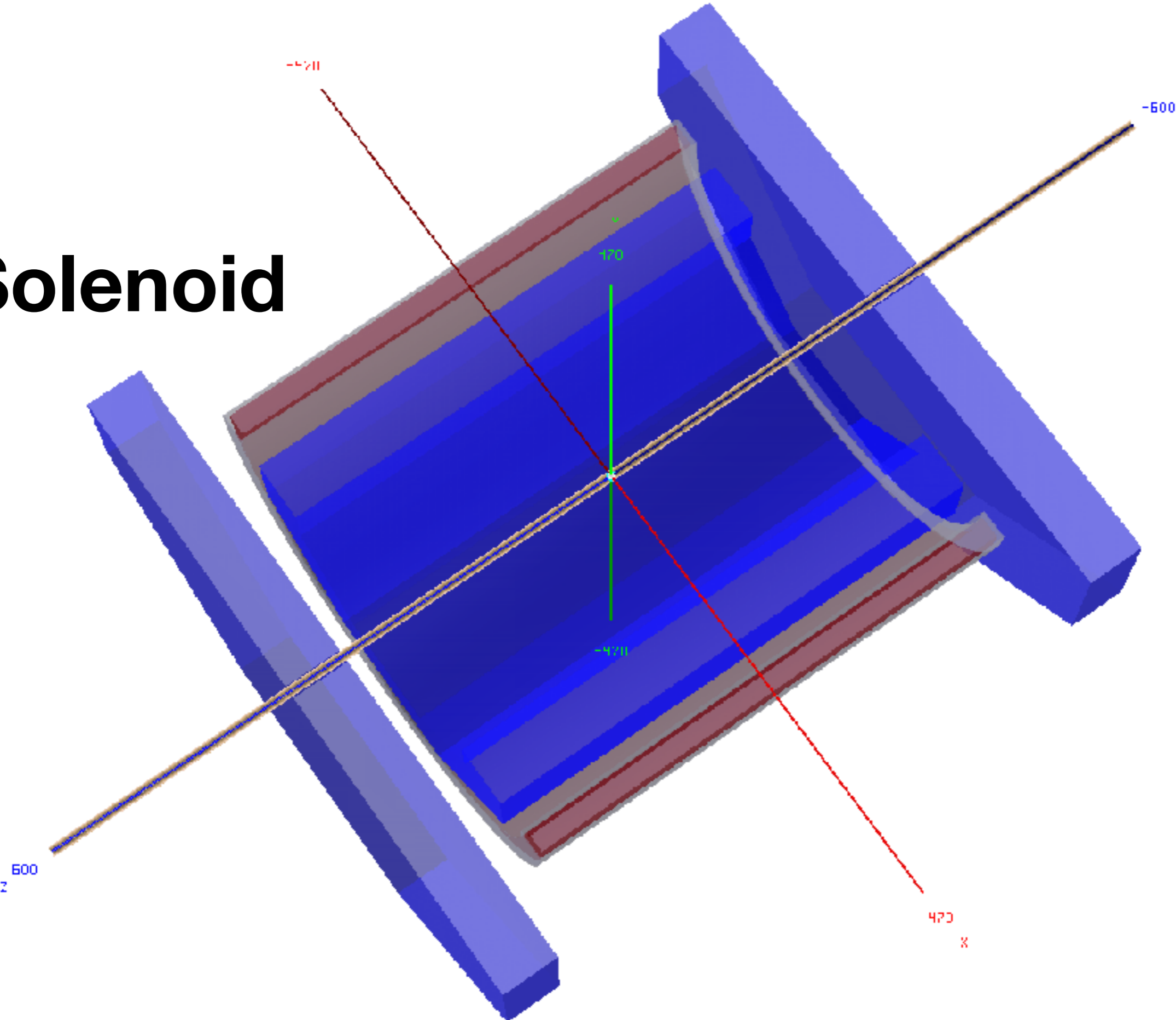
5 samples:

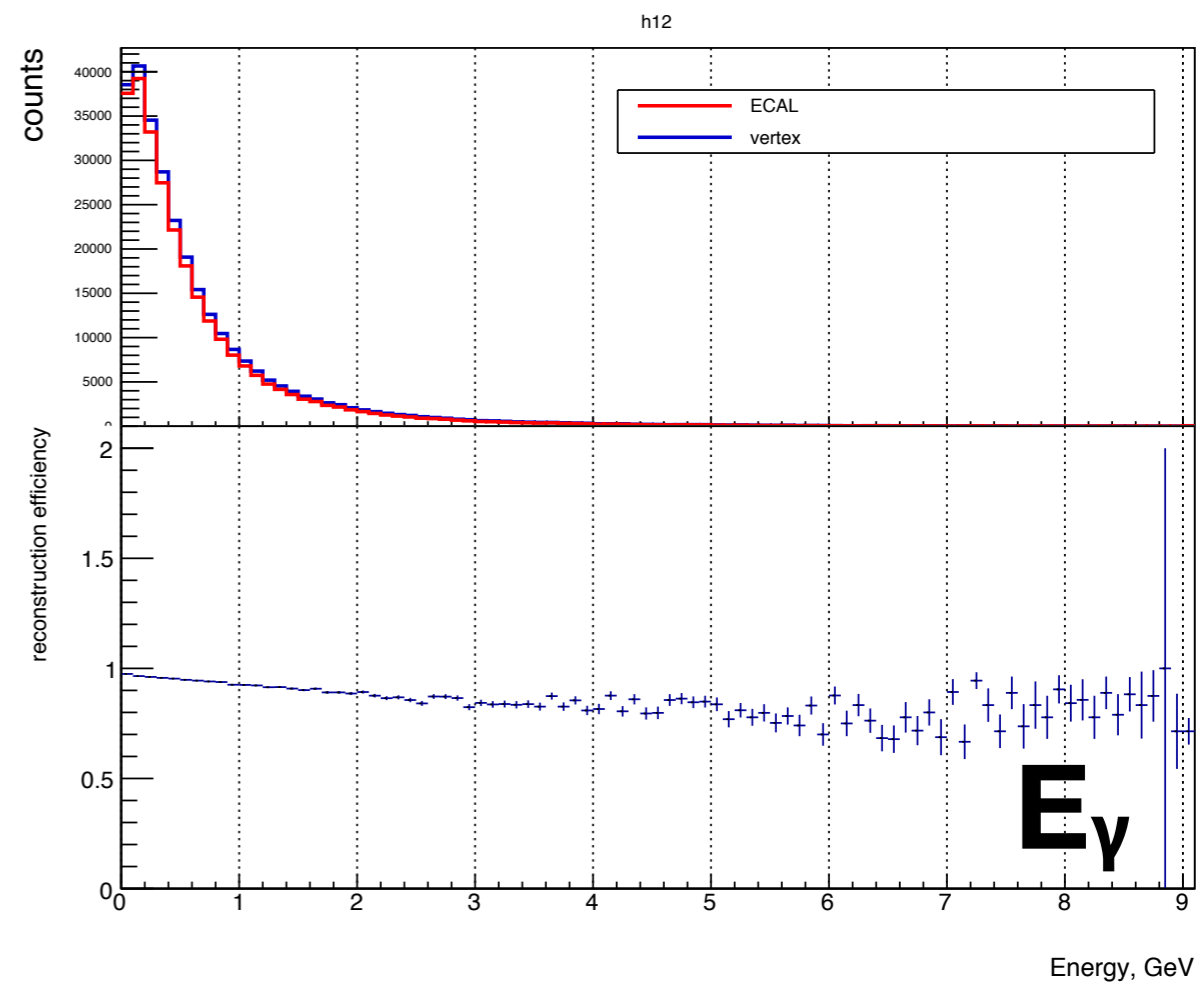
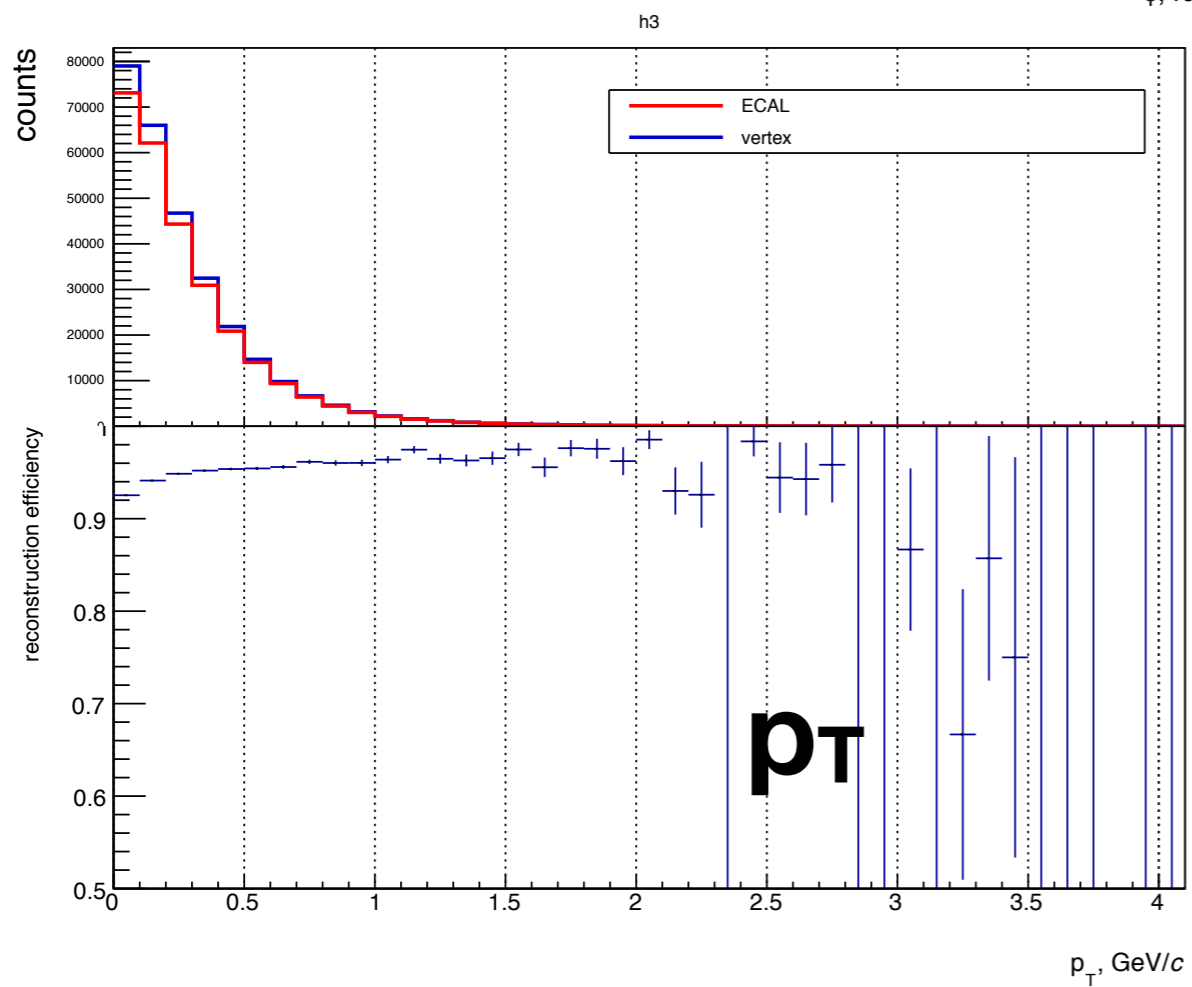
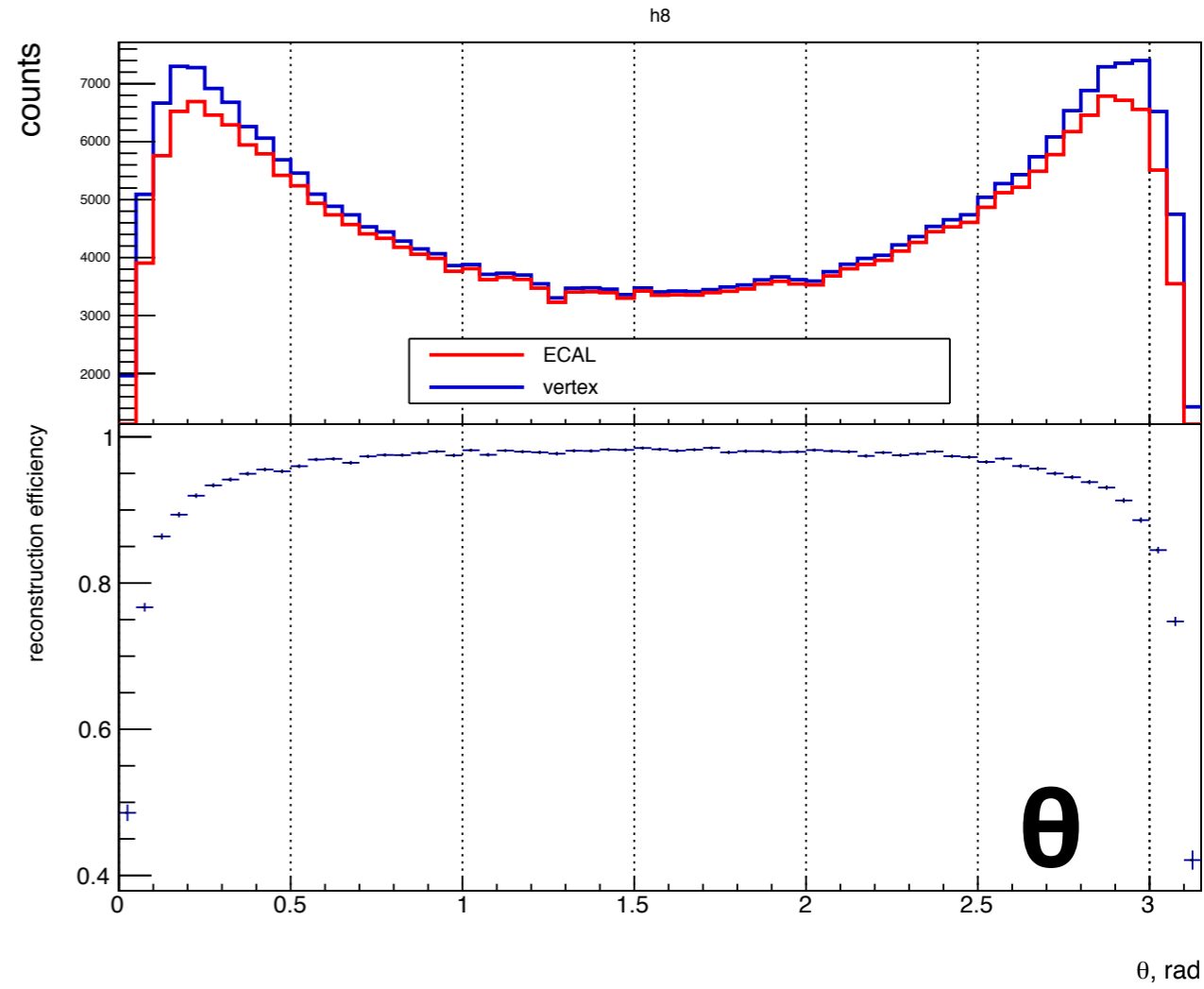
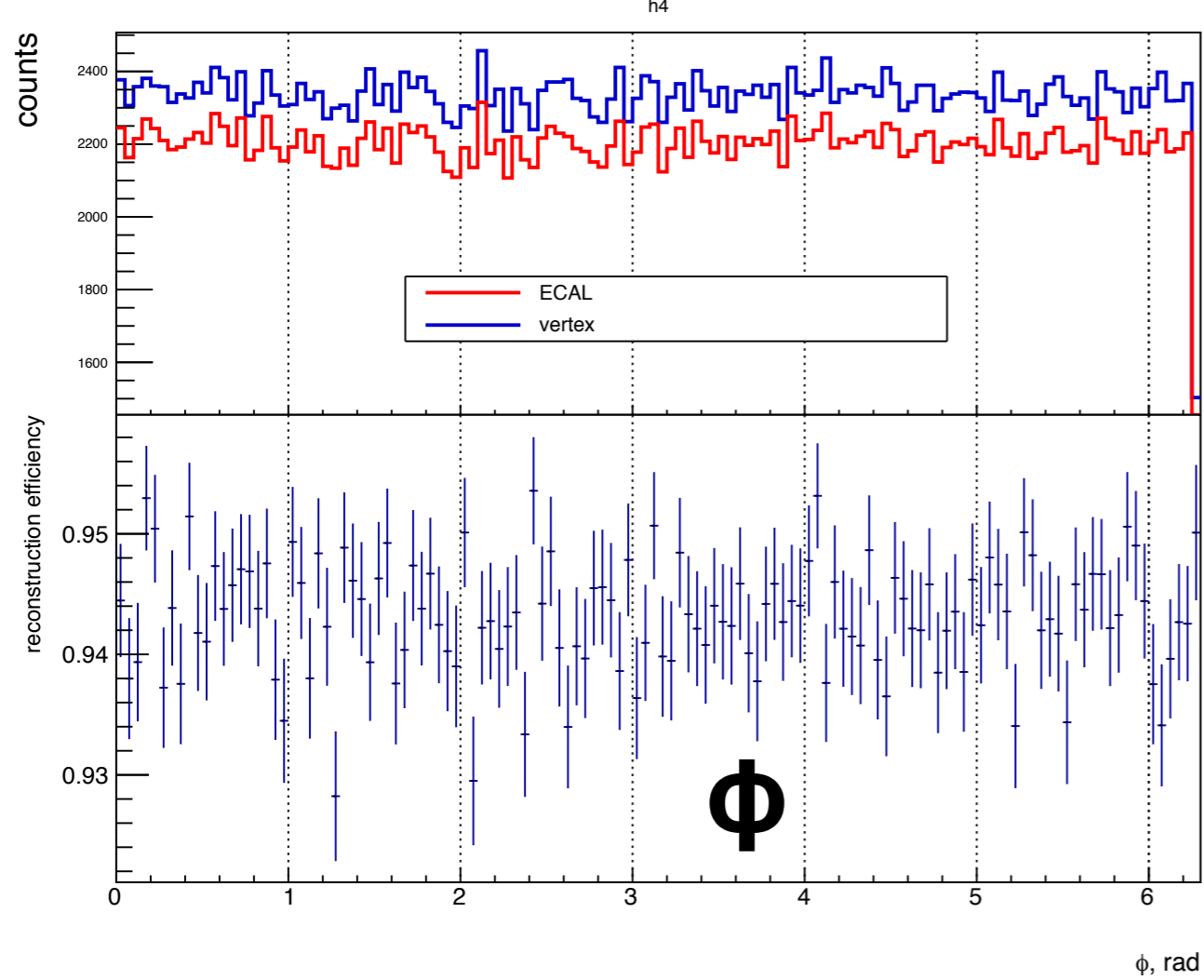
	Solenoid	Toroid	Toroid without basket
Minimum bias	~150 000	~160 000	~140 000
Glueon Compton scattering	~50 000	~60 000	

Available at:

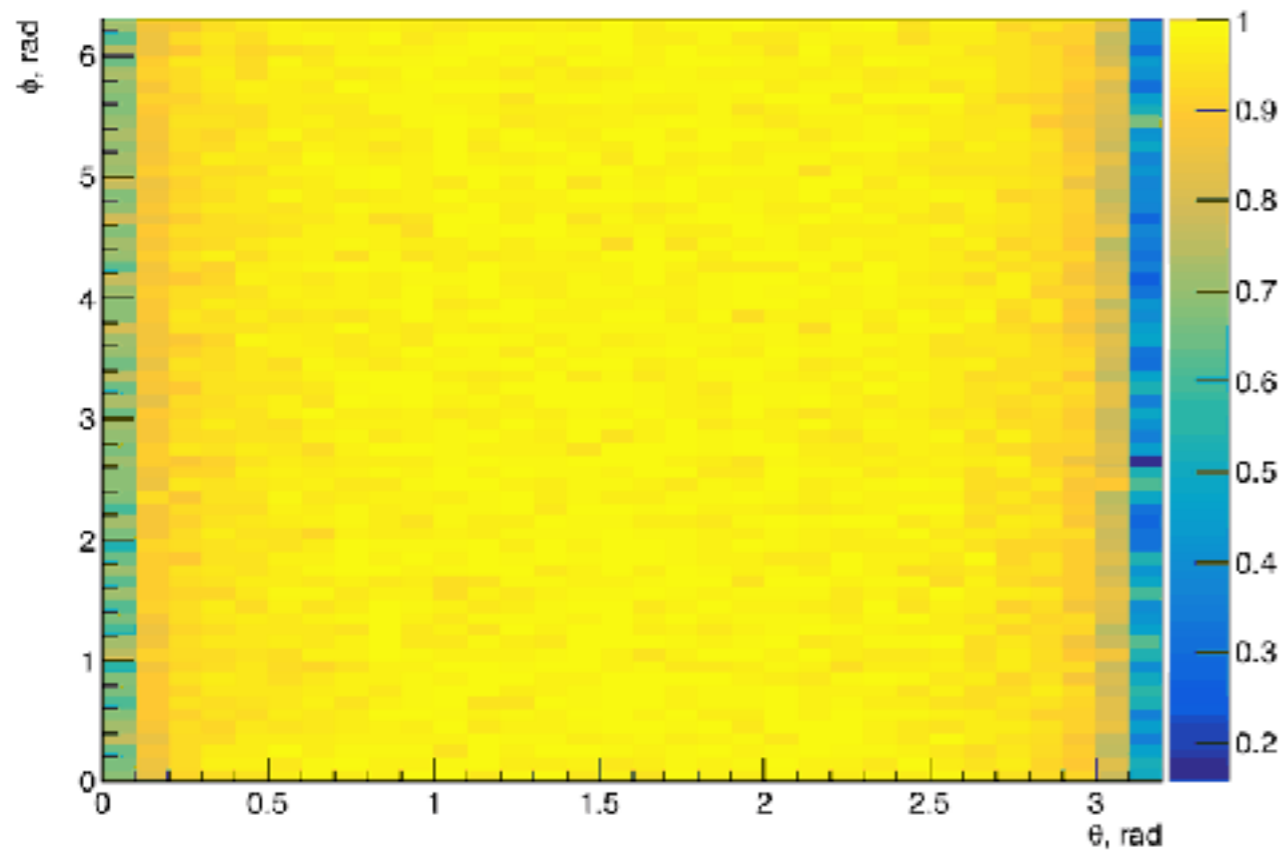
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Solenoid

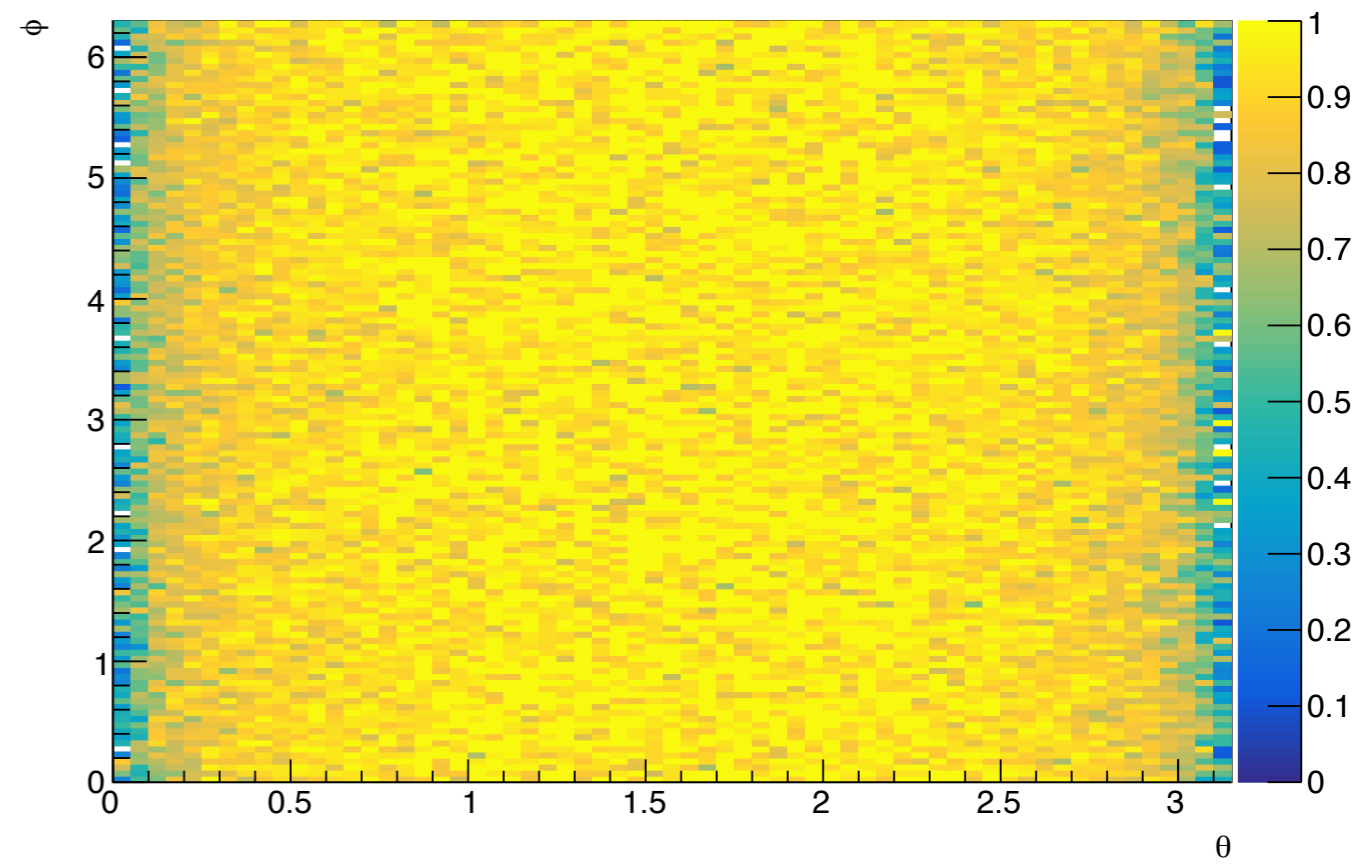




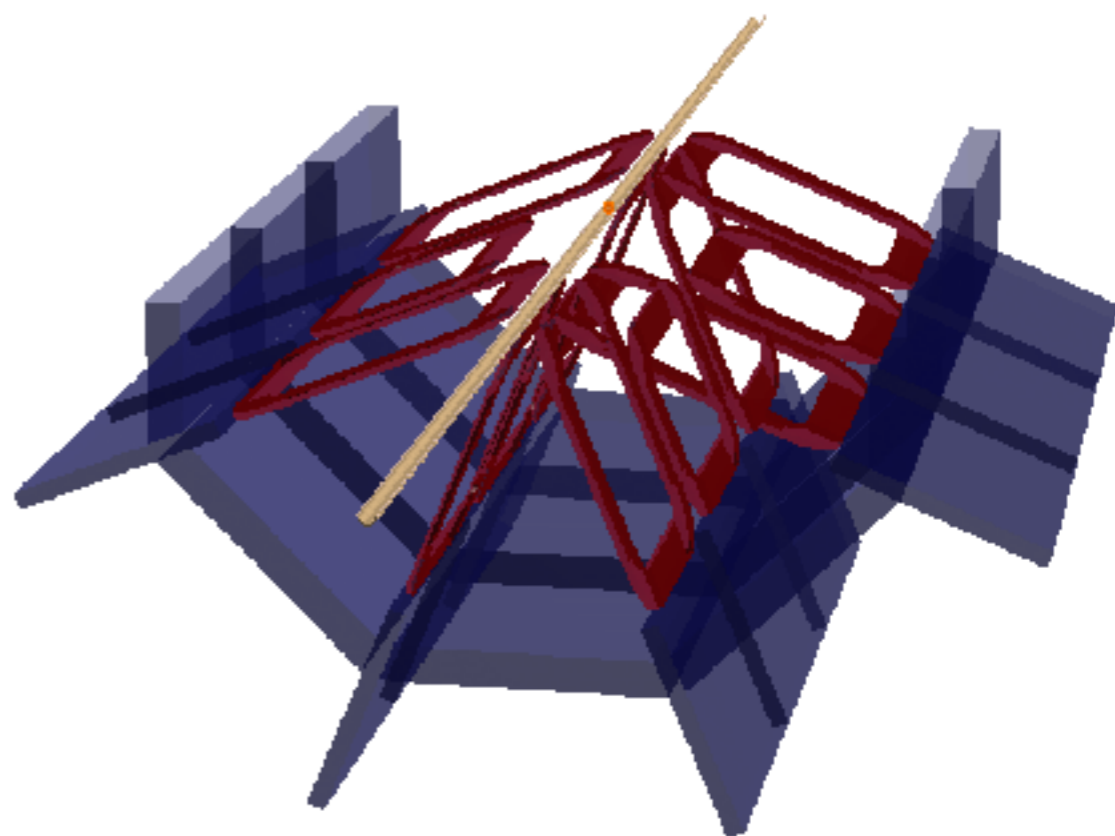
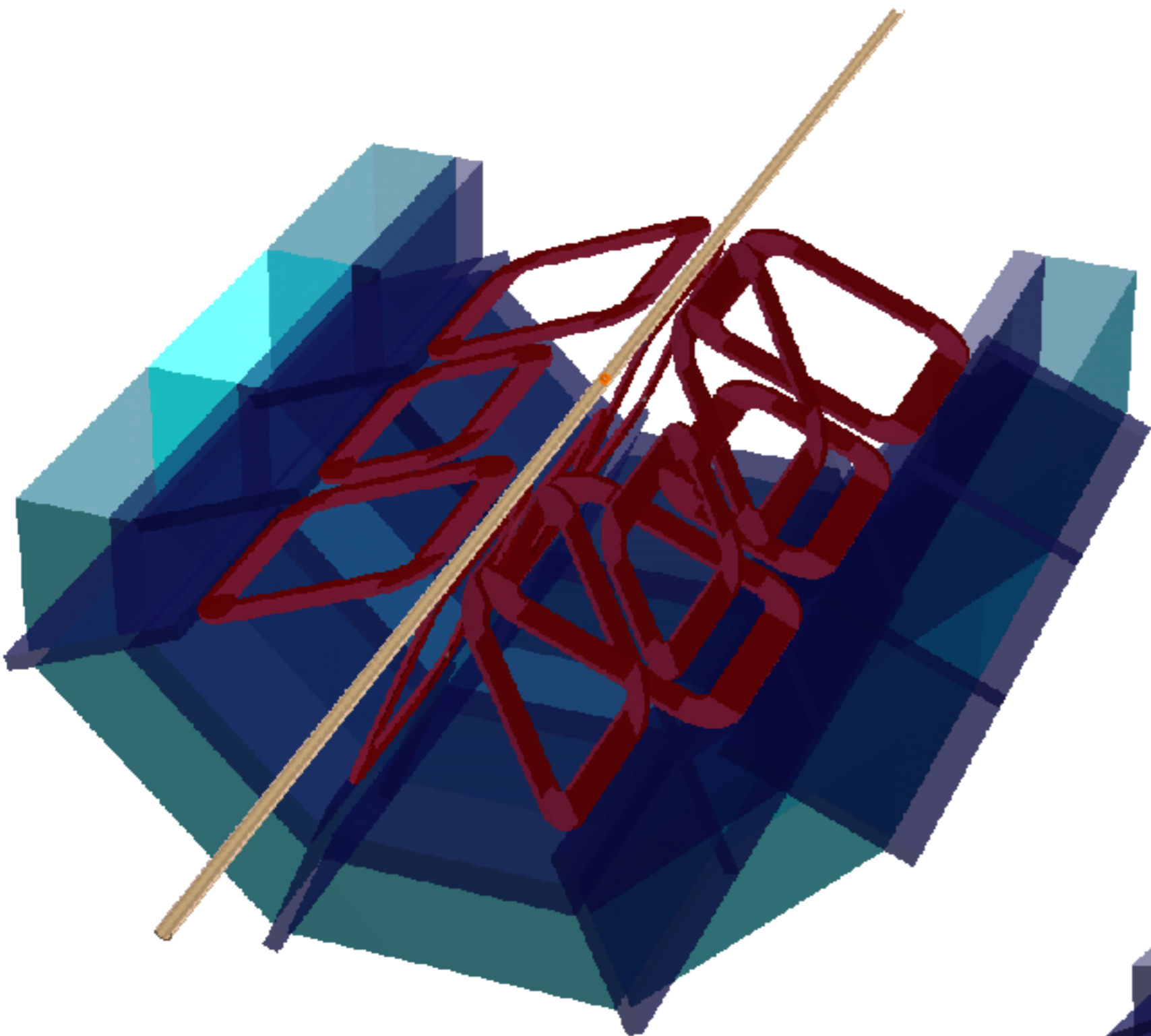
single photon

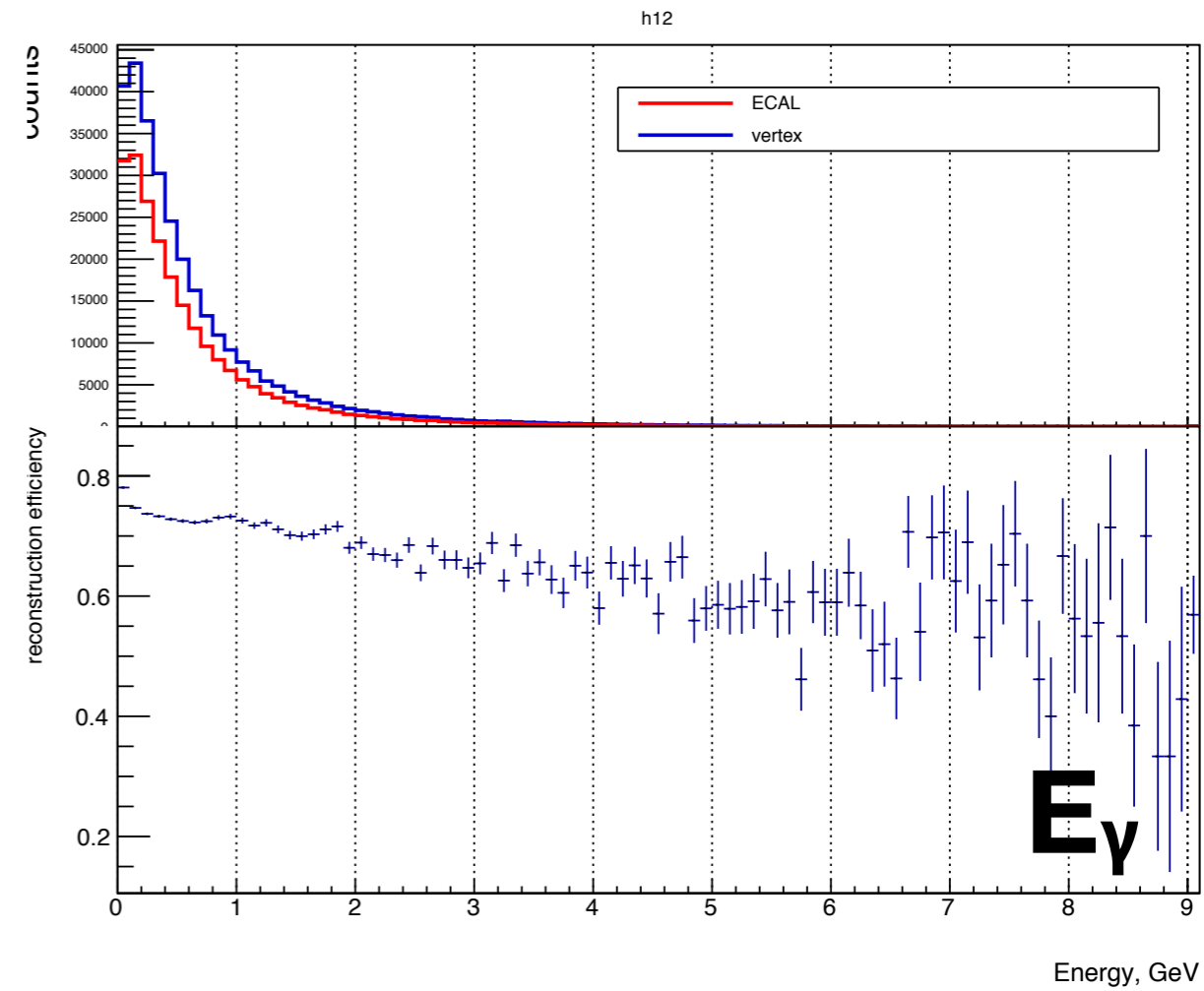
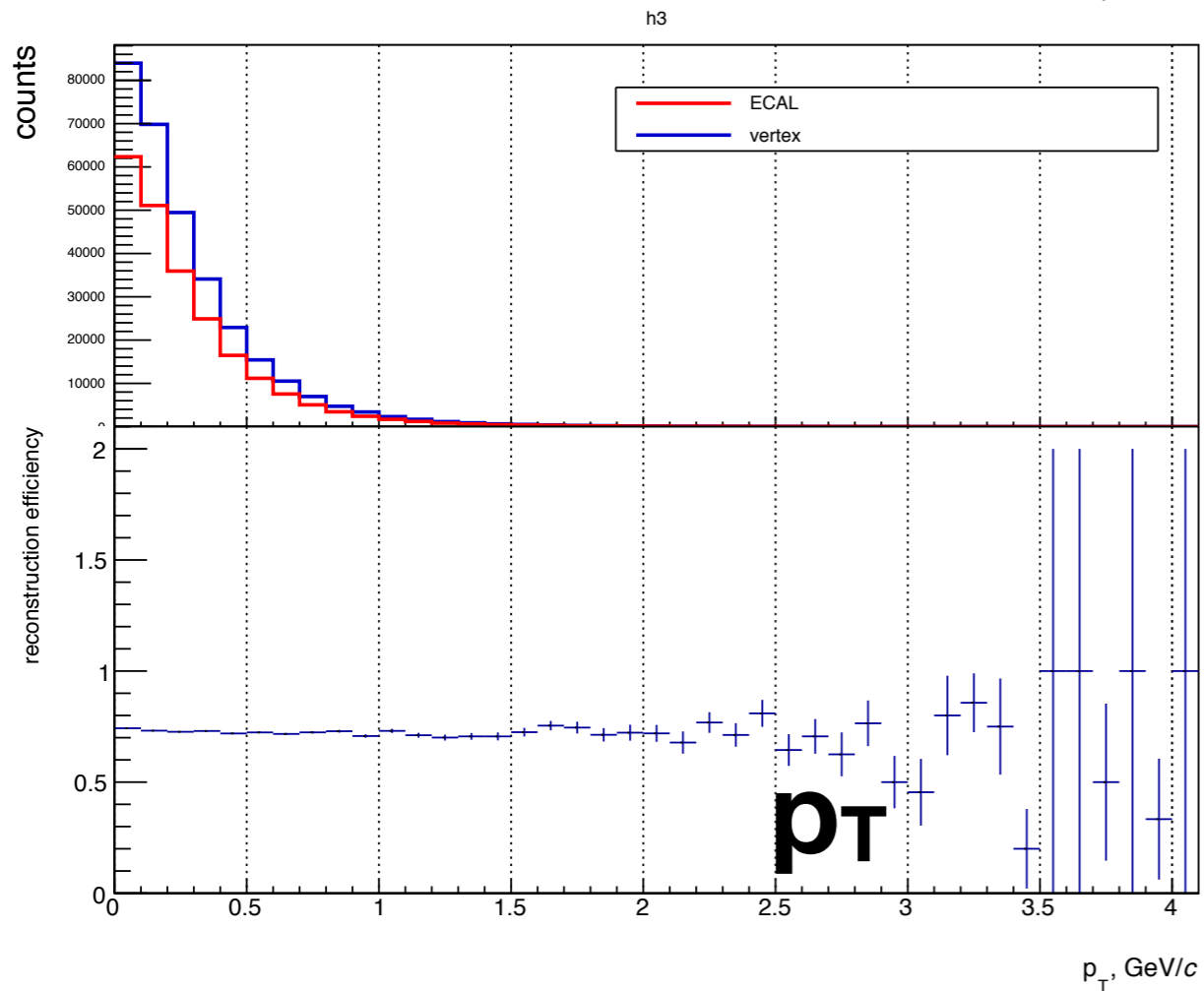
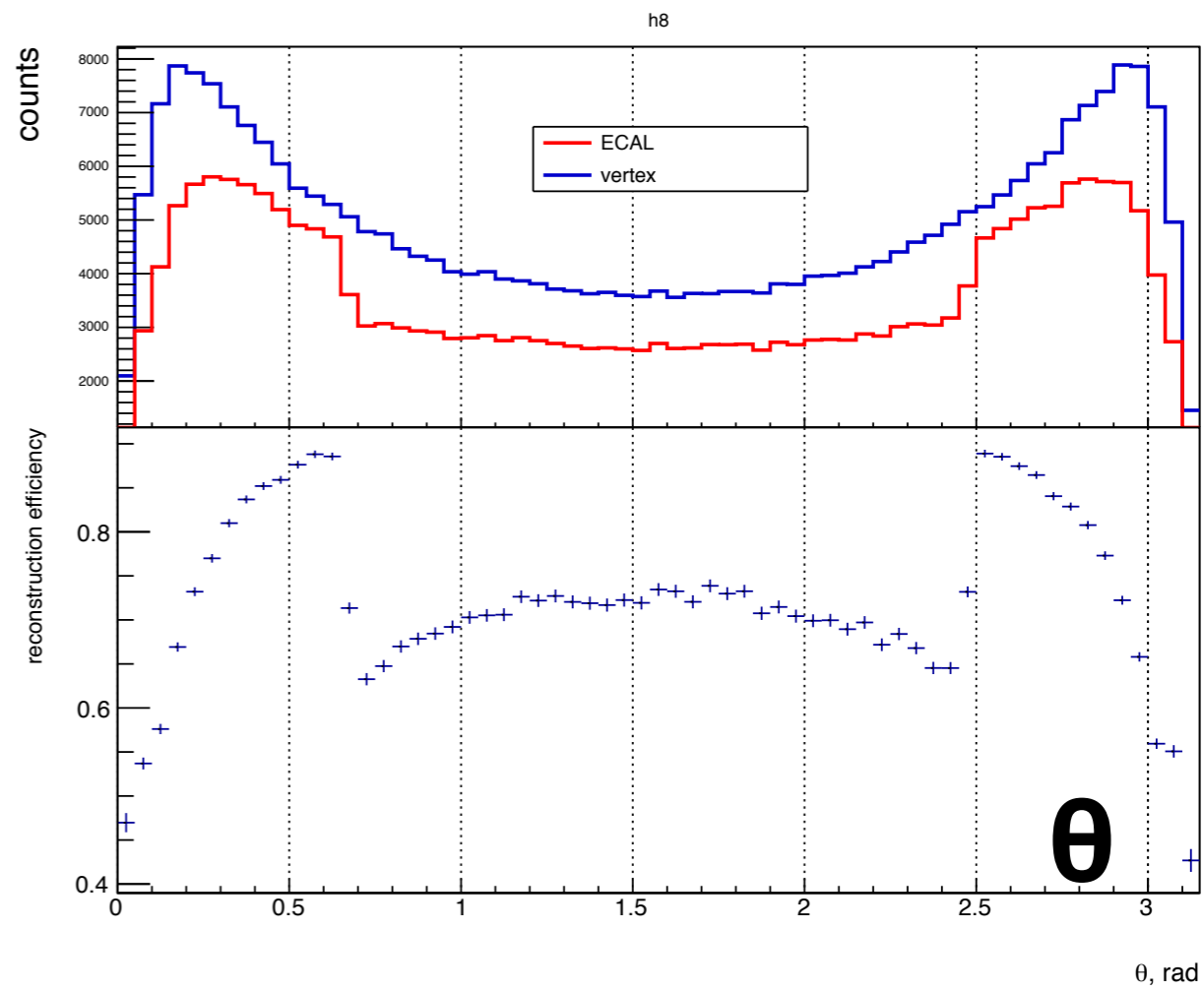
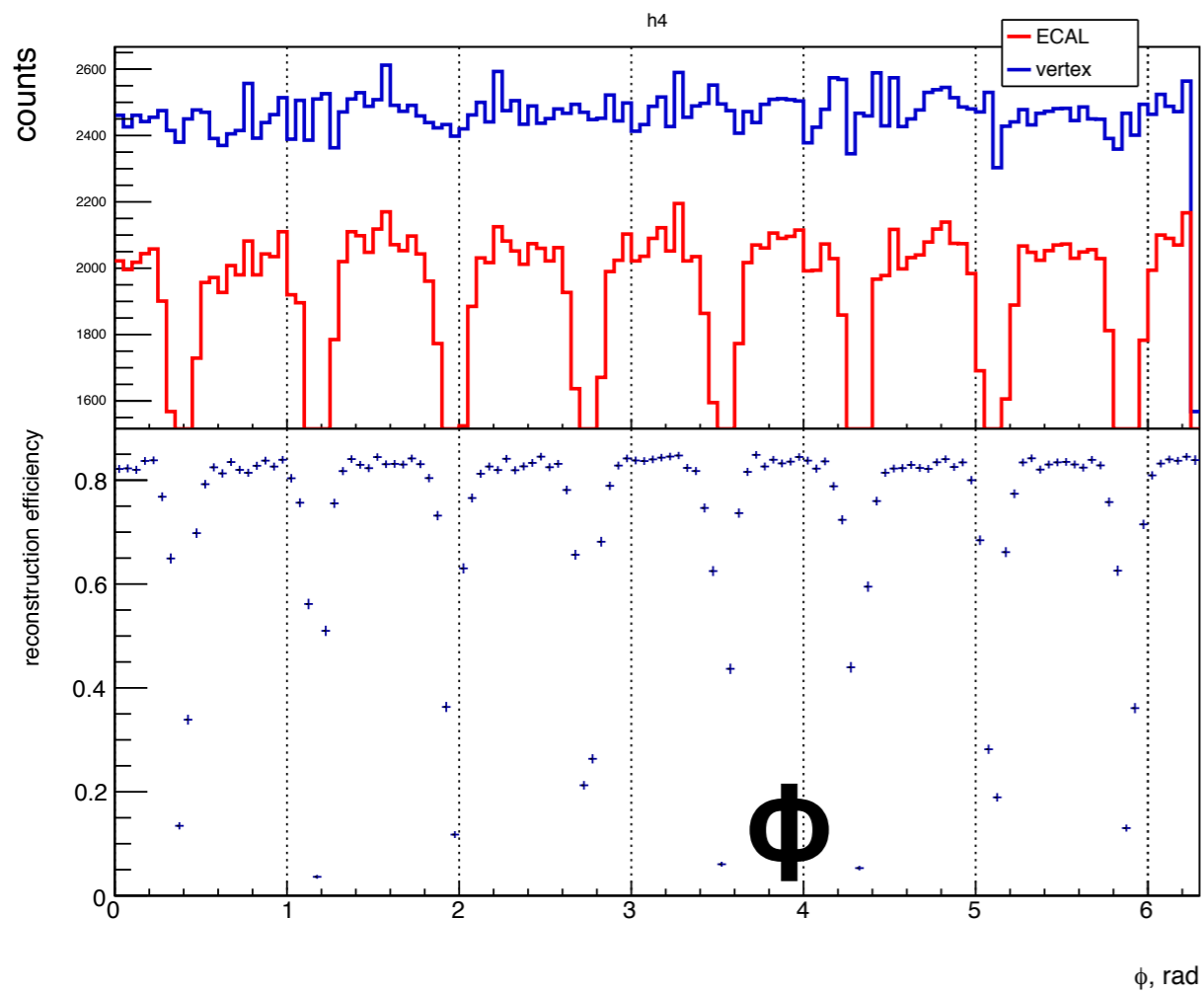


π^0

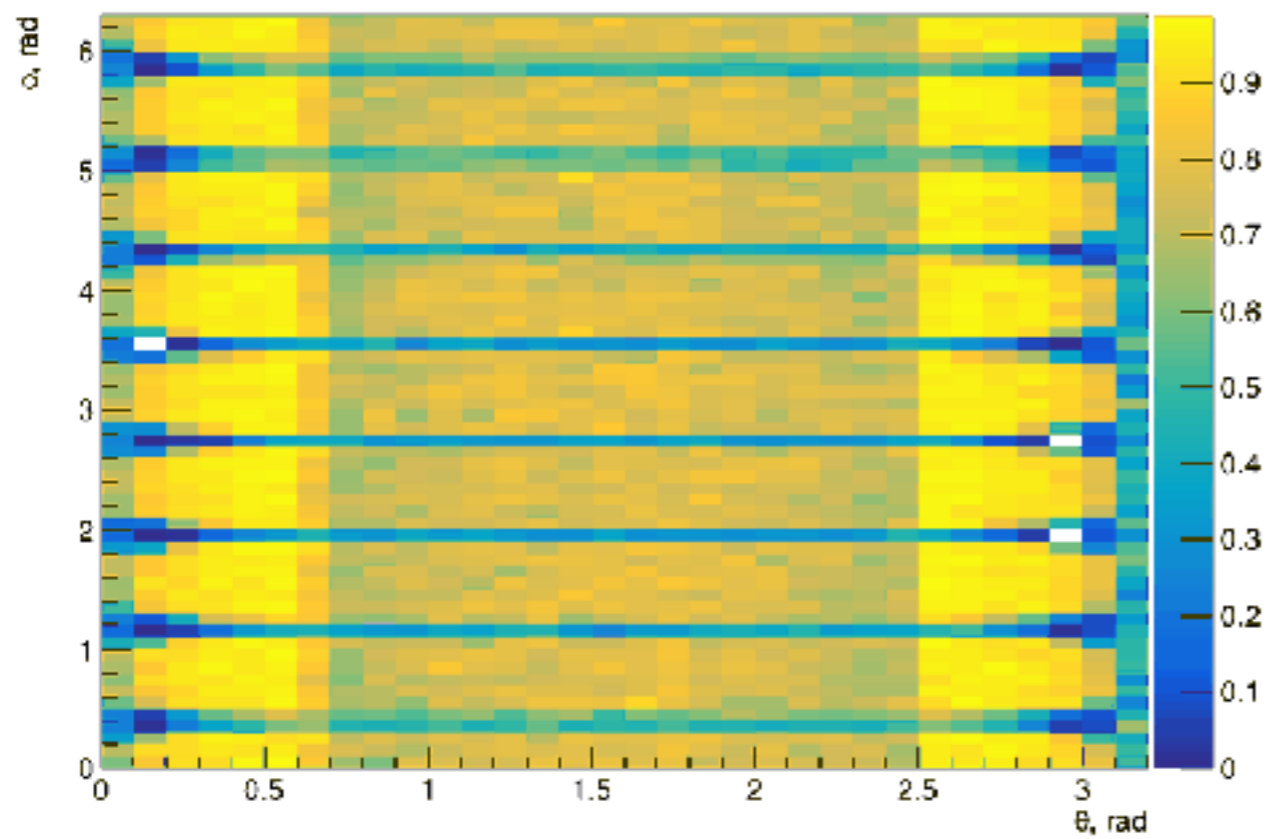


Toroid

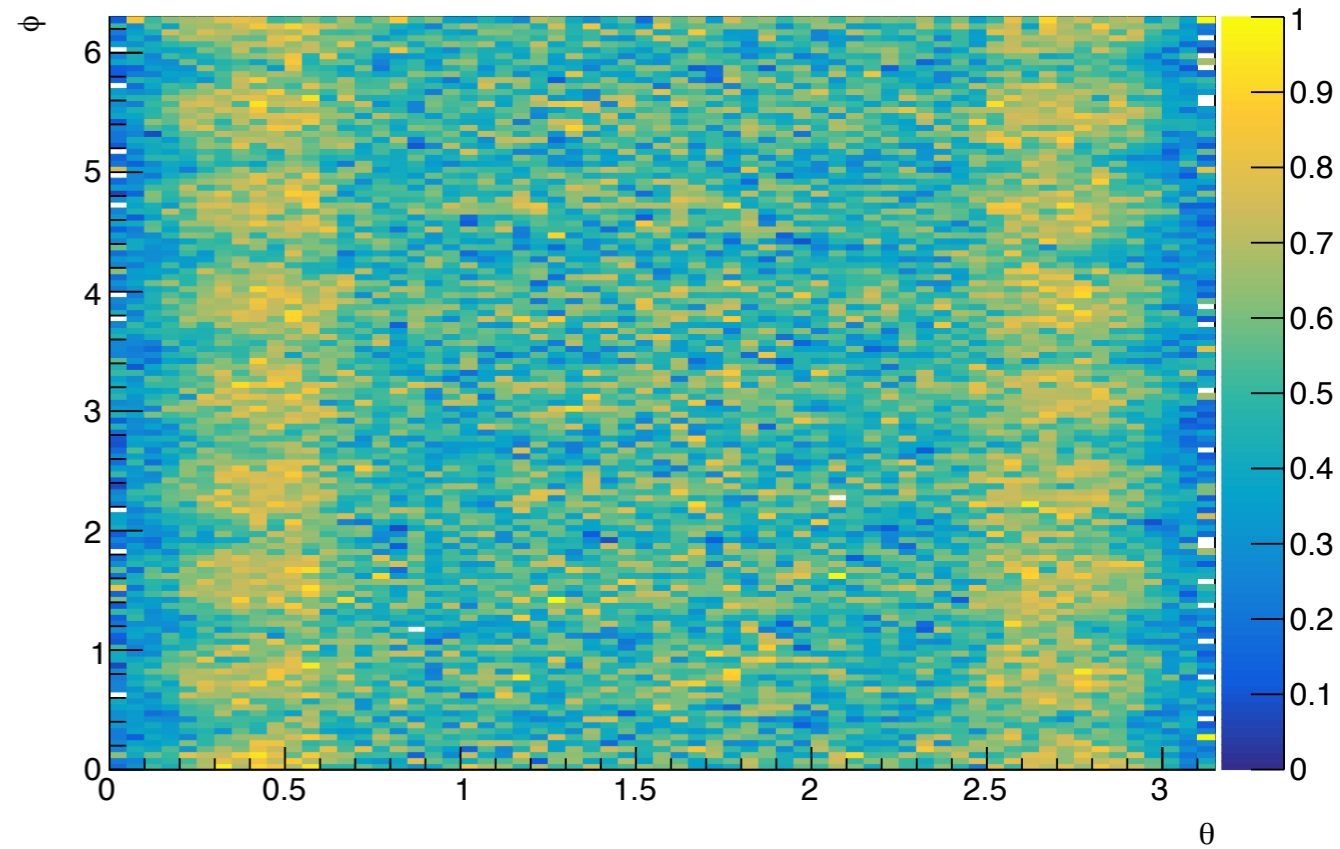




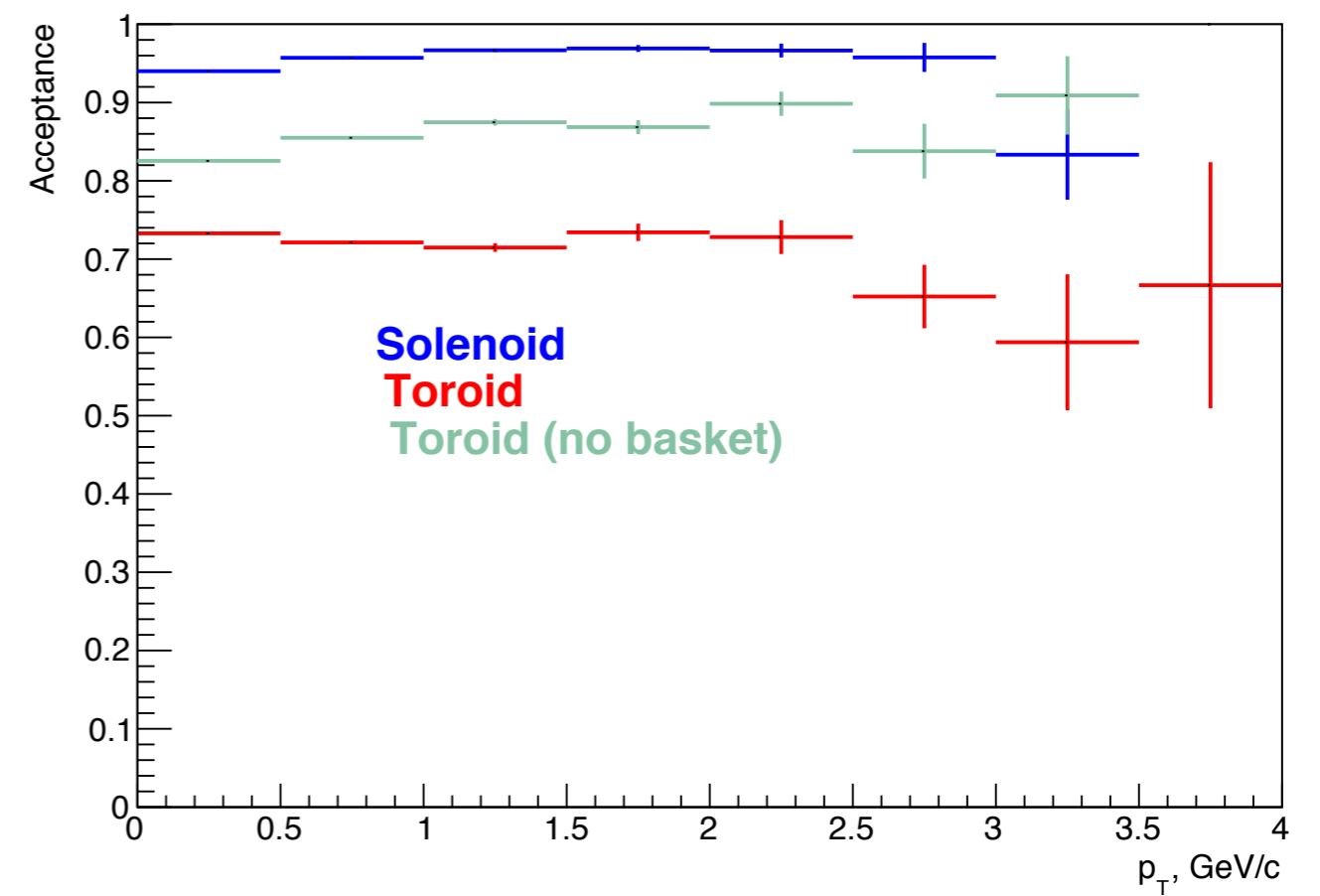
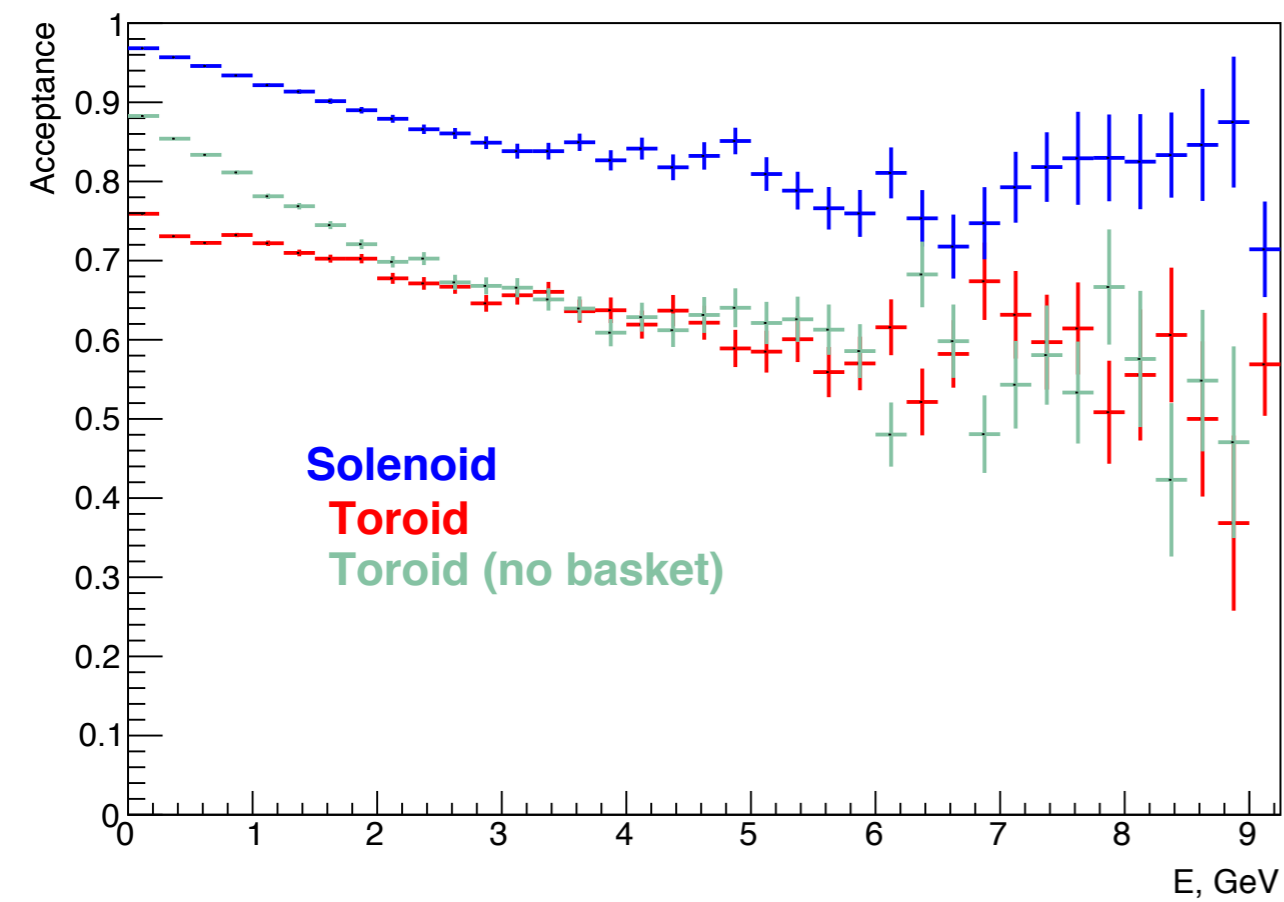
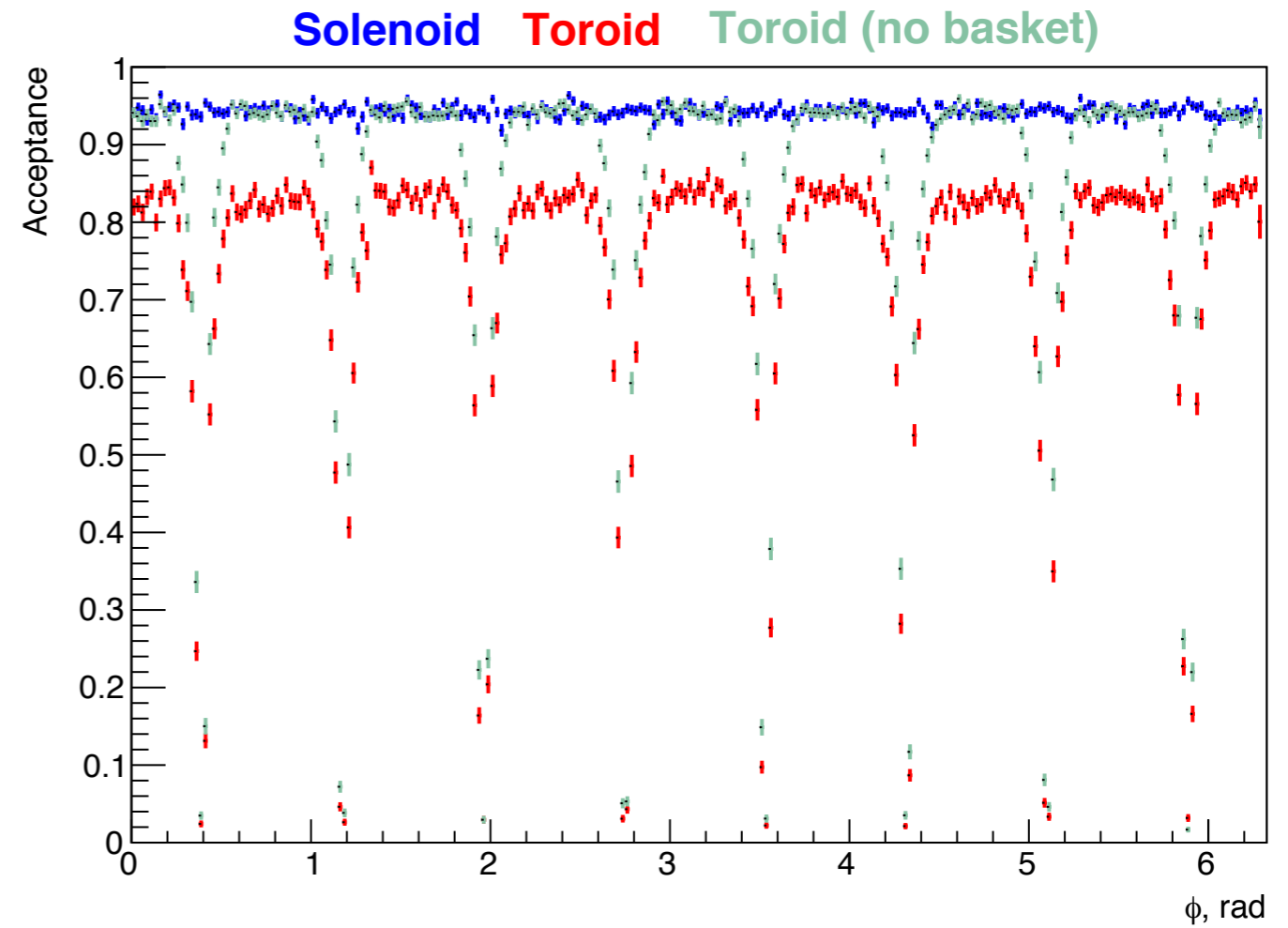
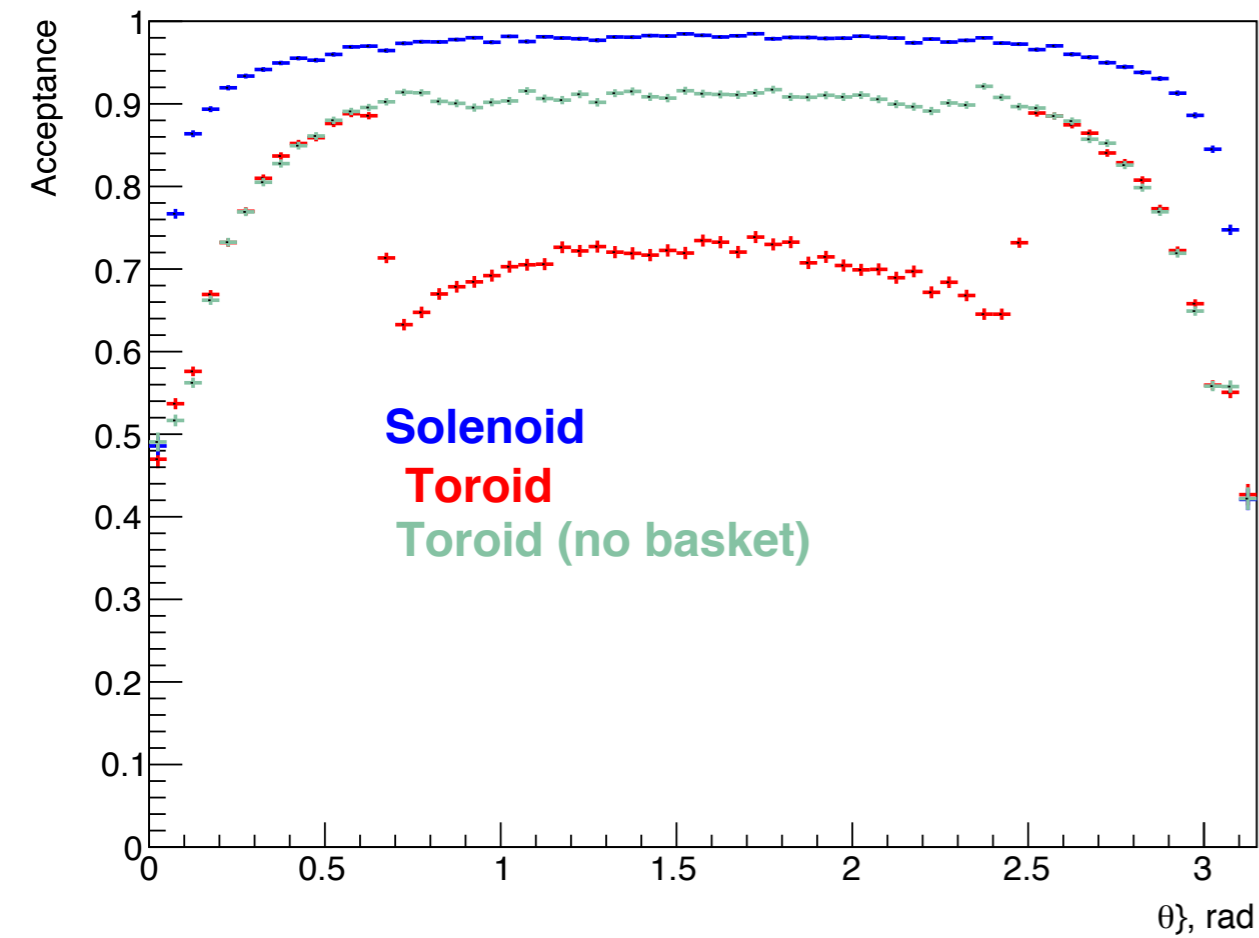
single photon



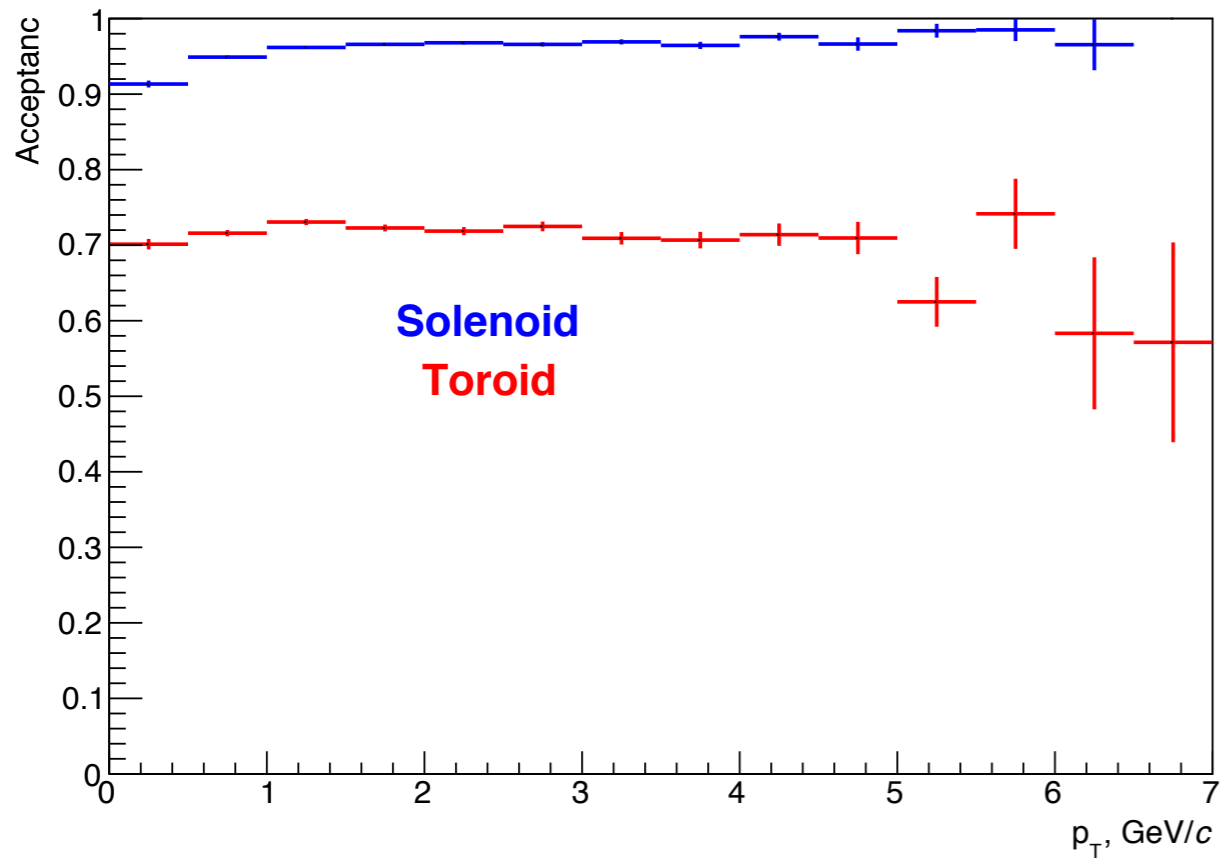
π^0



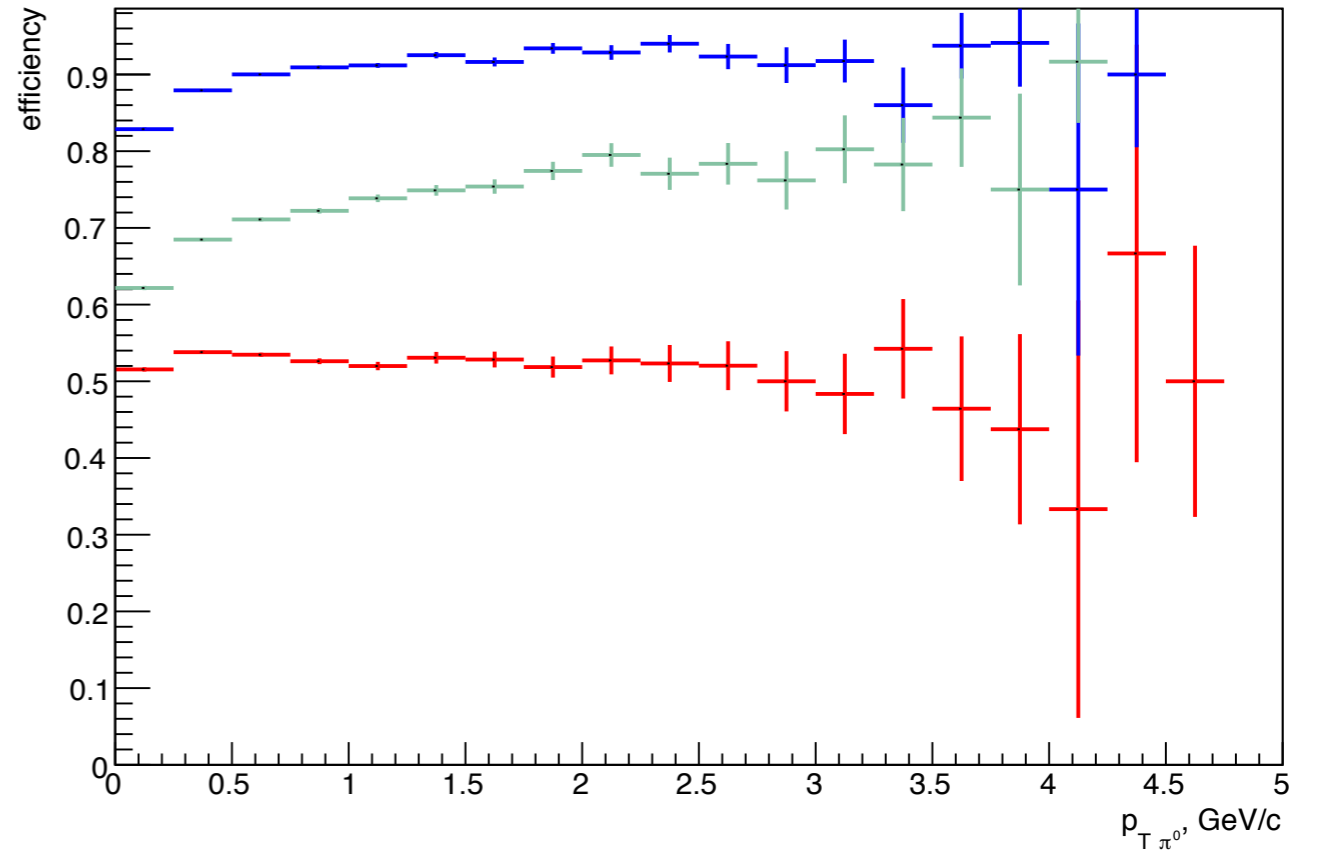
Toroid vs solenoid



Prompt photons (GCS)



π^0



Reconstruction efficiency

% All pT>2 GeV/c	Solenoid	Toroid	Toroid without basket
Single photon	94.3 97.1	73.1 70.4	83.1 88.7
π^0	88.2 92.9	52.9 51.9	68.9 78.8

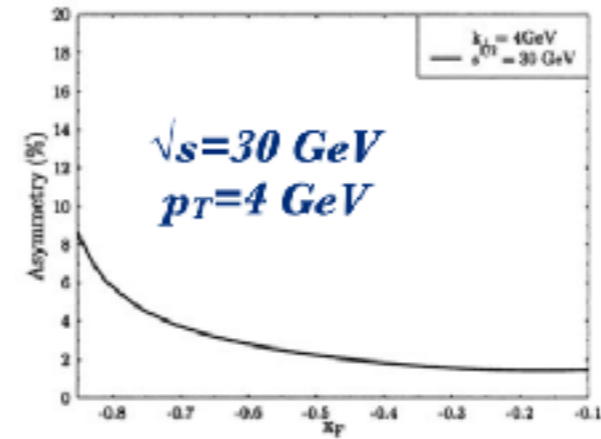
$$\sigma \sim N_{\text{prompt}} = N_{\text{single } \gamma} - 2 \times N_{\pi^0} \times k$$

$$L = 10^{38} \text{ cm}^{-2} \text{ s}^{-1}$$

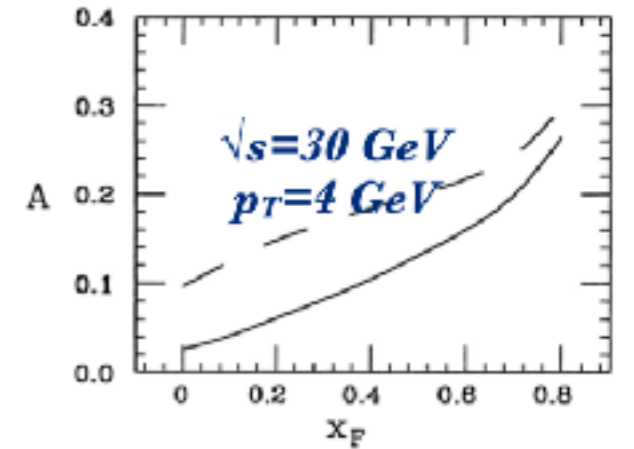
$$p_T > 3 \text{ GeV}/c$$

$$dk/k = 0.01$$

	Toroid	Solenoid
N_γ	4.14×10^8	7.57×10^8
$N_{\text{single } \gamma}$	1.18×10^8	0.36×10^8
N_{π^0}	1.48×10^8	3.60×10^8
k	0.35	0.02
N_{prompt}	0.15×10^8	0.20×10^8
$d\sigma/\sigma$	17.1 %	3.0 %

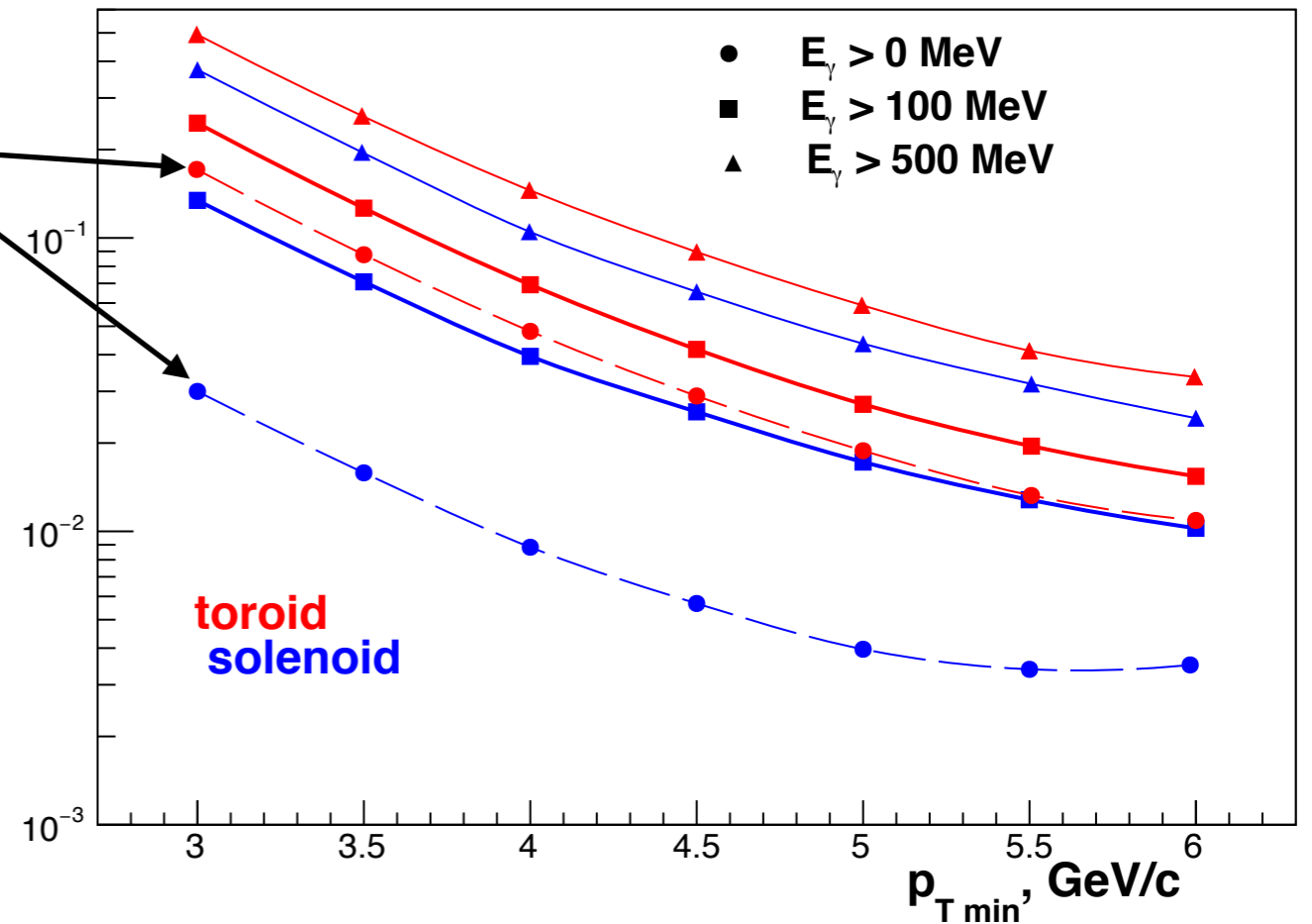


N. Hammon et al.
J. Phys. G: Nucl. Part. Phys. 24 991(1998)



J. Qui and G. Sterman, Phys. Rev. Lett. 67 (1991) 2264

$d\sigma/\sigma$



Conclusions

- Single photon and π^0 reconstruction efficiency for solenoid is much better than for toroid. Nevertheless, the main problem is coming not from toroidal magnets but from supporting structures.