η Paricle Gun, and gen_omegapi0

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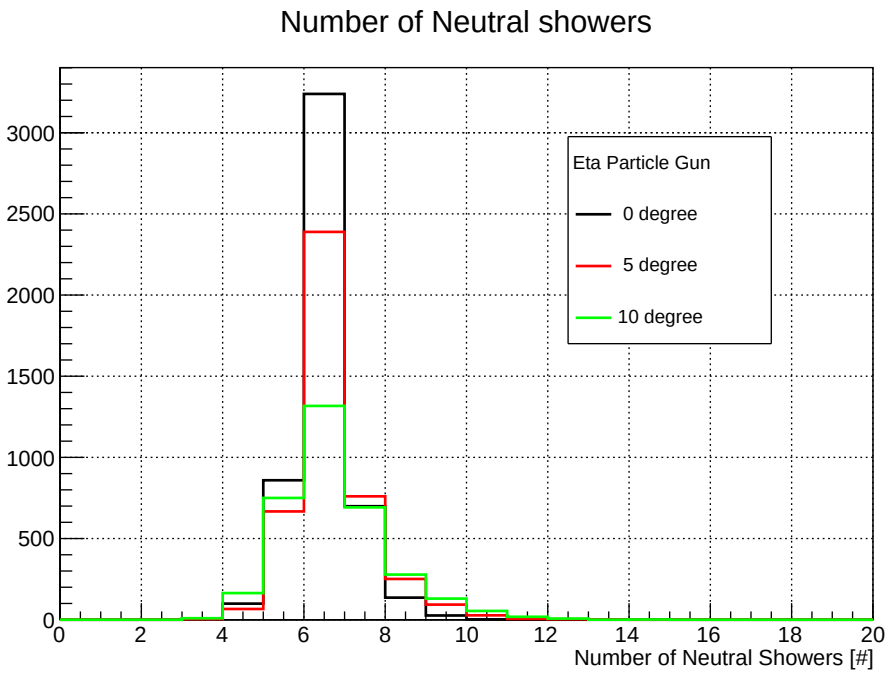
η MC Particle gun

Use GEANT4 particle gun and throw 6 GeV/c $\eta \to \pi^0\pi^0\pi^0$ at zero, five and 10 degree from z=1cm (10k Events):

1. Events FDC Pseudo hits<4 !
2. Shower multiplicity no QF cut



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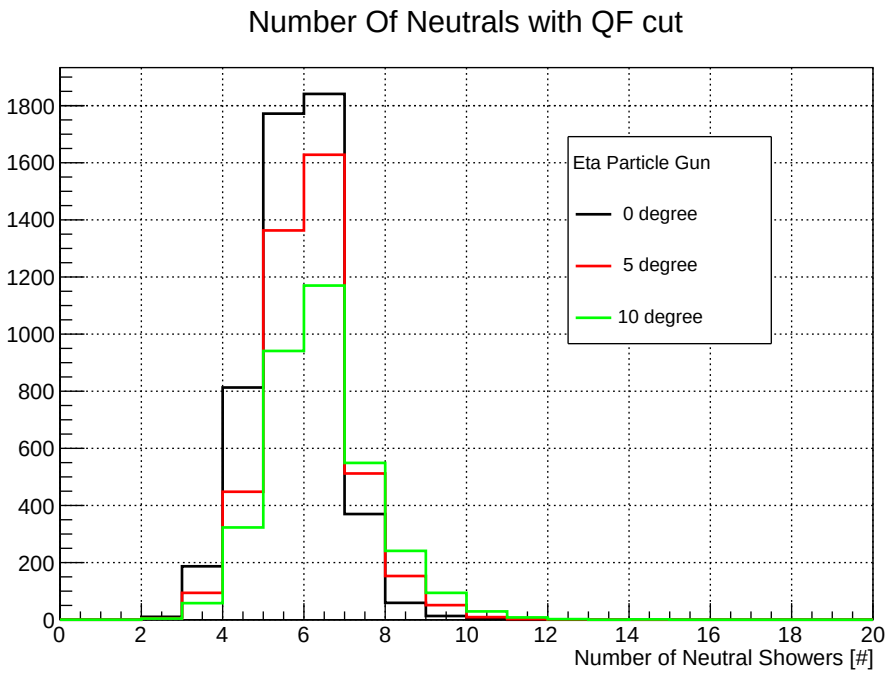

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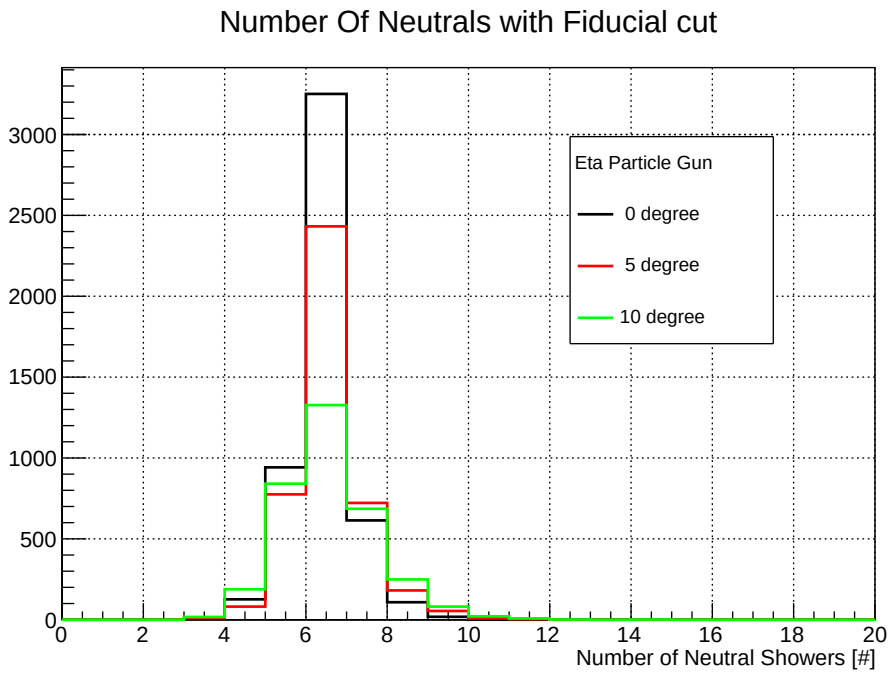

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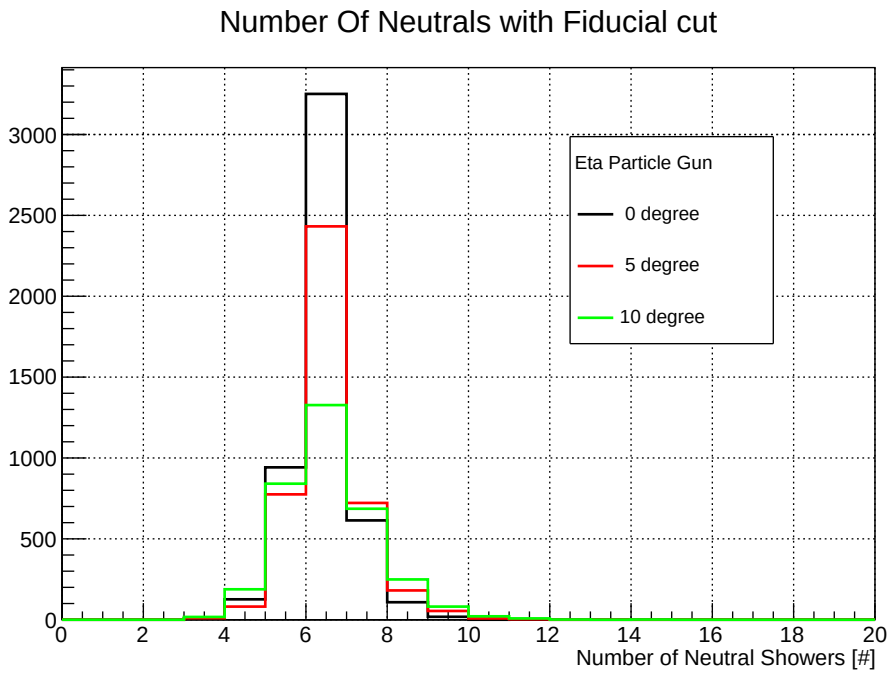
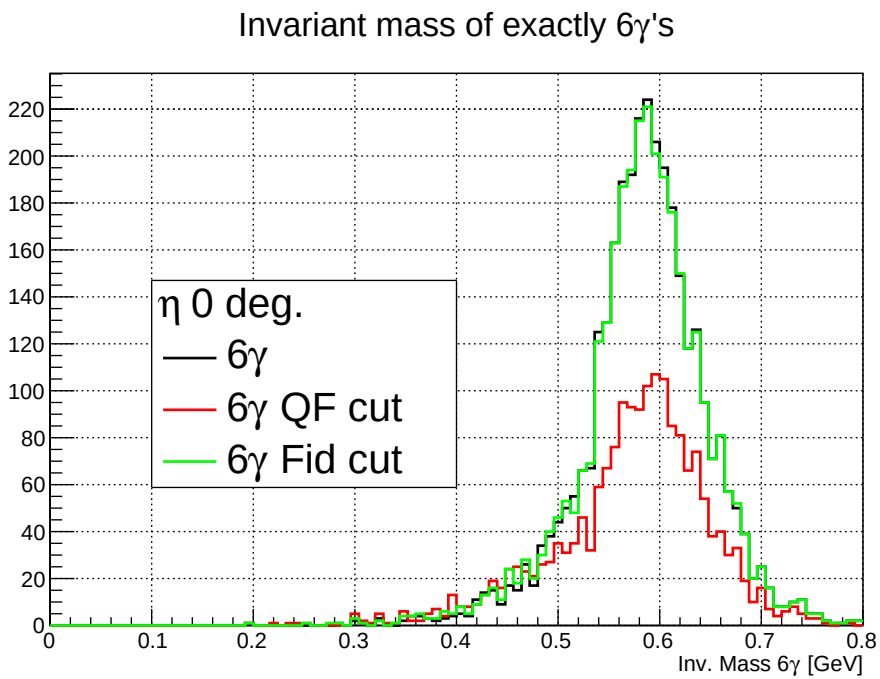
degrees	all	6	>6
0	50%	32%	7.6%
5	42%	24%	10%
10	34%	12%	8.4%
wQF 0	50%	18%	3.8%
wQF 5	42%	16%	6.2%
wQF 10	34%	10%	6.5%
wFid 0	50%	32%	5.6%
wFid 5	42%	24%	7.4%
wFid 10	34%	12%	6.5%



η Mass

Reconstructed *eta* Mass at zero, five and ten degrees:

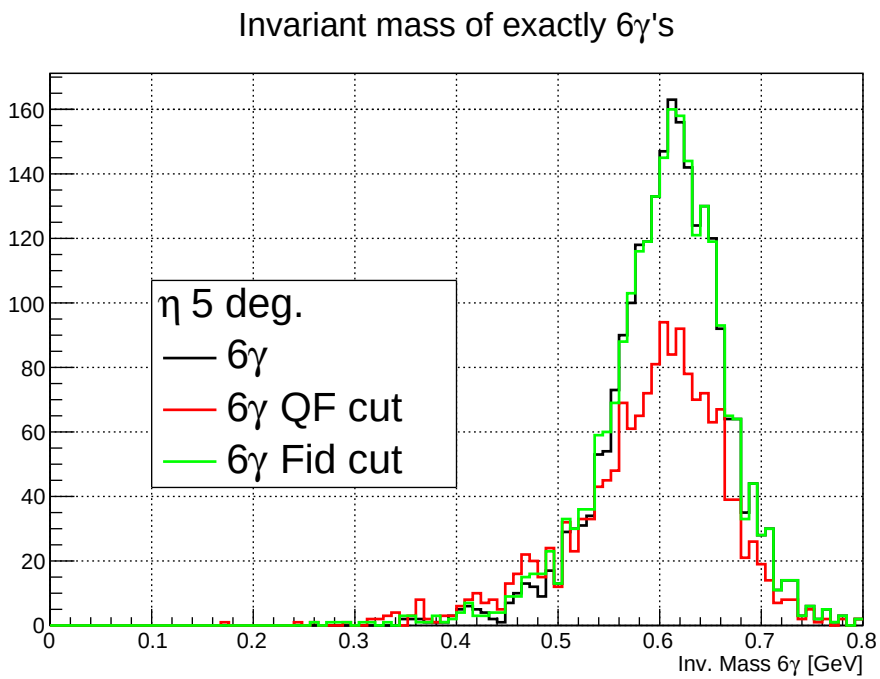
1. η at zero degree



η Mass

Reconstructed *eta* Mass at zero, five and ten degrees:

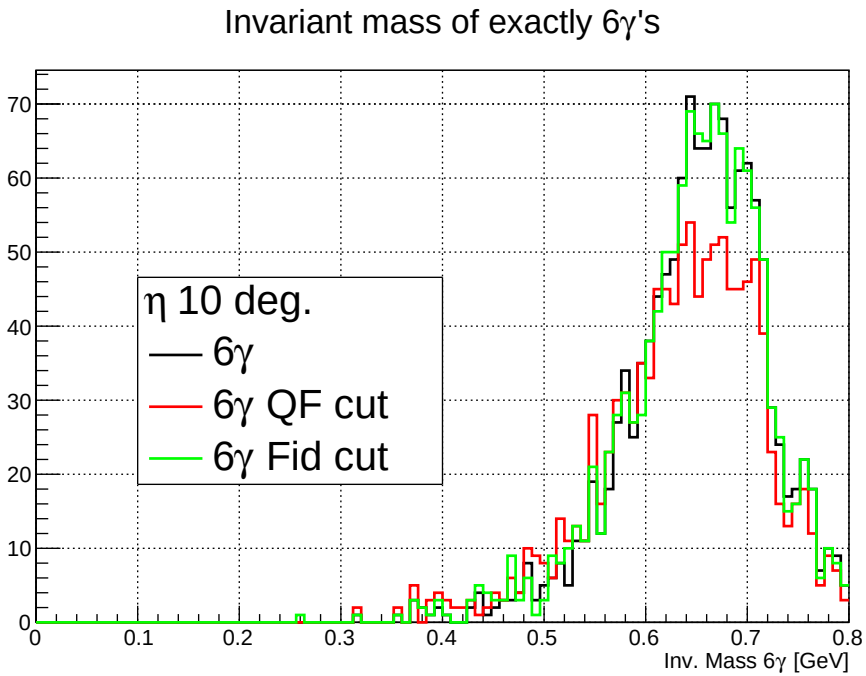
1. η at zero degree
2. η at five degrees



η Mass

Reconstructed *eta* Mass at zero, five and ten degrees:

1. η at zero degree
2. η at five degrees
3. η at ten degrees



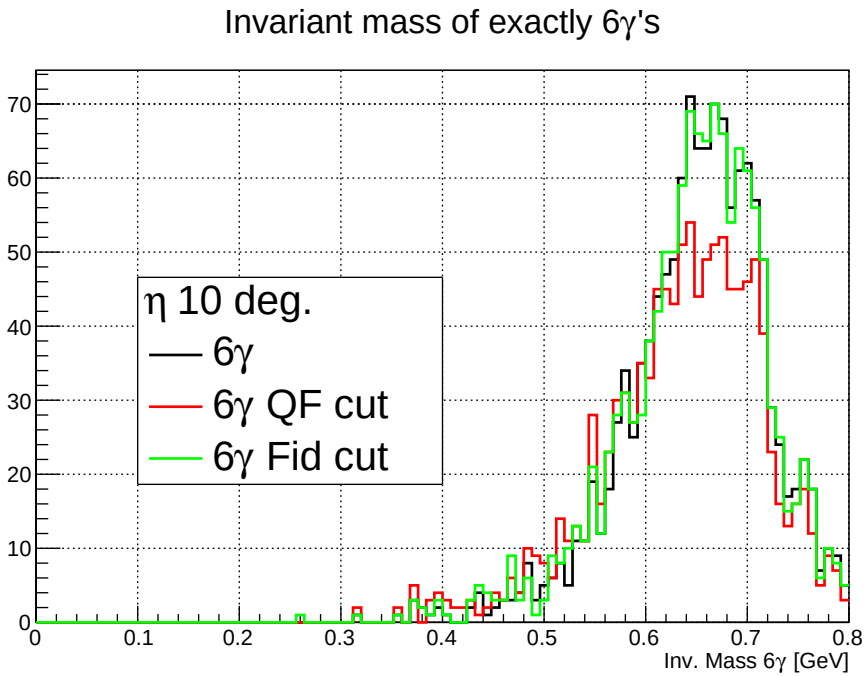
η Mass

Reconstructed *eta* Mass at zero, five and ten degrees:

1. η at zero degree
2. η at five degrees
3. η at ten degrees

Yield of η reconstruction:

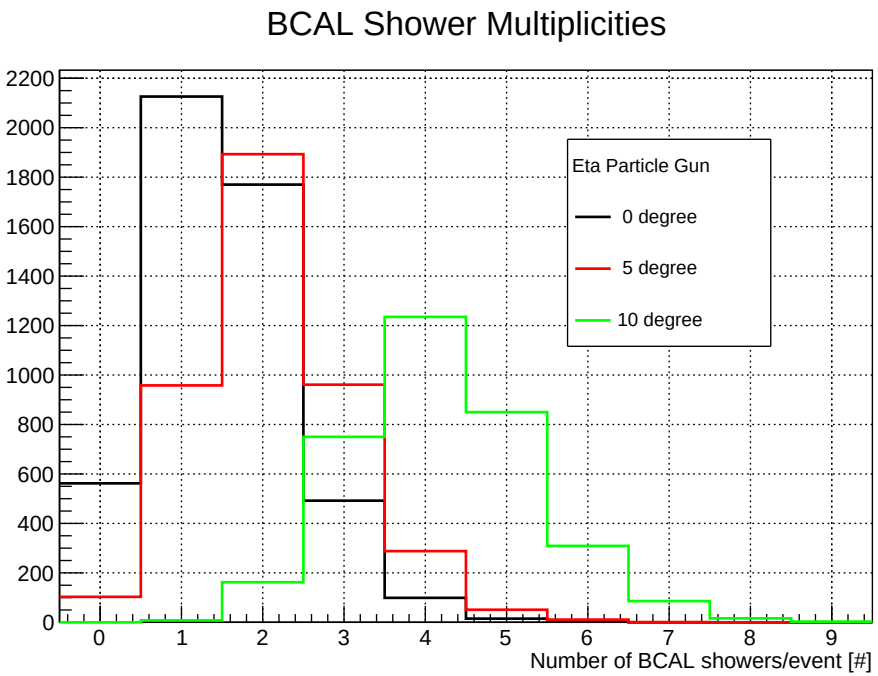
deg.	6γ	6γ QF	6γ Fid.
0	32.4%	18.0%	32.0%
5	24.2%	16.1%	24.0%
10	12.3%	10.2%	12.0%



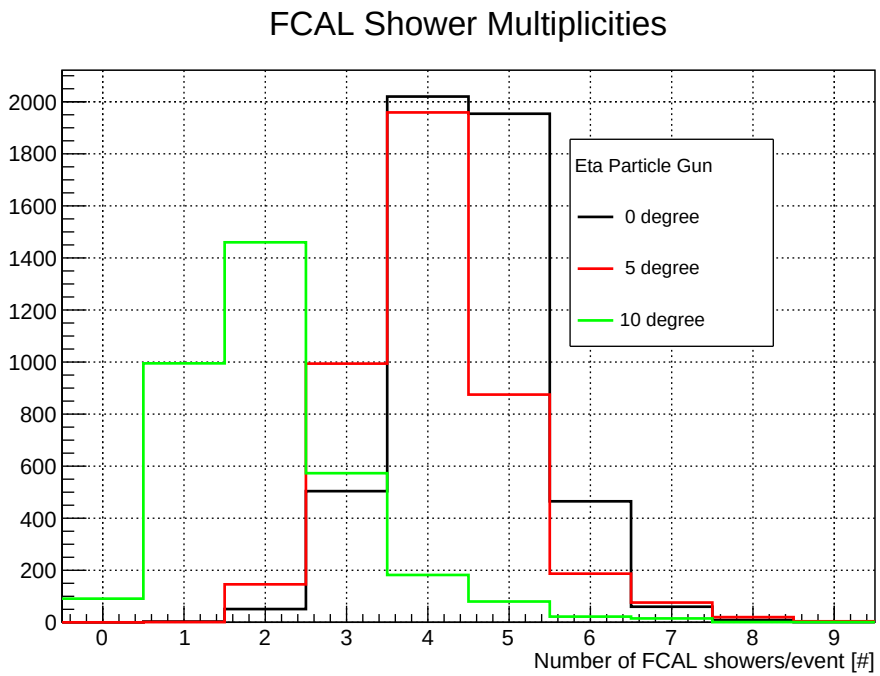
BCAL, FCAL Shower multiplicity

Shower multiplicities are sensitive to FCAL/BCAL transition region.

BCAL Shower multiplicity:

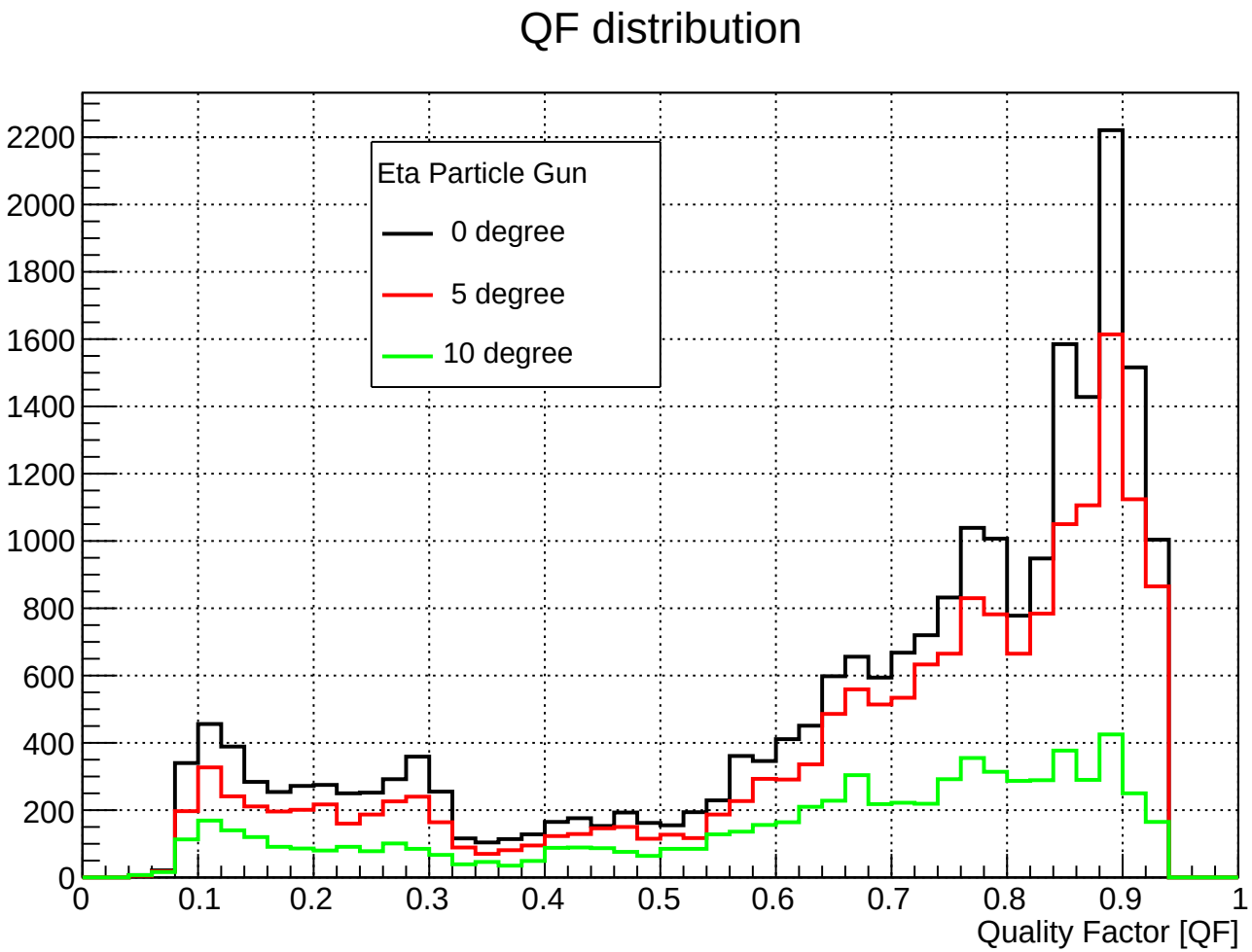


FCAL Shower multiplicity:



Shower Quality Factor

QF factor (FCAL only):



Note the gap at low and high values.

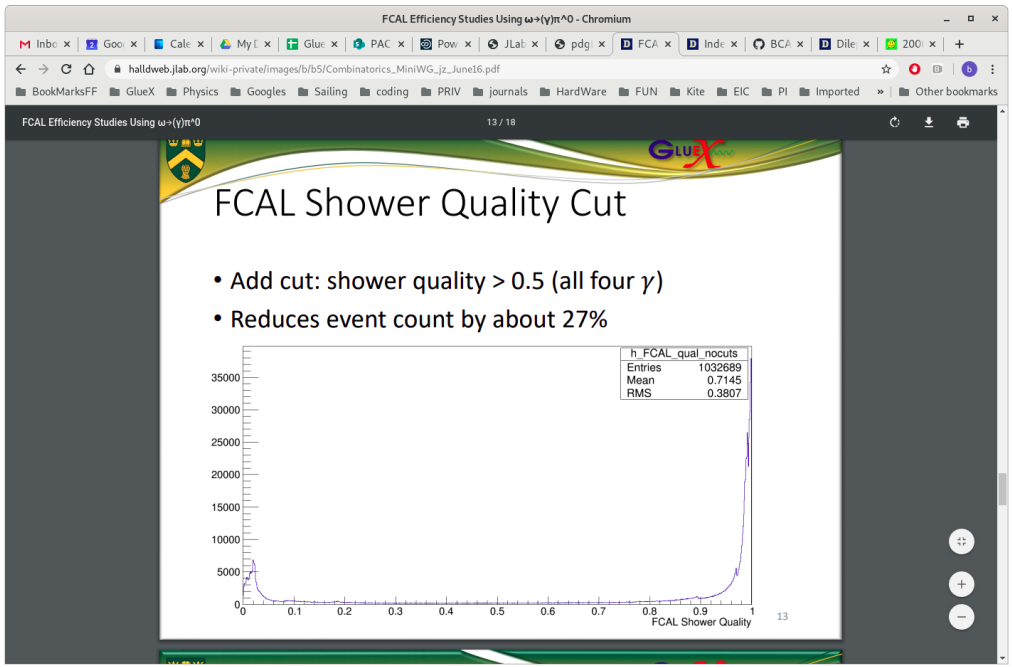
$b1 \rightarrow \omega\pi^0$

Generator gen_omegapi0 looking at $p\pi^+\pi^-\gamma\gamma\gamma\gamma$ exclusive final states. (Jon Zarling)

- Generate 8M events, After Reaction Filter 881k events
- Applying χ^2-cut, ω-MassCut, ... leaves 459k events
- 98.5% have exactly 3 charged tracks
- 78.5% have exactly 4γ
- 21.5% have more than 4γ
- After applying QF cut 37% of events are left (of 459k):
  98.6% have exactly 4γ

$b1 \rightarrow \omega\pi^0$

Generator gen_omegapi0 looking at $p\pi^+\pi^-\gamma\gamma\gamma\gamma$ exclusive final states. (Jon Zarling)
QF histogram looks quite different than previously shown in eta case:



Lesson Learned: DO NOT apply QF to events where you already have the correct exact number of photons. Only in those cases where you have more! this may have been obious to you already