

Island algorithm update

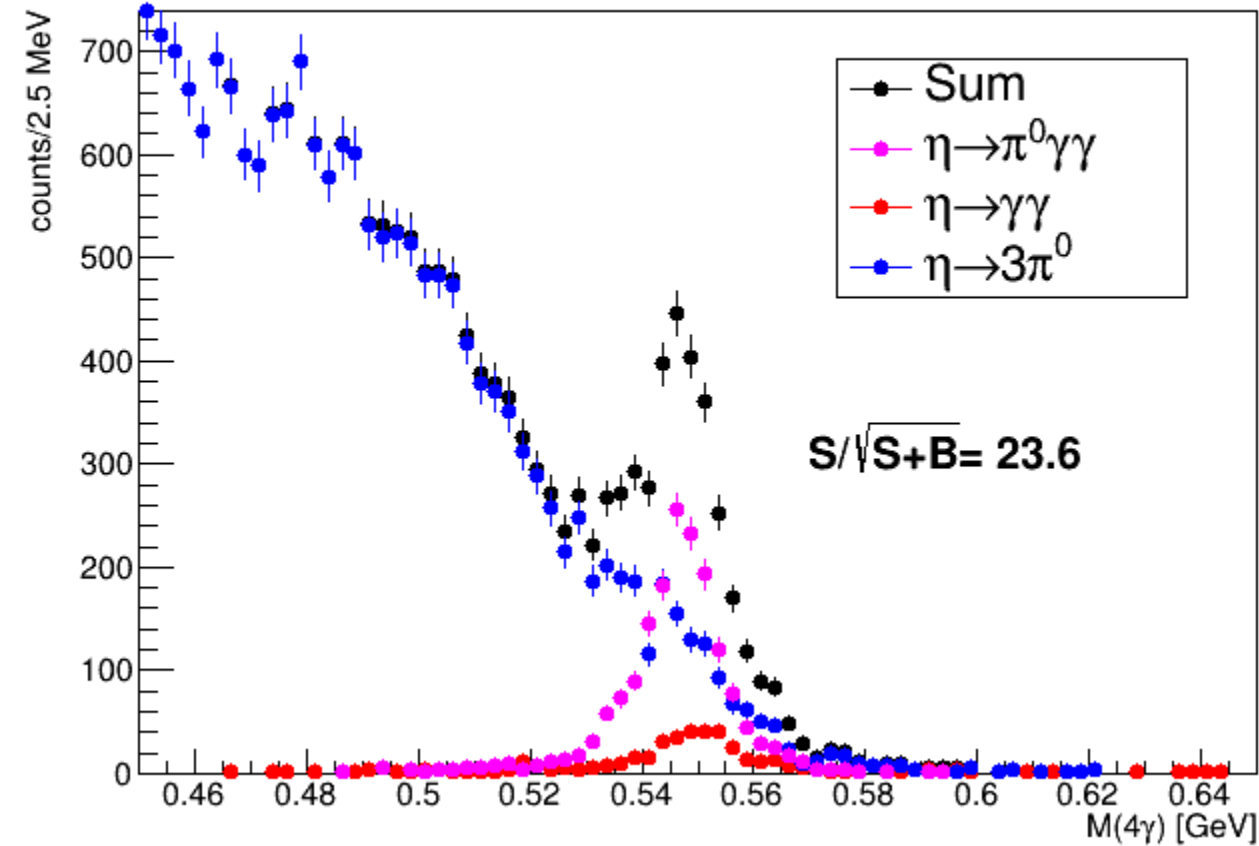
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- Fixed bug in initial guess for peak parameters before fit to find centroid
- Improved handling of interface between lead glass and lead tungstate crystals
- Improved handling of / default settings for parameters that control merging vs. splitting of clusters
 - Modified how χ^2 margin parameter works
 - Controls whether or not a cluster will be split in two
 - Does the χ^2/ndf improve sufficiently to justify splitting?
 - Fixed tests on minimum number of hits in cluster
 - Does it make sense to attempt to split in two?
 - Mass squared cut controls how close the clusters can be to be considered separate photons
- Look at impact on $\eta \rightarrow \pi^0 \gamma \gamma$ channel
 - FCAL2 geometry
 - Generated 9.9 M $\eta \rightarrow 2\gamma$ events, 8.2 M $\eta \rightarrow 3\pi^0$ events, 6479 $\eta \rightarrow \pi^0 \gamma \gamma$ events

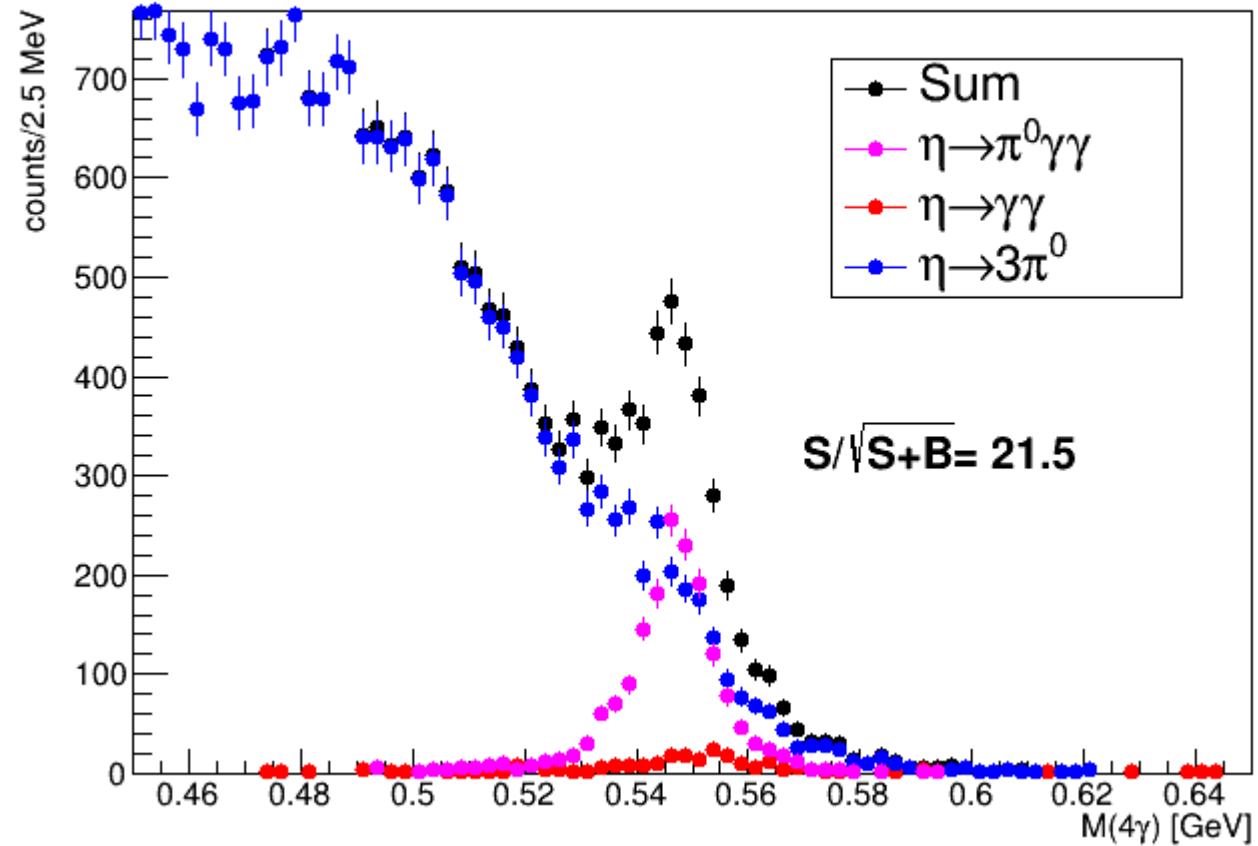
Signal/background for $\eta \rightarrow \pi^0 \gamma \gamma$

- mass of one pair of photons consistent with π^0

Island algorithm, mass cut = $5 \times 10^{-5} \text{ GeV}^2$, χ^2 margin=5



Island algorithm, mass cut = $5 \times 10^{-5} \text{ GeV}^2$, χ^2 margin=10

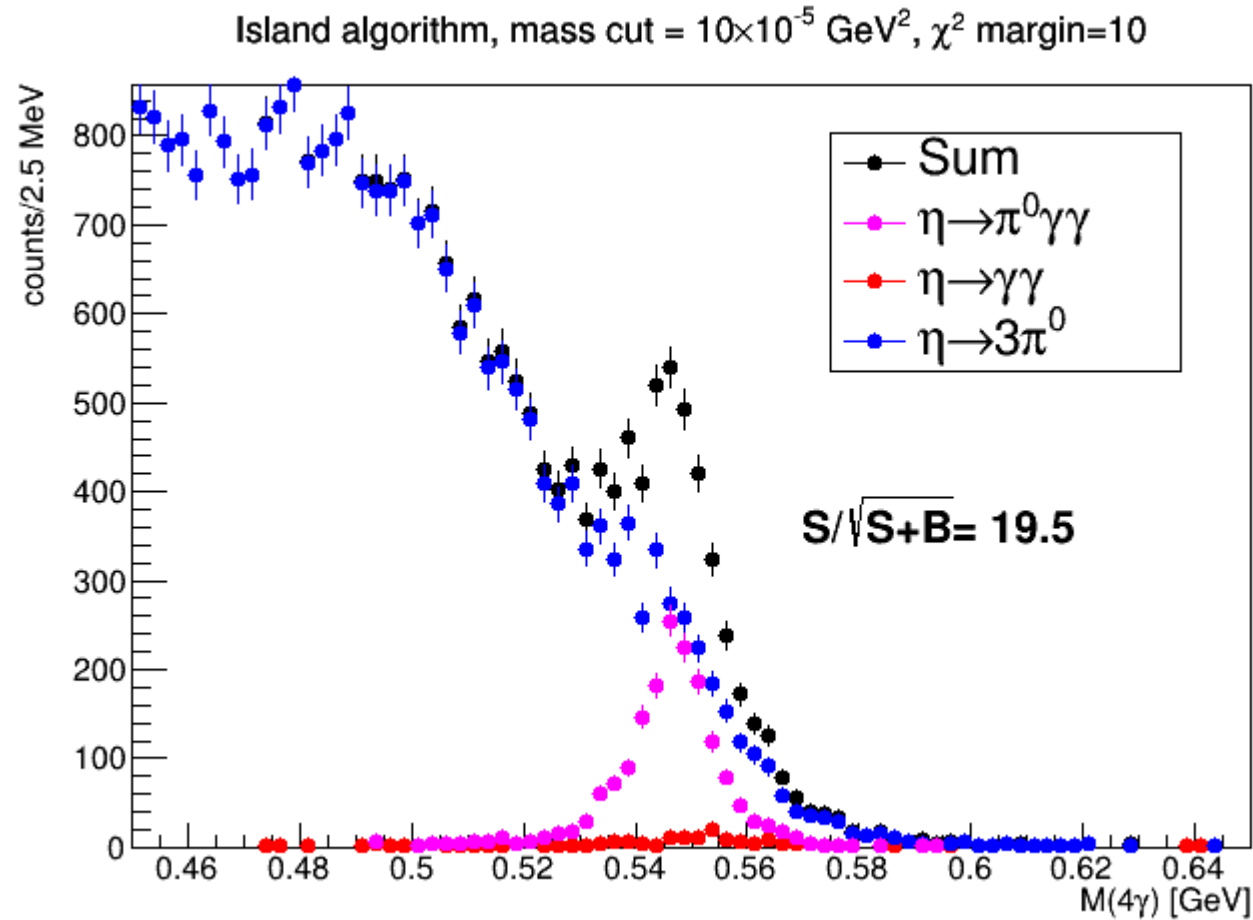


- Cut range for significance = (0.52, 0.58) GeV

- Thresholds: FCAL=0.1 GeV, BCAL=0.05 GeV
- 4 cm inner fiducial cut for shower center

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Observations

- Increasing χ^2 margin cut suppresses 2γ peaking background at expense of increased $3\pi^0$ background
- Increasing mass squared cut does not improve signal/background