

Updates

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for the GlueX Collaboration

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1 $\eta \rightarrow \gamma\gamma\pi^0$

$\eta \rightarrow \gamma\gamma\pi^0$, selection criteria

Selection criteria:

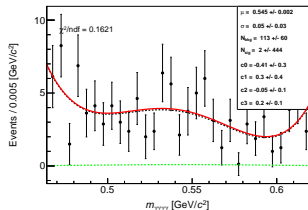
- No extra tracks and no extra energy
- All 4 photons in FCAL but first two rings excluded
- At least one photon with a polar angle below 4.5°
- Kinematic fit $\chi^2/\text{ndf} < 3$
- Coplanarity between 4γ and p between 175 and 185°
- Mass conservation between initial and final states between -0.2 and 0.2 (GeV/c^2)²
- Elasticity, $E_\gamma^{\text{incident}} - (E_\gamma^1 + E_\gamma^2 + E_\gamma^3 + E_\gamma^4)$ between -1 and 1.5 GeV
- Proton DOCA $50 < z < 80\text{cm}$ and $r < 1\text{cm}$
- $110 < m_{\gamma\gamma}^i < 160 \text{ MeV}/c^2$
- $m_{\gamma\gamma}^i < 90 \text{ MeV}/c^2$ or $m_{\gamma\gamma}^i > 190 \text{ MeV}/c^2$ or $m_{\gamma\gamma}^j < 500 \text{ MeV}/c^2$ or $m_{\gamma\gamma}^j > 600 \text{ MeV}/c^2$
- Any events with a combination corresponding to $2\pi^0$, $\pi^0\eta$, and 2η are discarded
 - ▶ $2\pi^0$: $110 \leq m_{\gamma\gamma}^{i/j} \leq 160 \text{ MeV}/c^2$
 - ▶ $\pi^0\eta$: $110 \leq m_{\gamma\gamma}^i \leq 160 \text{ MeV}/c^2$ and $500 \leq m_{\gamma\gamma}^j \leq 600 \text{ MeV}/c^2$
 - ▶ 2η : $500 \leq m_{\gamma\gamma}^{i/j} \leq 600 \text{ MeV}/c^2$

$\eta \rightarrow \gamma\gamma\pi^0$, invariant mass distributions

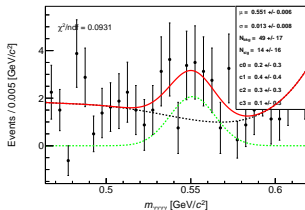
Selection criteria applied, only 40% of 2017-01 data set analyzed

- No MVA cut and TOF veto applied

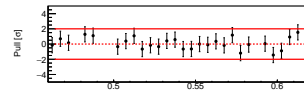
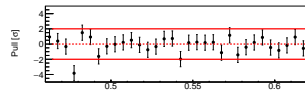
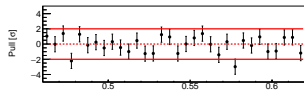
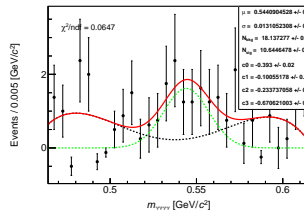
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- MVA cut applied but no TOF veto applied



- MVA cut and TOF veto applied



- BDT cut of 0.9
- Veto FCAL and Veto hits matched, $|\Delta x/y| < 10$ cm