Rough Data-Quality Checks

(still in progress)

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Basic Event Selection

Look at the largest channels of the form $e^+e^- \to XJ/\psi$ *($\pi^+\pi^- J/\psi$, $\pi^0\pi^0 J/\psi$, $\gamma_{ISR}\psi(2S)$, etc.)*.

For all reactions, make the following basic selections:

* Reconstruct $\boldsymbol{\pi^0} \to \gamma\gamma$, $\boldsymbol{\eta} \to \gamma\gamma$, $\mathbf{K_S} \to \pi^+\pi^-$, and $\mathbf{J/\psi} \to e^+e^-$ or $\mu^+\mu^-$.

* Use standard **track quality cuts** ($V_R < 1$cm; $|V_Z| < 10$cm; $|\cos(\vartheta)| < 0.93$).

* For every $\mathbf{K_S}$, require $L/\sigma > 2$.

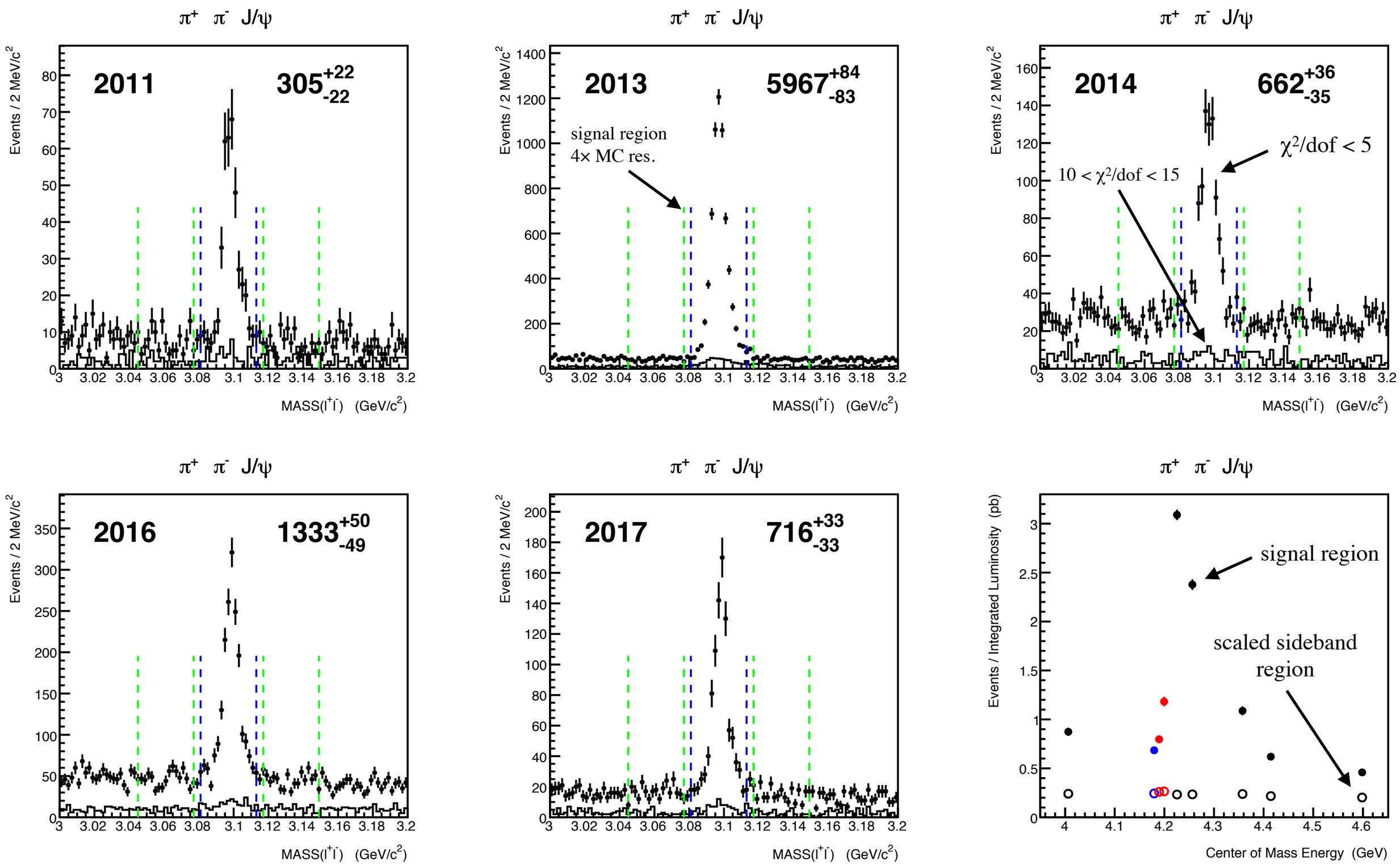
* For every **charged kaon**, require kaon probability > pion probability.

* To suppress $\boldsymbol{\gamma \to e^+e^-}$, require the cosine of the opening angle between all oppositely charged tracks be less than 0.98.

* **Separate e and μ** using E/p: for e^+e^-, at least one of them has $E/p > 0.75$; for $\mu^+\mu^-$, both tracks have $E/p < 0.25$.

* Perform a **kinematic fit** to the initial four-momentum (4C), and include an additional mass constraint (1C) for every $\pi^0 \to \gamma\gamma$, $\eta \to \gamma\gamma$, and $K_S \to \pi^+\pi^-$. Require $\chi^2/\mathrm{dof} < 5$.

Raw Mass Distributions



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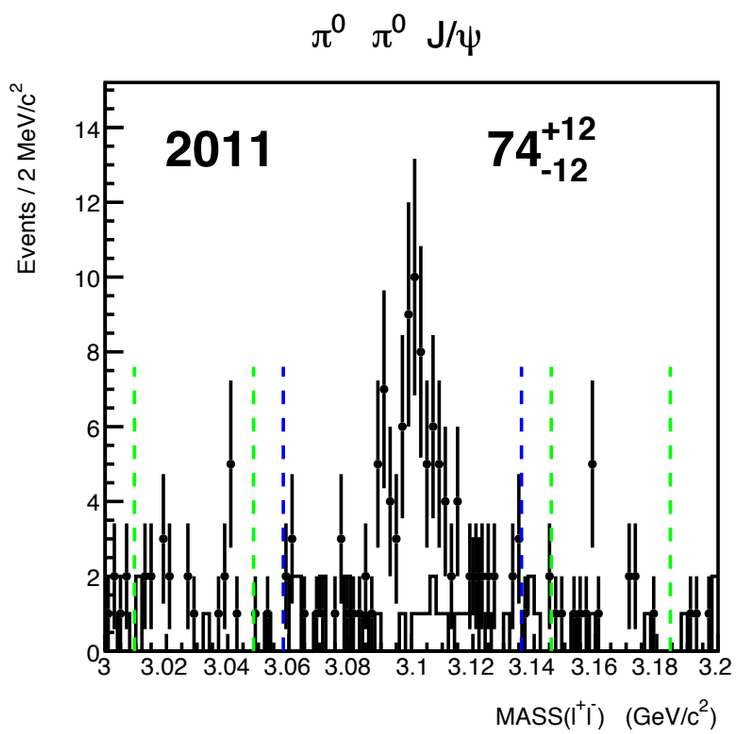

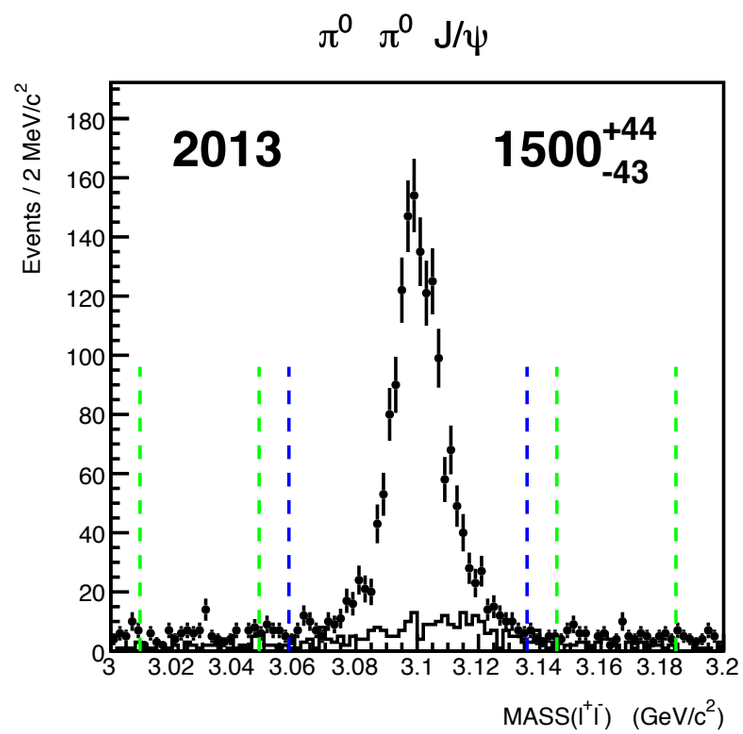

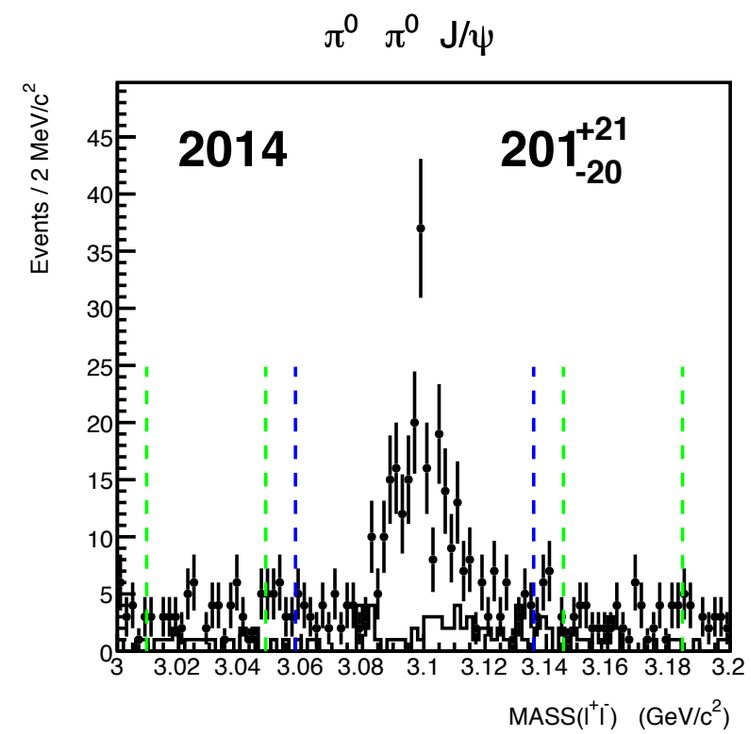

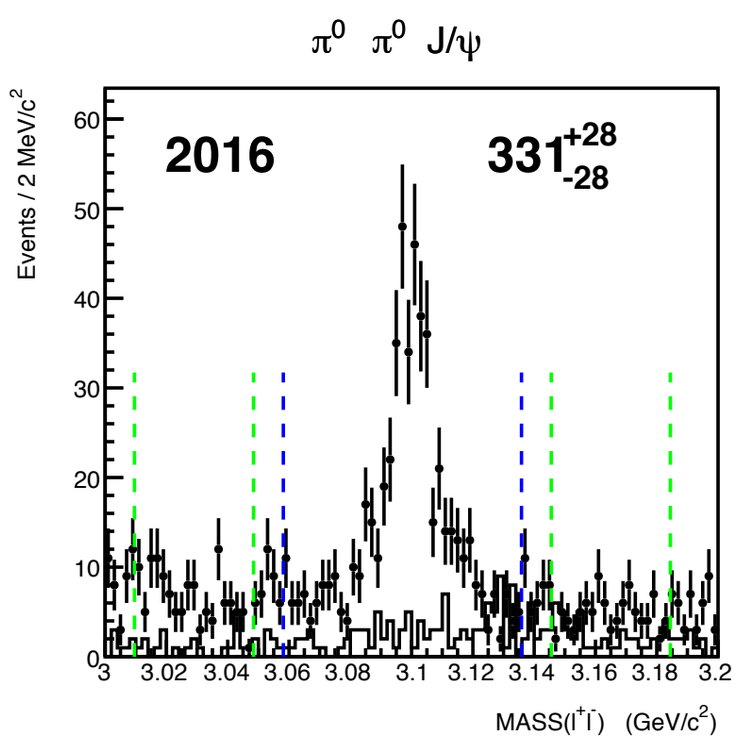

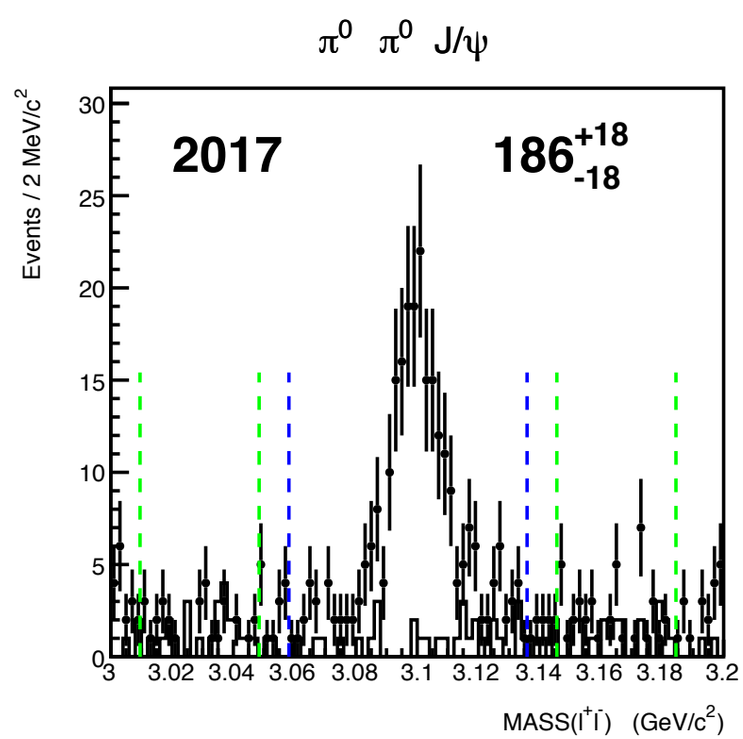

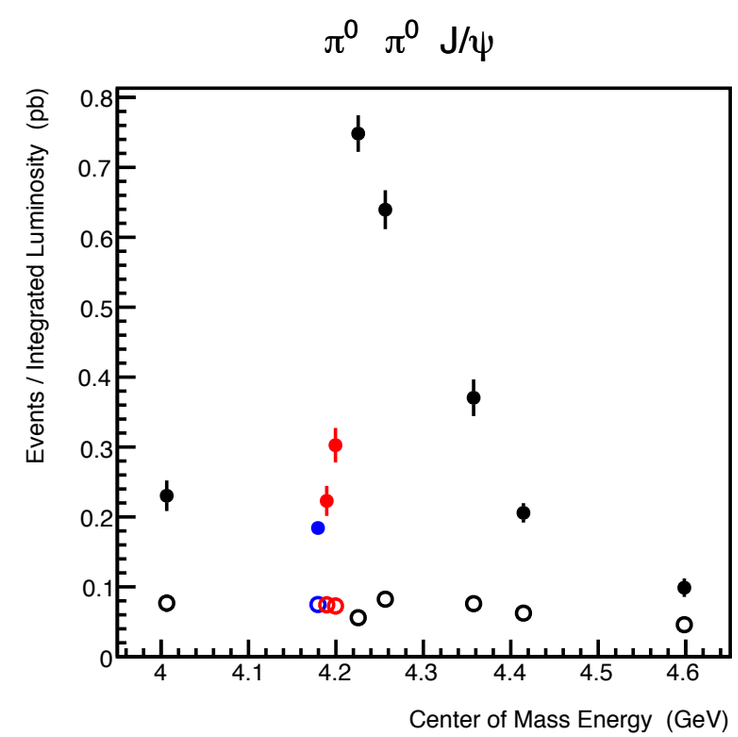

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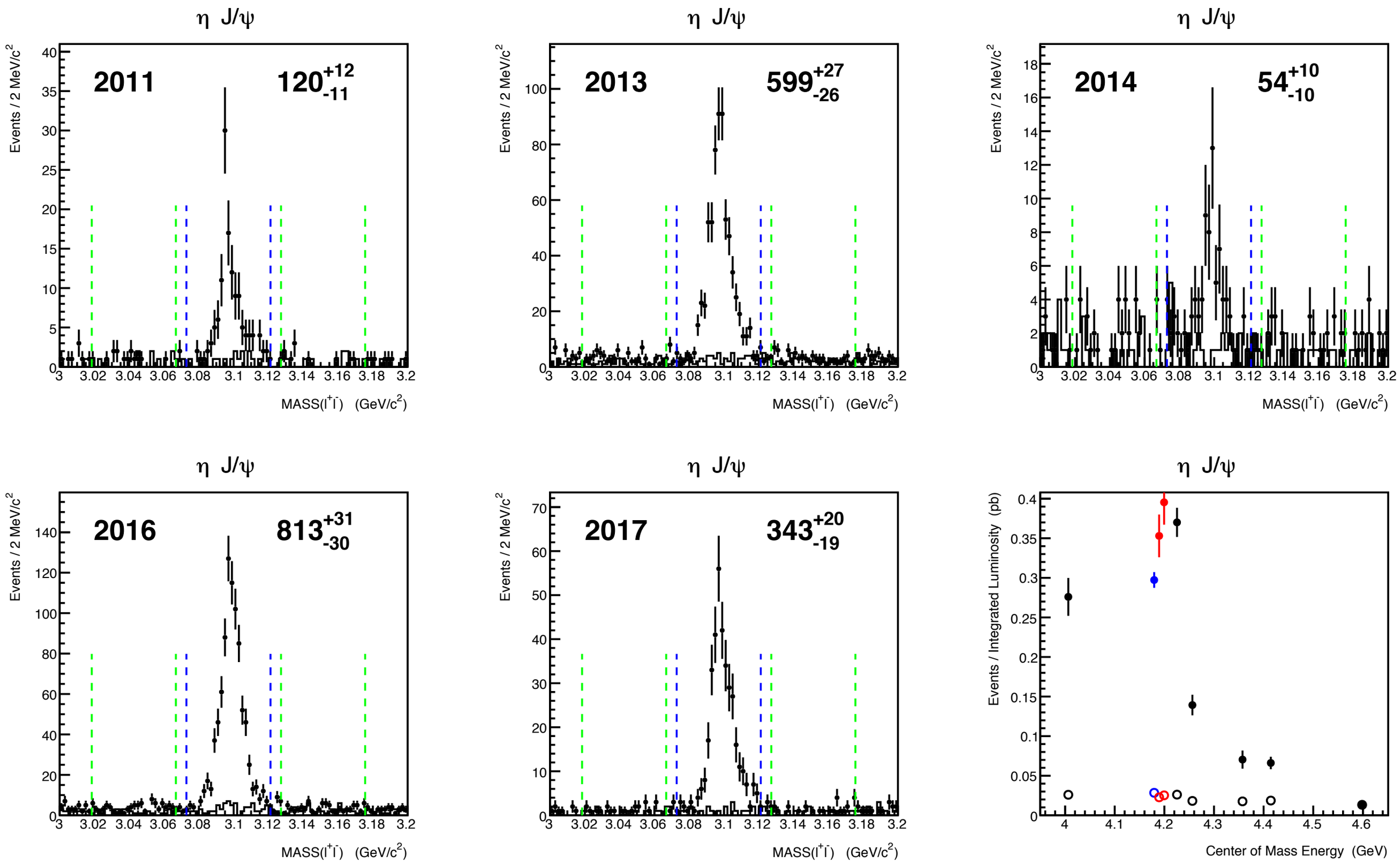

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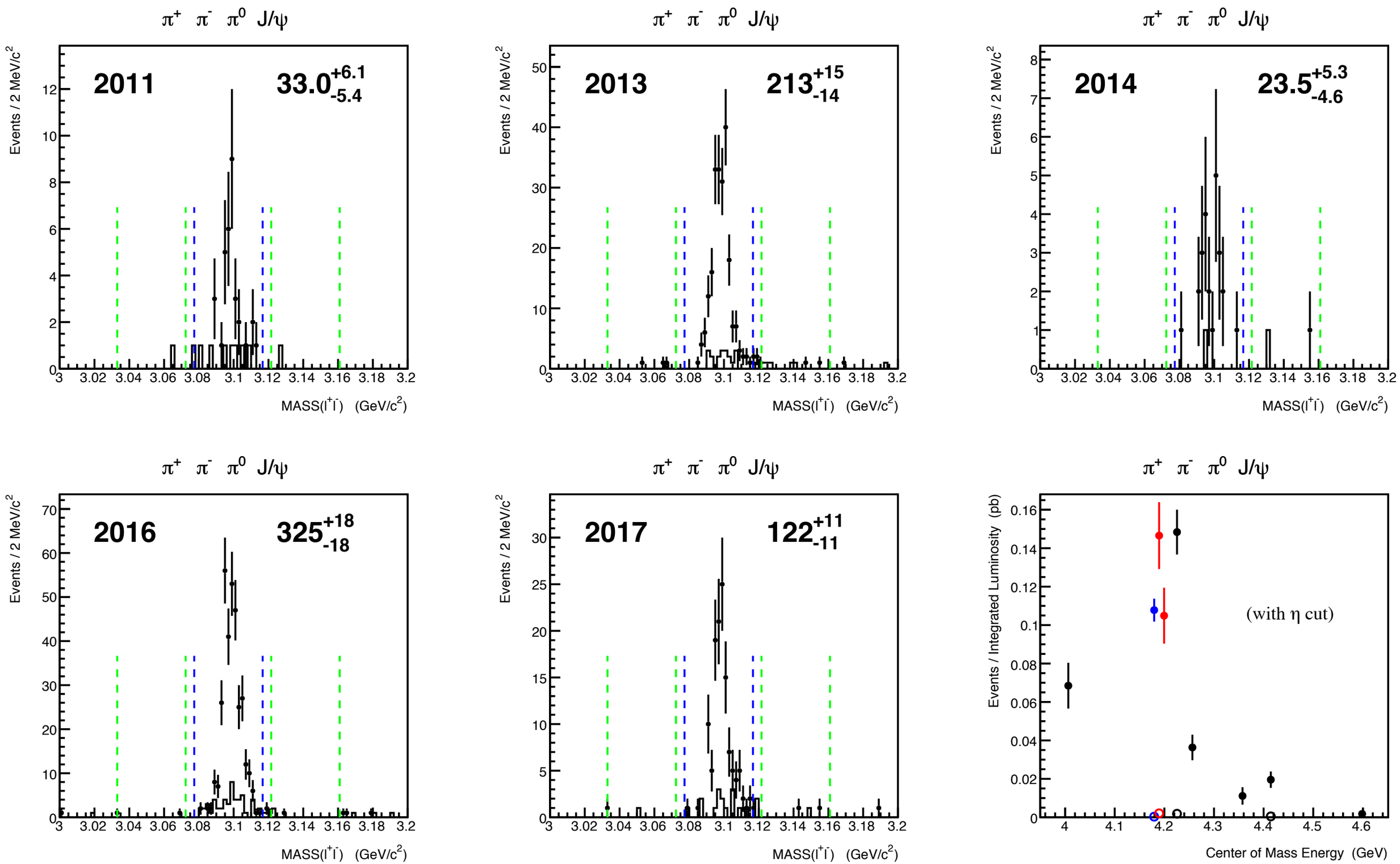

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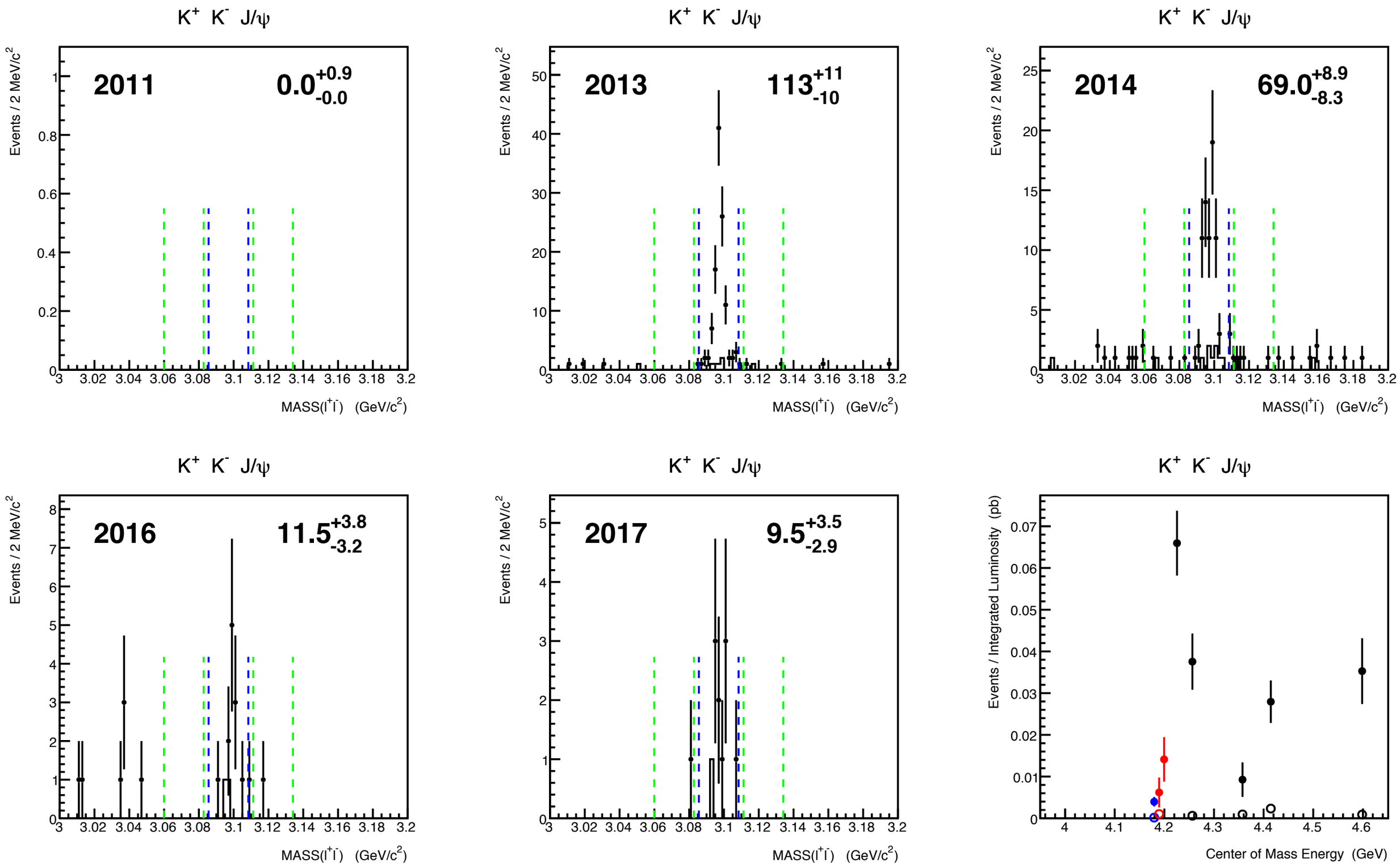

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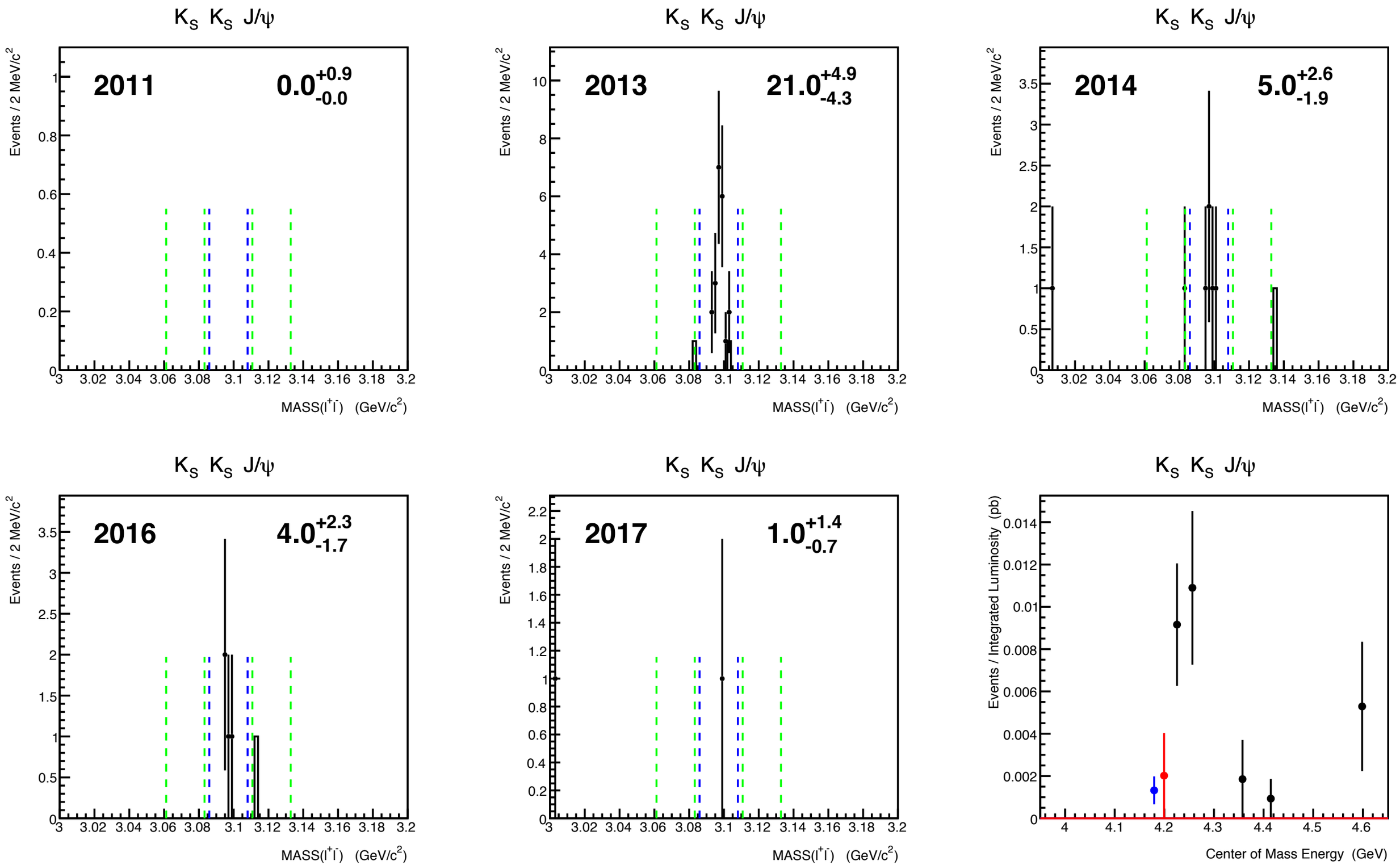

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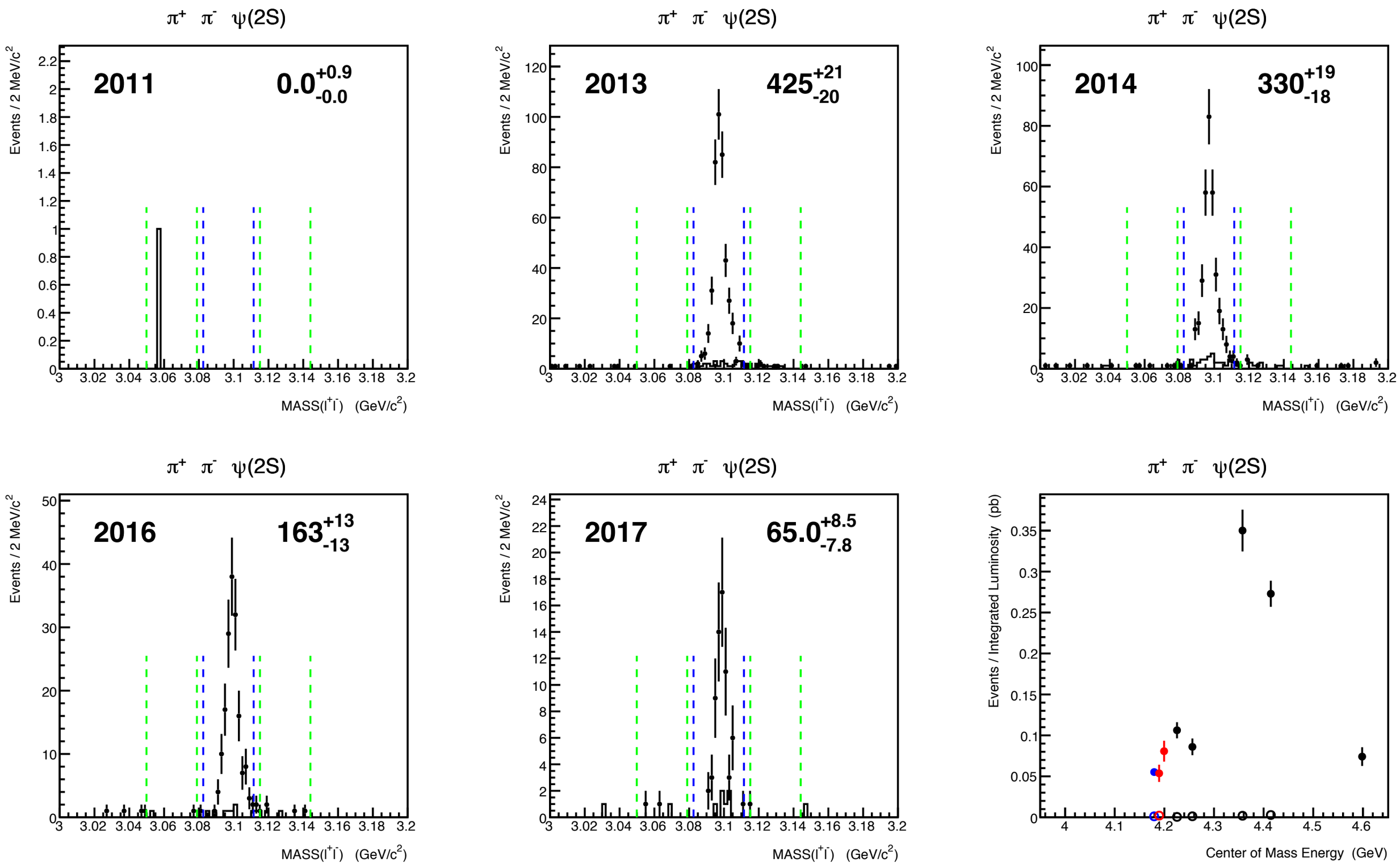

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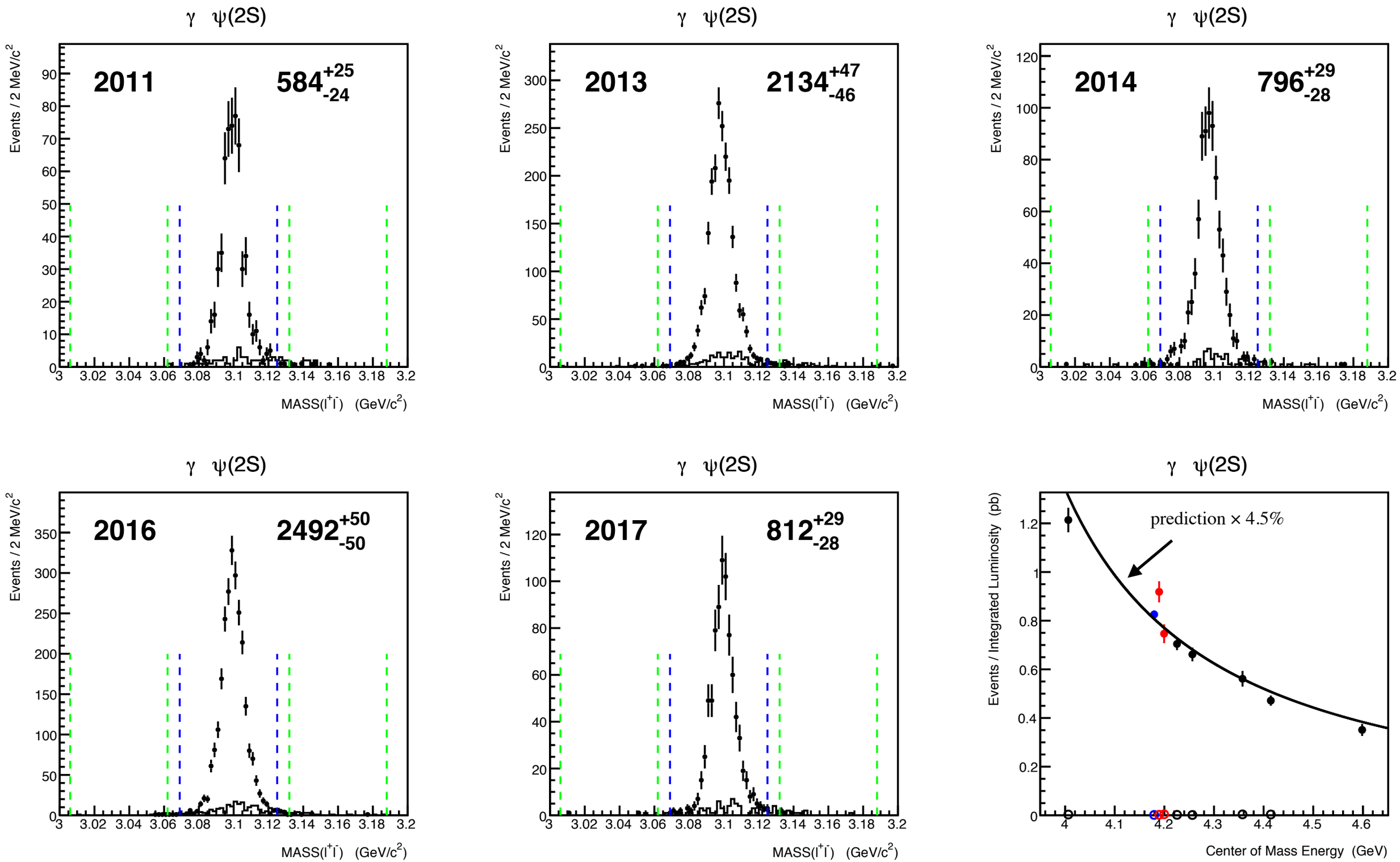
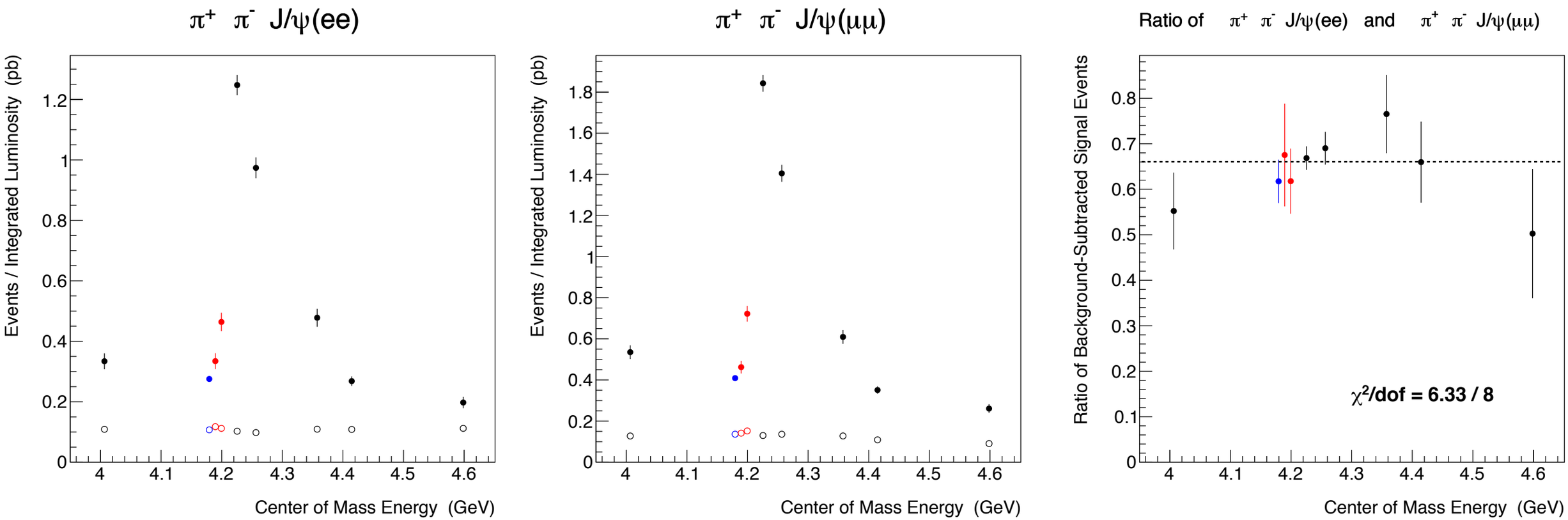


Ratios of Background-Subtracted Signal Events



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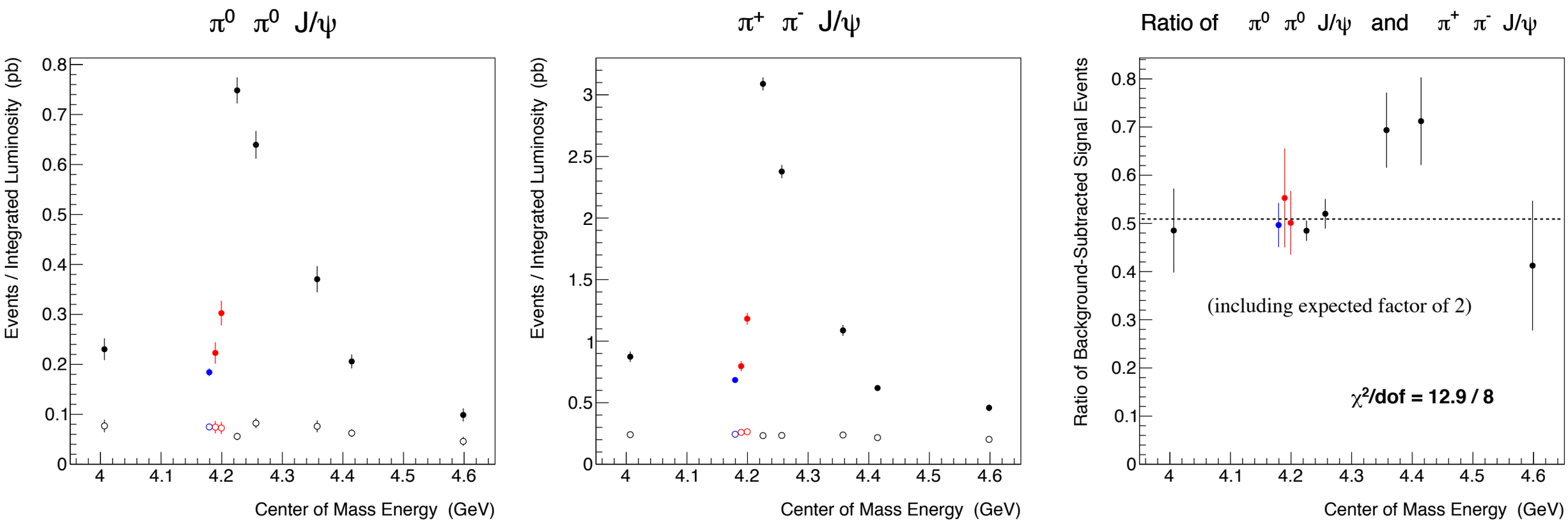

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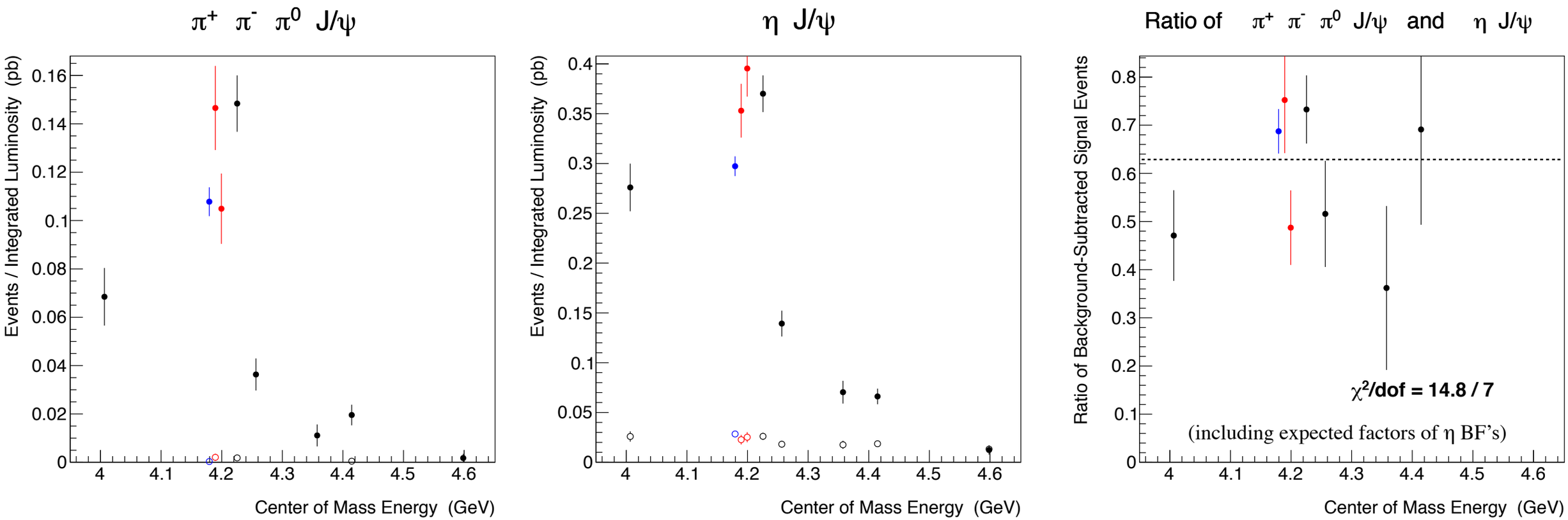
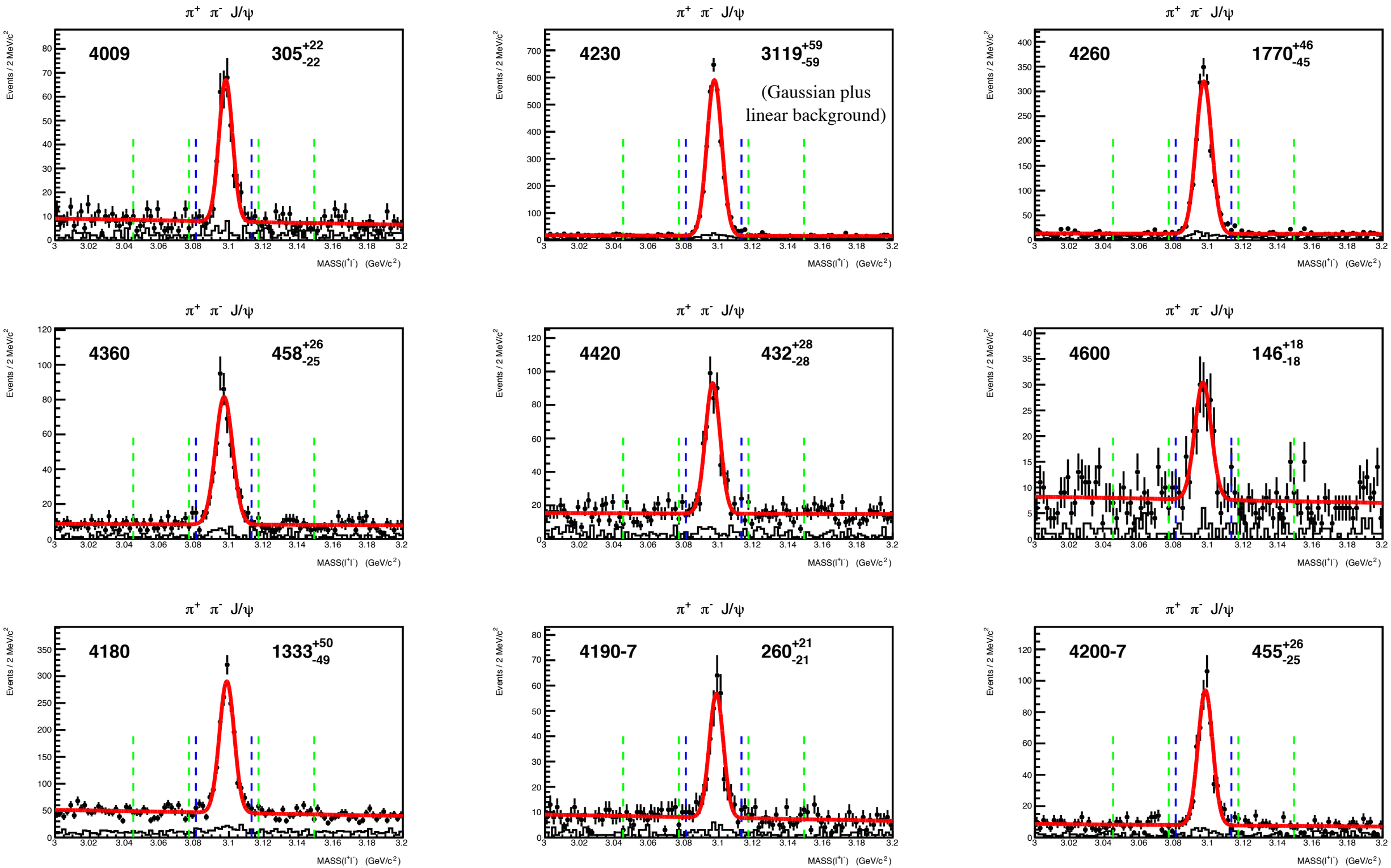


Fits to J/ψ Mass Distributions



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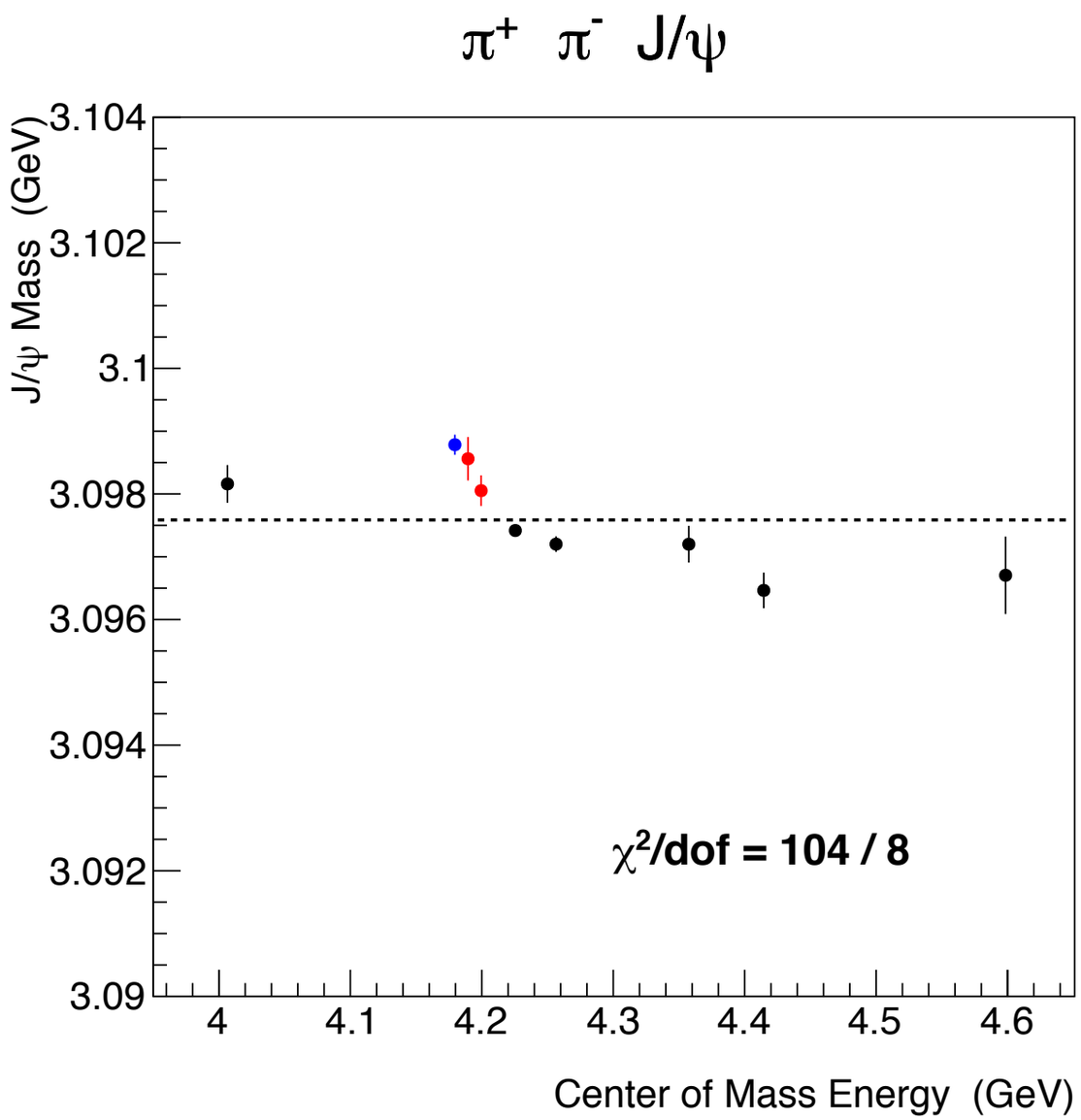

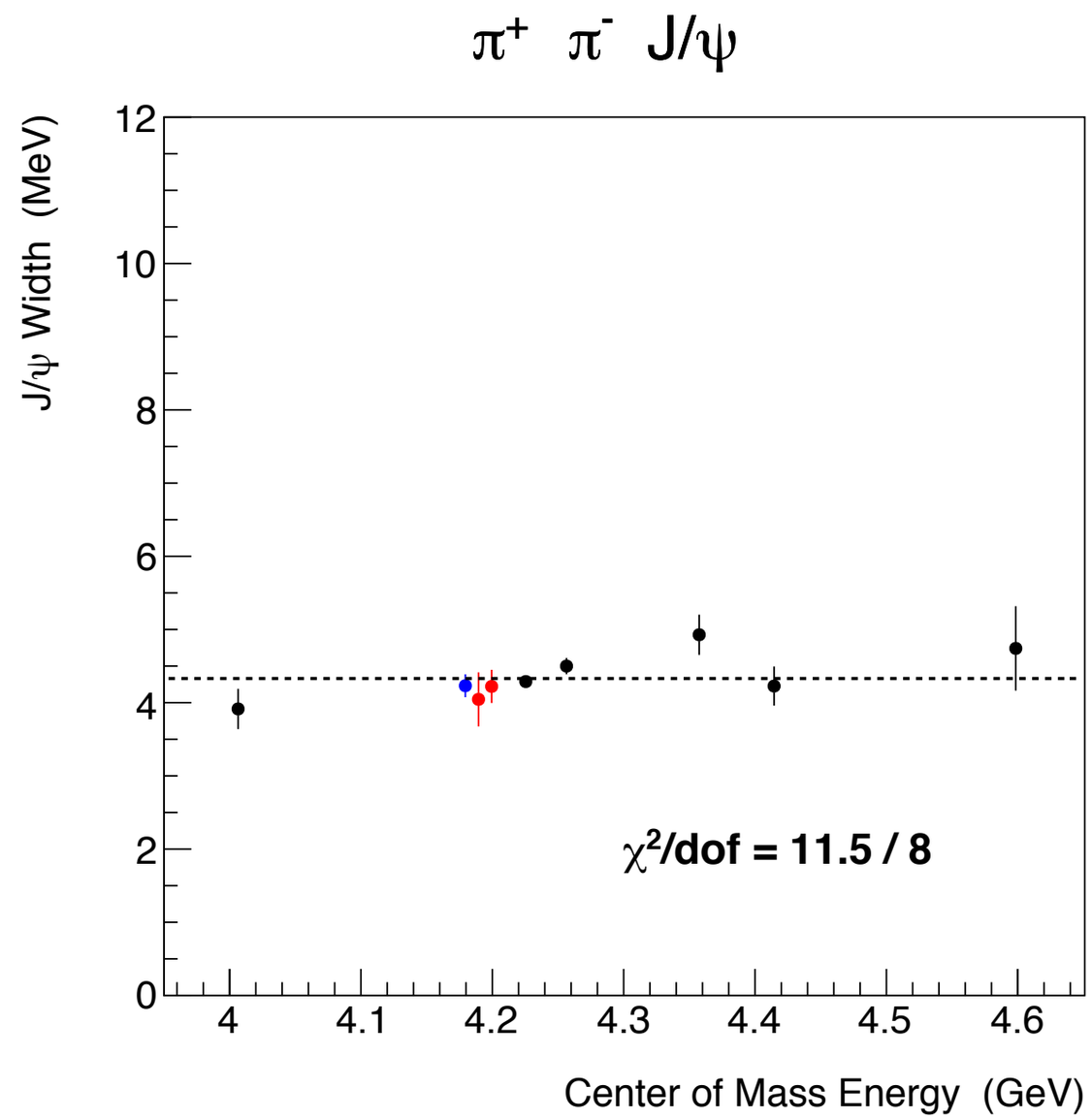

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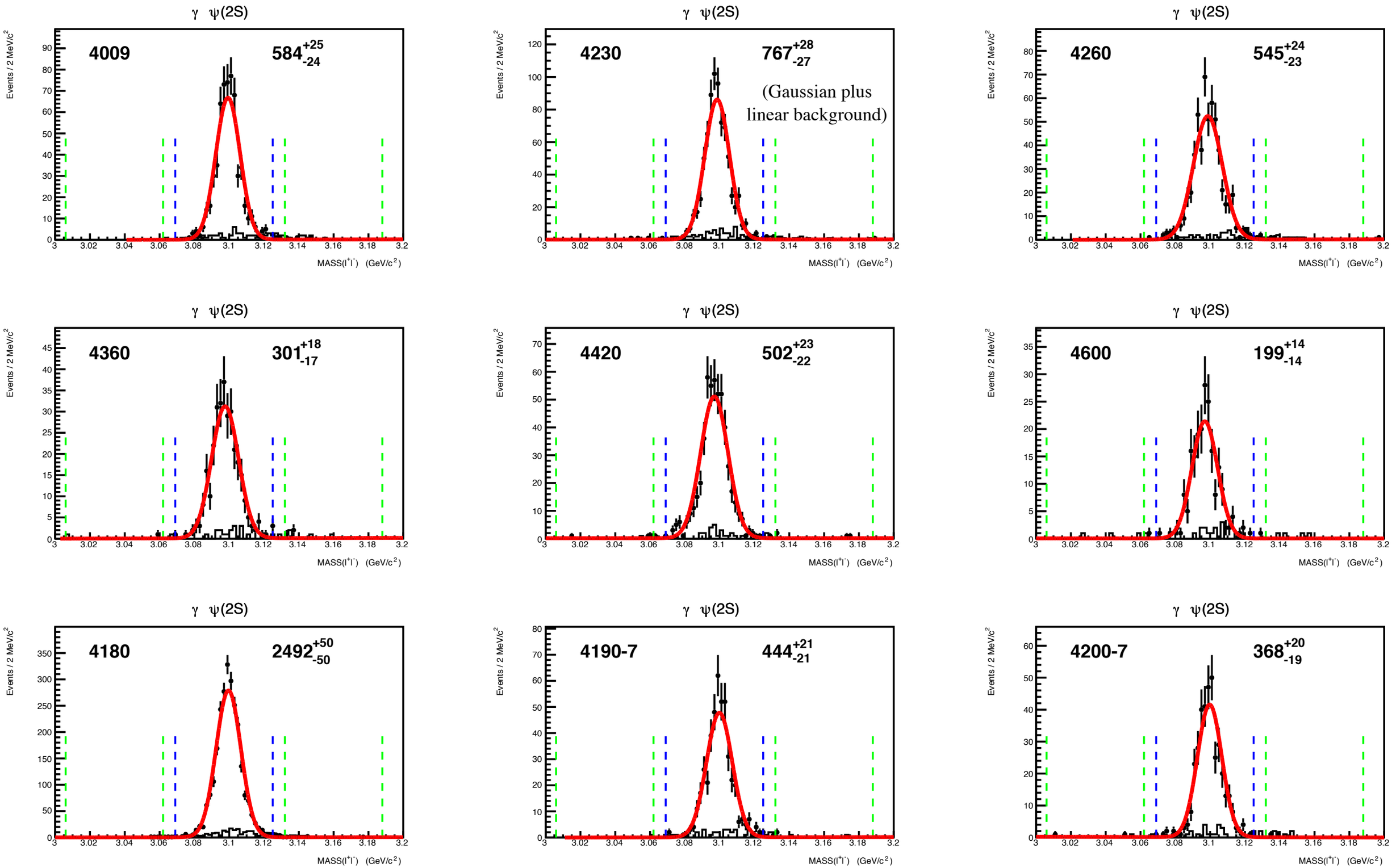

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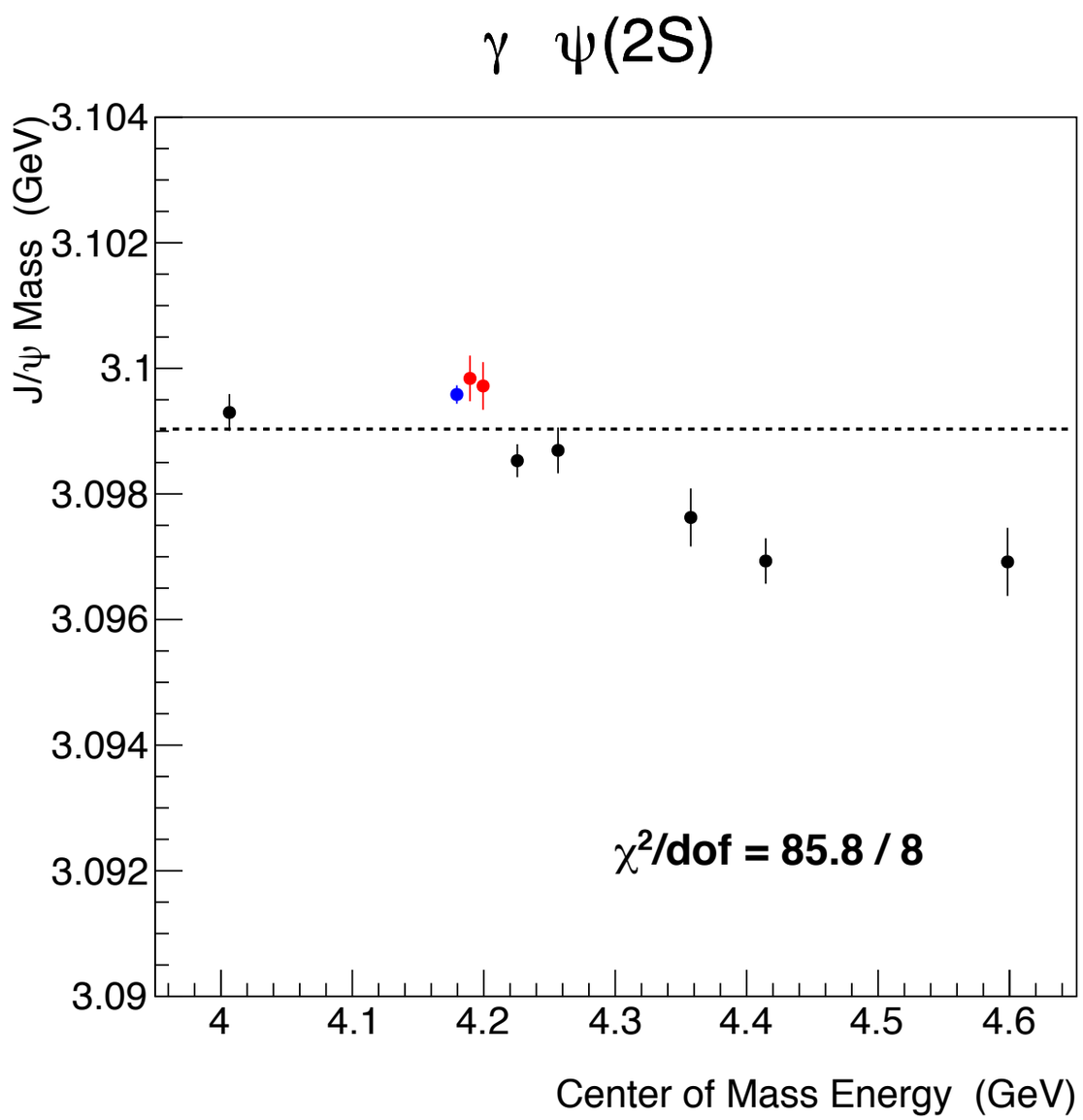

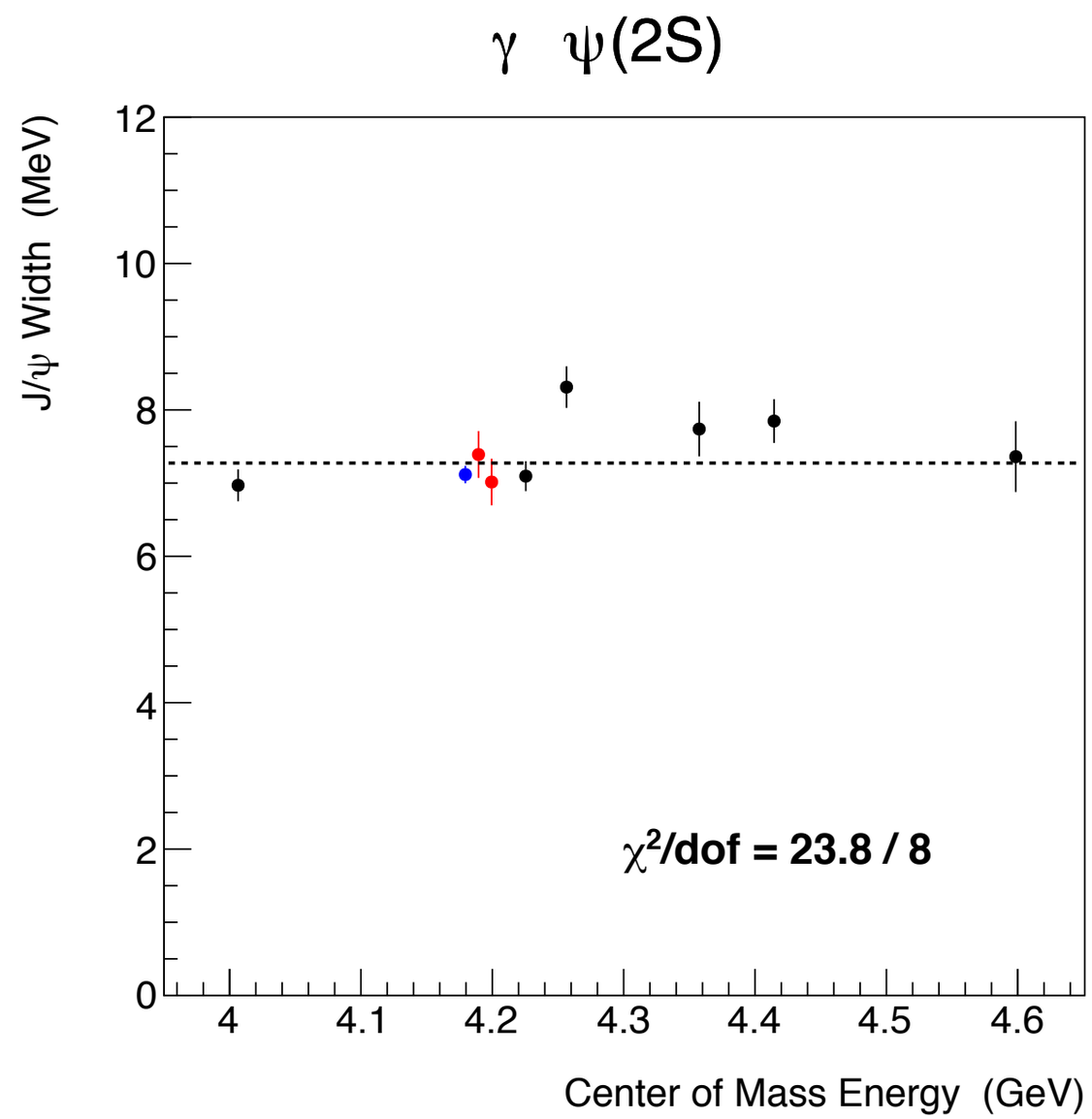

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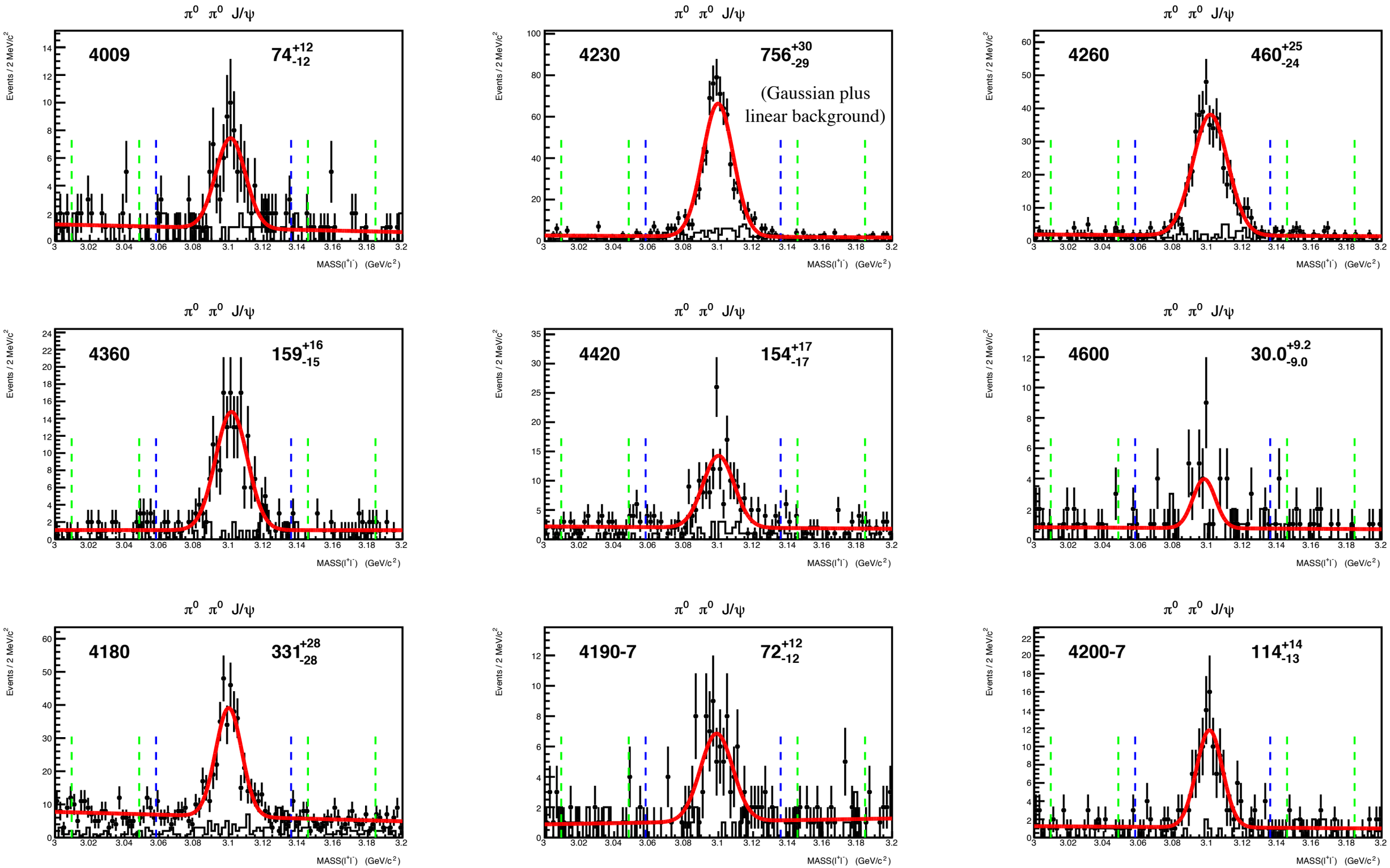

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