

update on gamma invisible

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2017.10.30

Systematic uncertainty

$$Br = \frac{N_{signal}}{N_{tagged J/\psi} \epsilon_{signal}}$$

The source of Systematic uncertainty is just from this formula.

source	estimation	uncertainty
signal shape of extracted $N_{J/\psi}$	change from DG to signal MC shape	0.5%
bkg shape of extracted $N_{J/\psi}$	change from 2nd Chebychev to 3rd Chebychev	less than 0.1%
fit range of extracted $N_{J/\psi}$	not done	-
only one good shower	use $\gamma e^+ e^-$ control sample	0.2%
extra showers' energy cut	use $\gamma e^+ e^-$ control sample	less than 0.1%
Shower shape cut	use $\rho\pi$ control sample	less than 0.4%
extracted N_{sig}	not done	-

Table 6: Systematic uncertainty

Shower shape cut with energy dependence

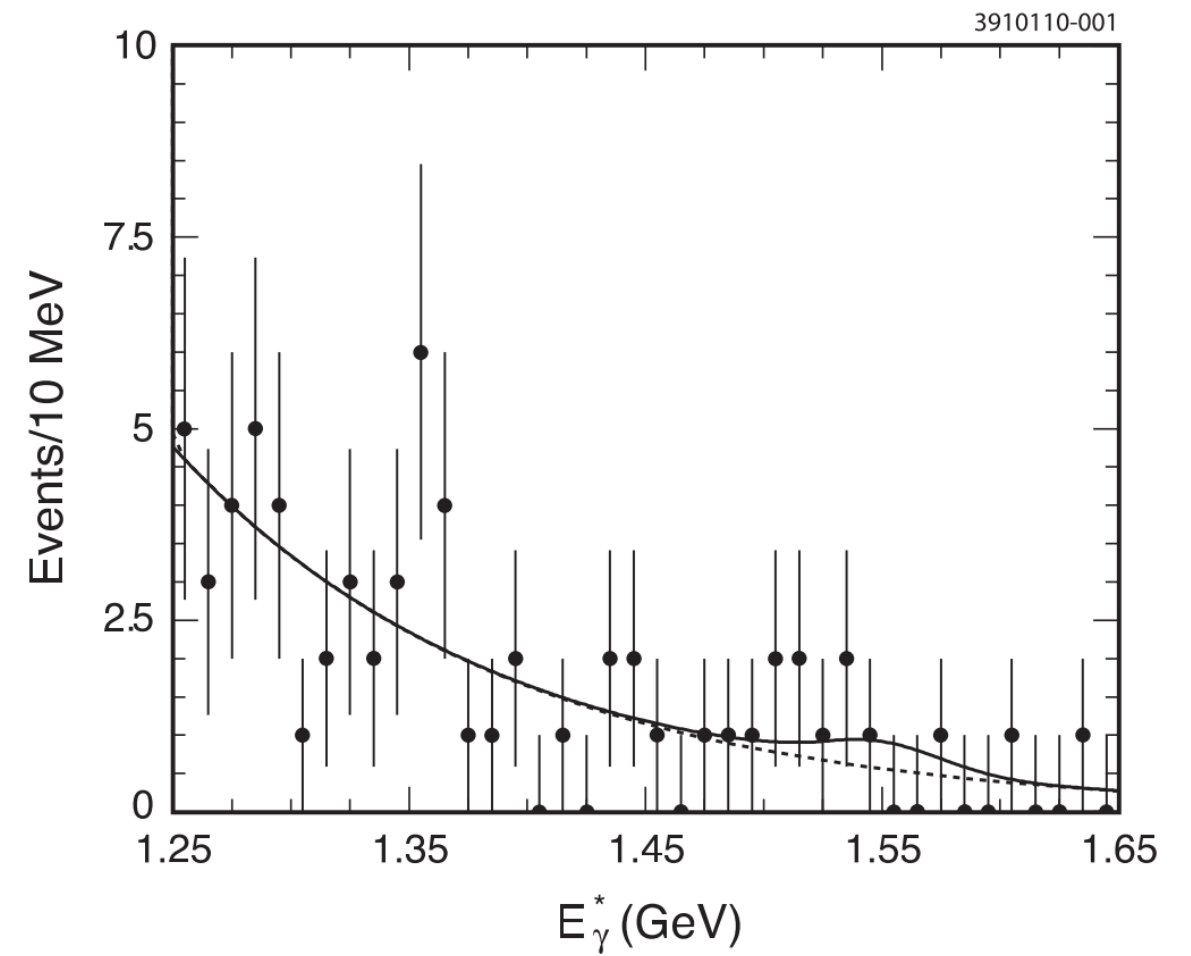
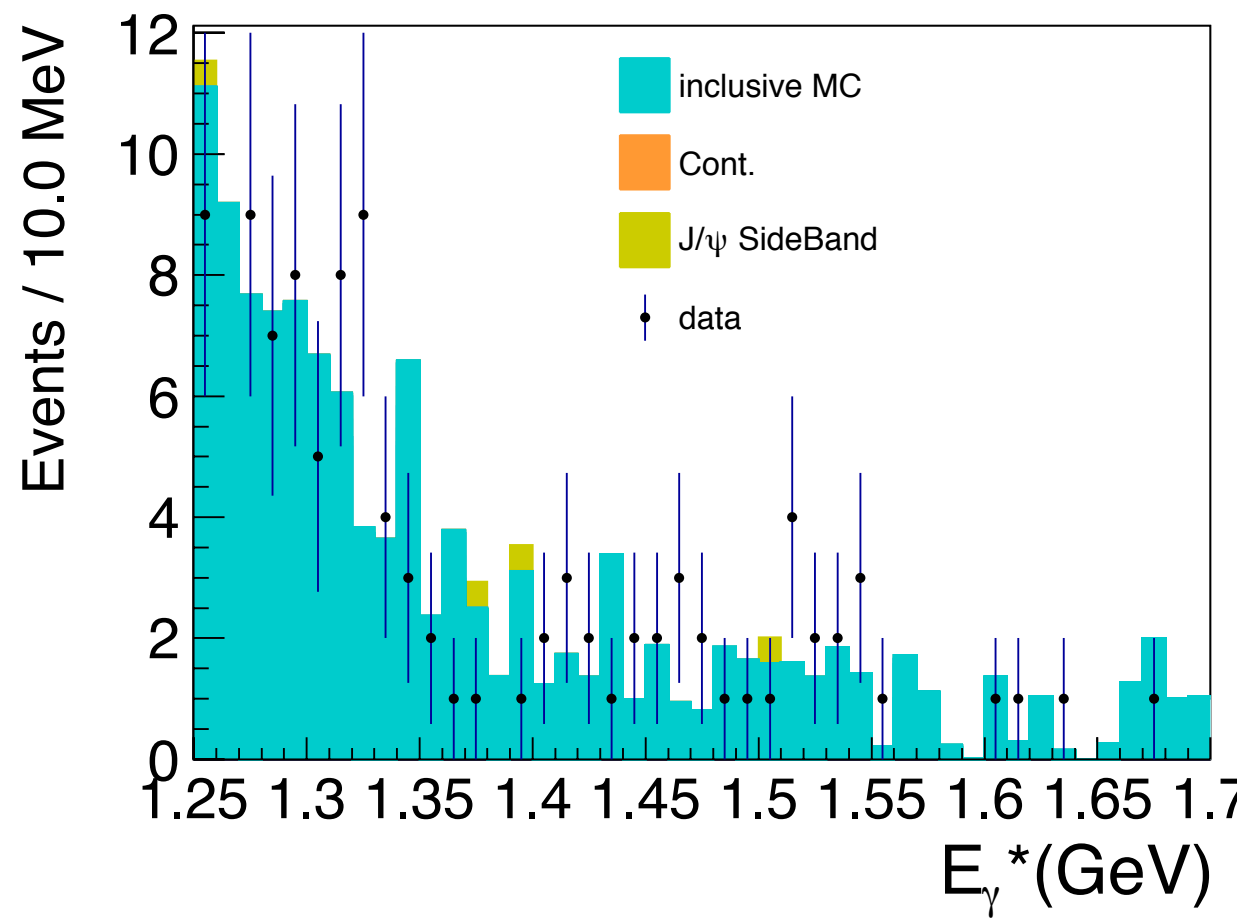
$E(\text{GeV}/c^2)$	ϵ_{Data}	ϵ_{MC}	$ \epsilon_{Data} - \epsilon_{MC} /\epsilon_{MC}$
[0.3,0.4]	0.800	0.793	8.9%
[0.4,0.5]	0.836	0.836	0.2%
[0.5,0.6]	0.862	0.868	0.6%
[0.6,0.7]	0.884	0.892	0.8%
[0.7,0.8]	0.909	0.914	0.6%
[0.8,0.9]	0.918	0.923	0.6%
[0.9,1.0]	0.926	0.930	0.5%
[1.0,1.1]	0.930	0.934	0.3%
[1.1,1.2]	0.932	0.933	0.1%
[1.2,1.3]	0.929	0.931	0.3%
[1.3,1.4]	0.924	0.927	0.4%
[1.4,1.5]	0.922	0.922	0.1%

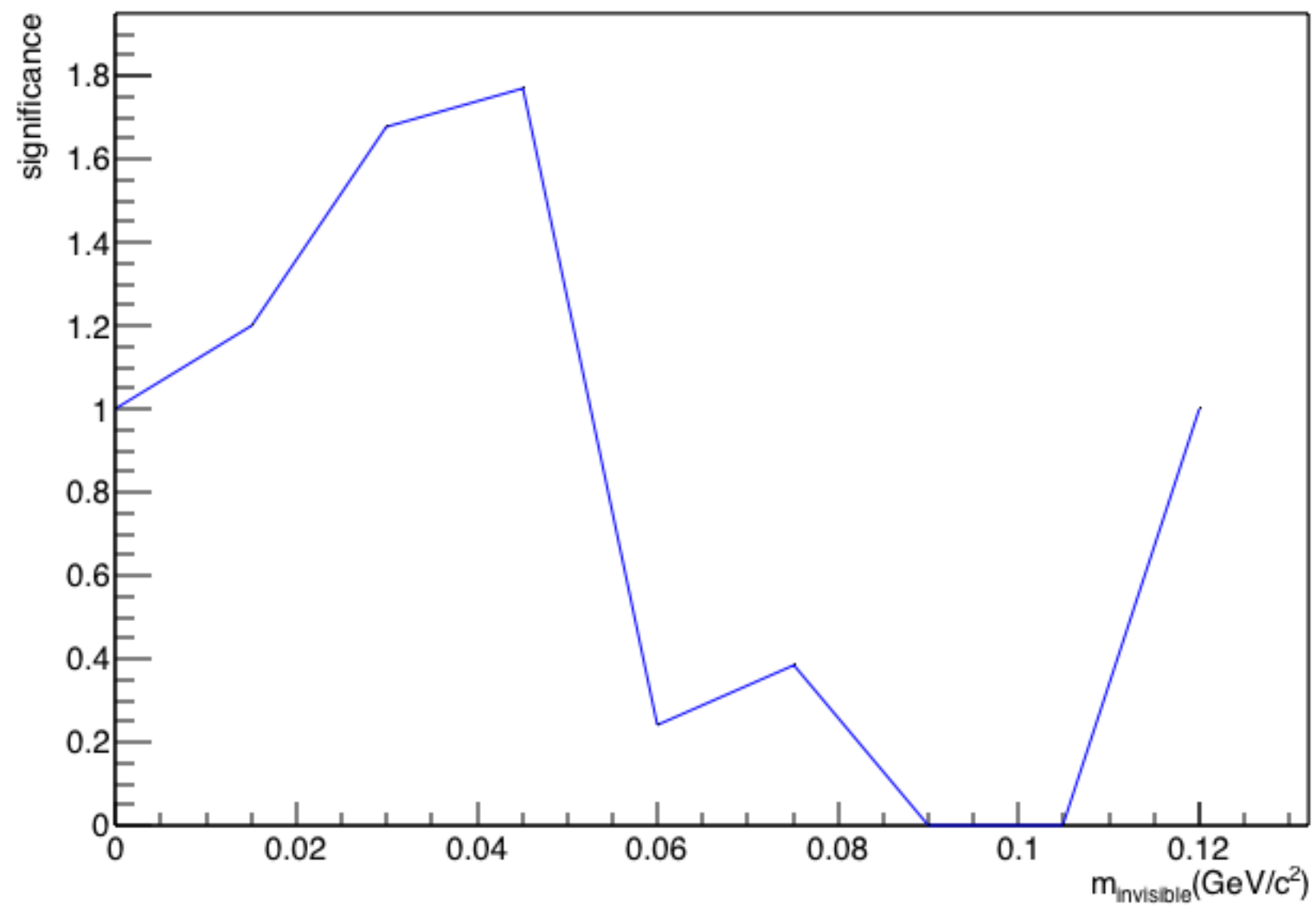
Table 5: Systematic uncertainty of Shower-Cut

Next to do

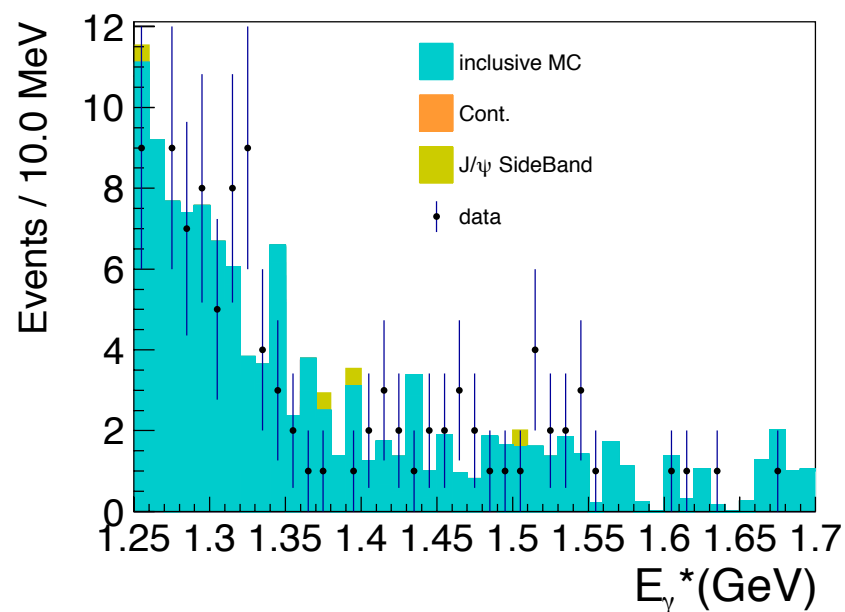
- Get other systematic error.
- Use frequency method to get upper limit

Back-Up

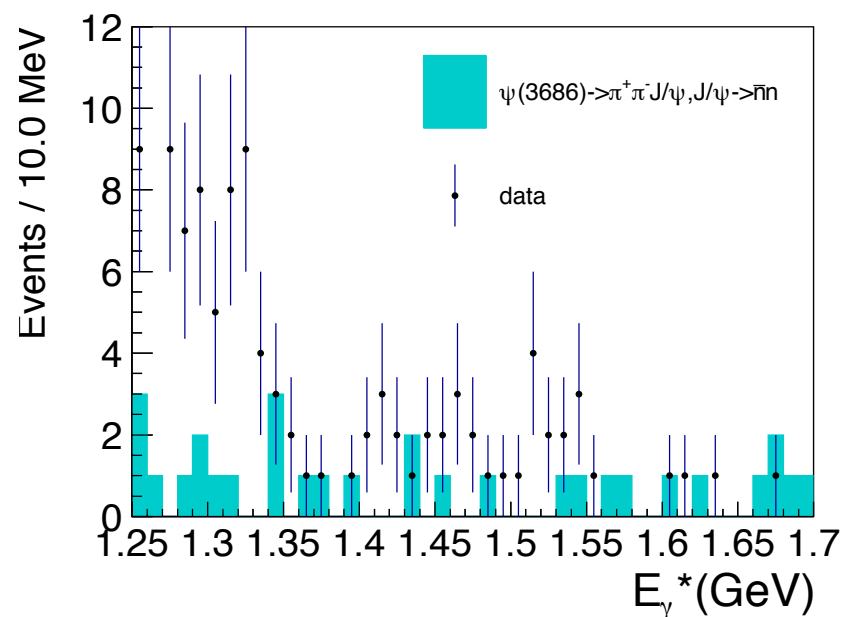




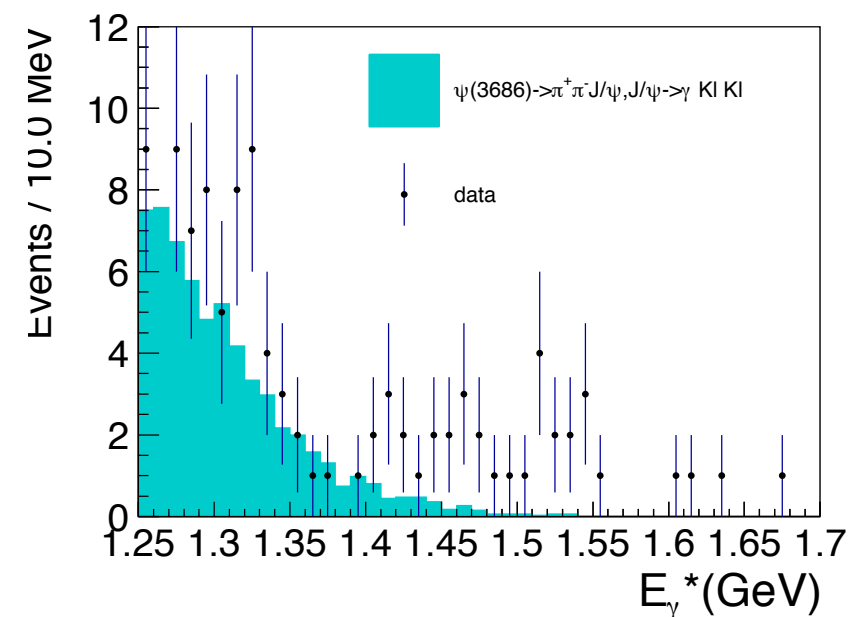
Systematic uncertainty



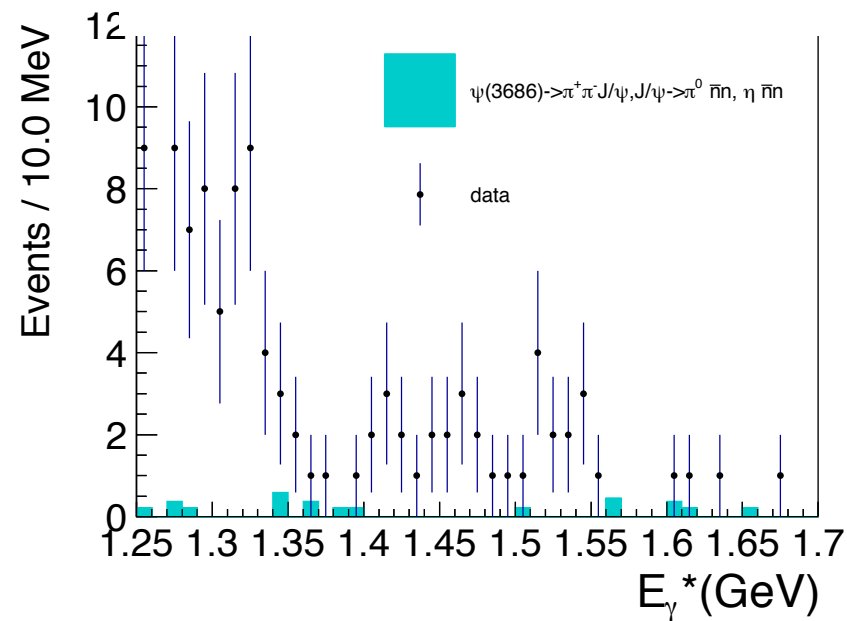
(a) $J/\psi \rightarrow \text{anything}$



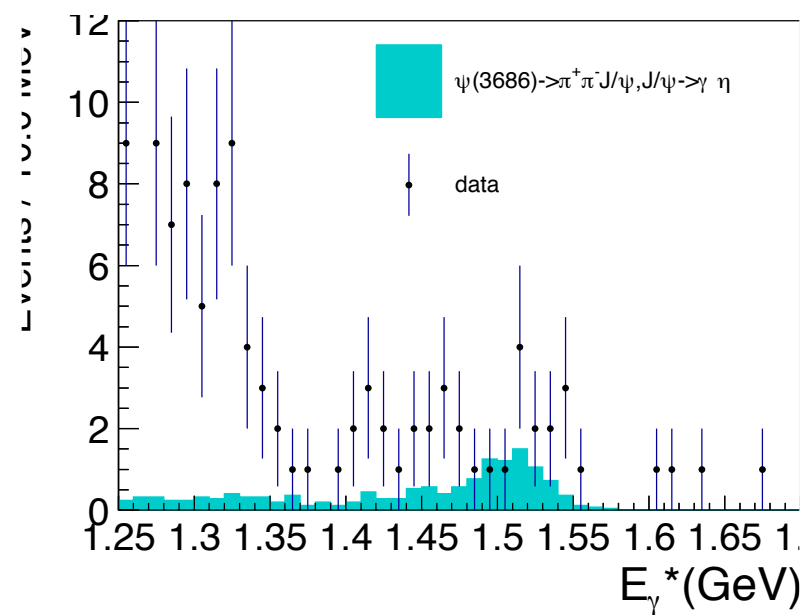
(b) $J/\psi \rightarrow \gamma \eta \bar{\eta}$



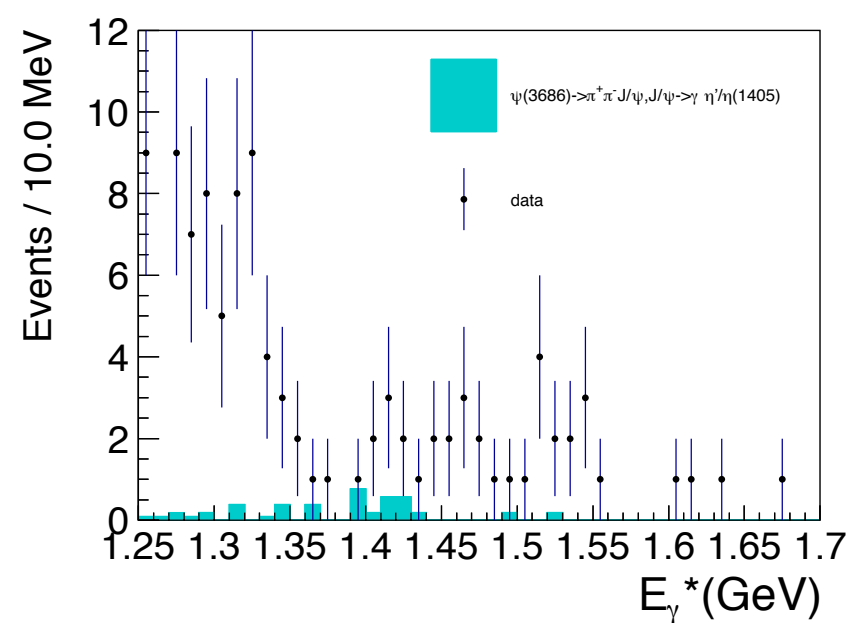
(c) $J/\psi \rightarrow \gamma K l K l$



(d) $J/\psi \rightarrow \pi^0 \eta \bar{\eta}, \eta \bar{\eta}$

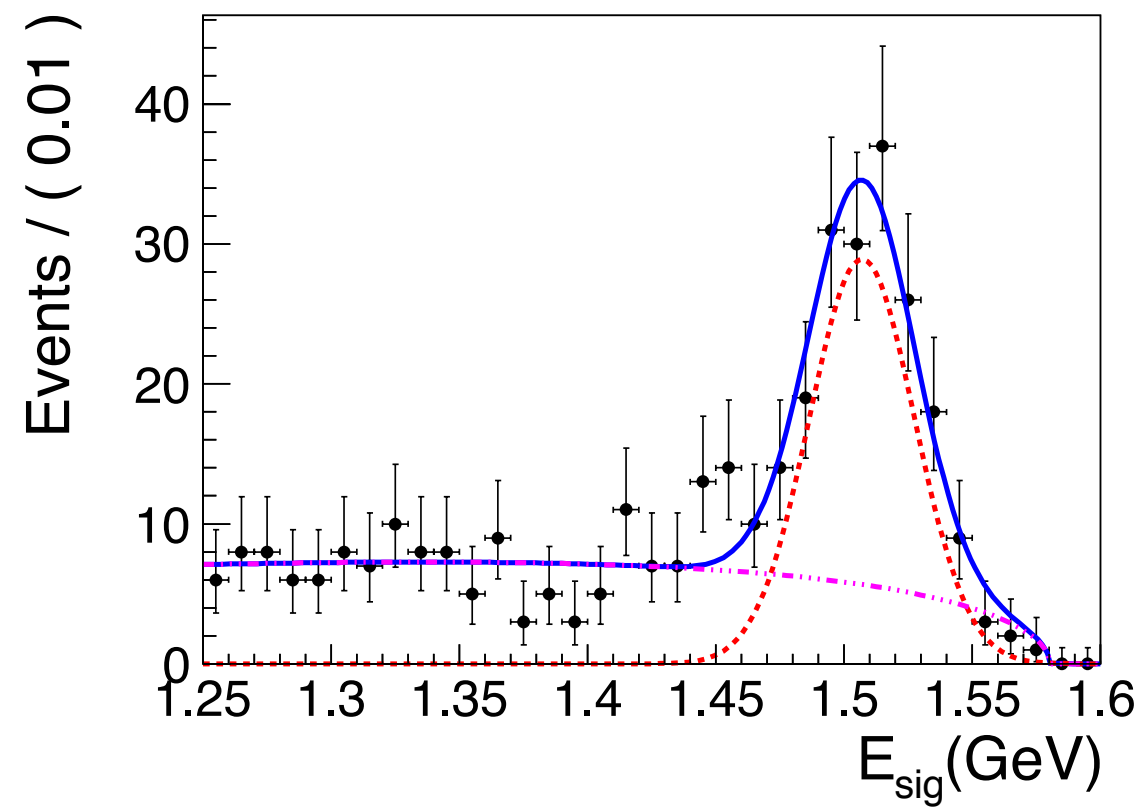


(e) $J/\psi \rightarrow \gamma \eta$

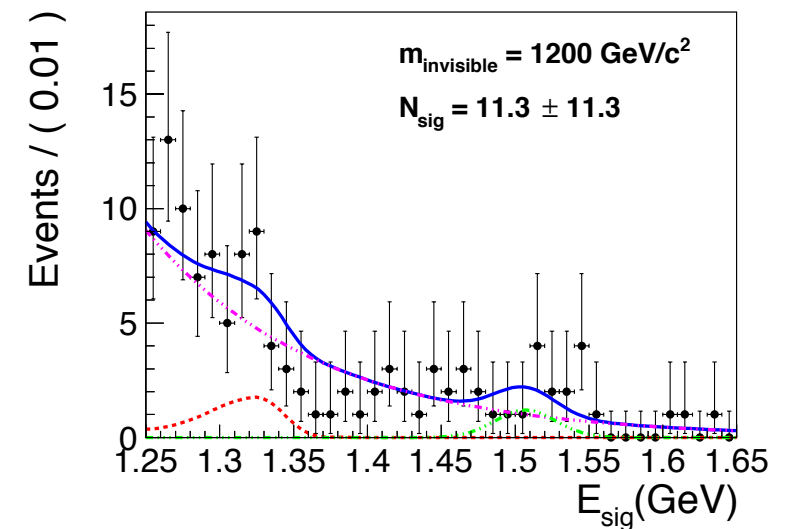
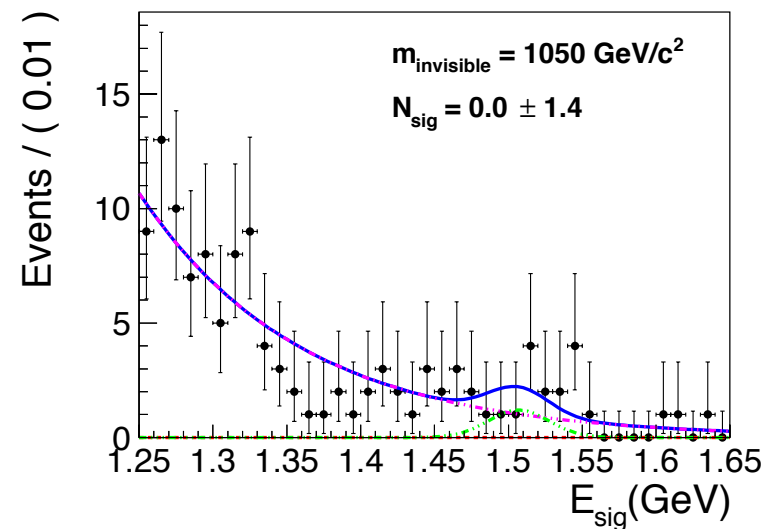
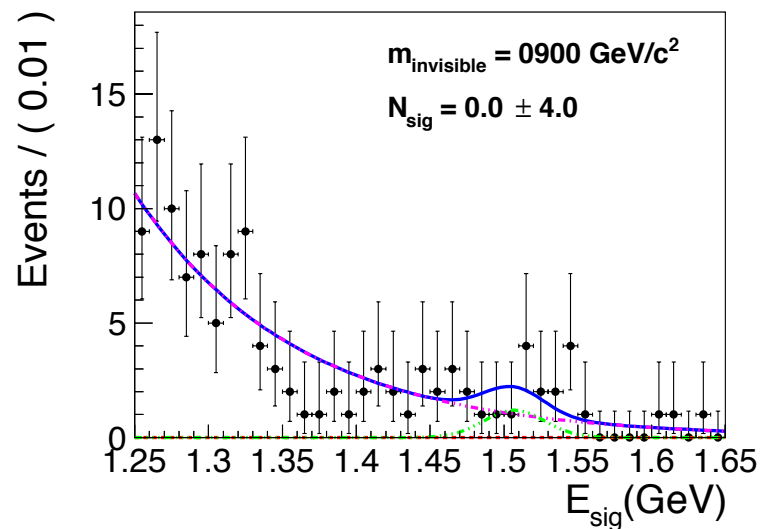
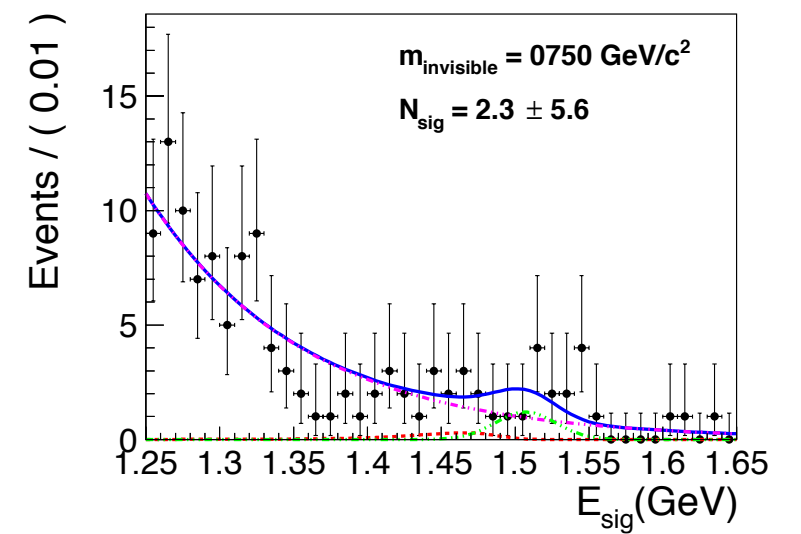
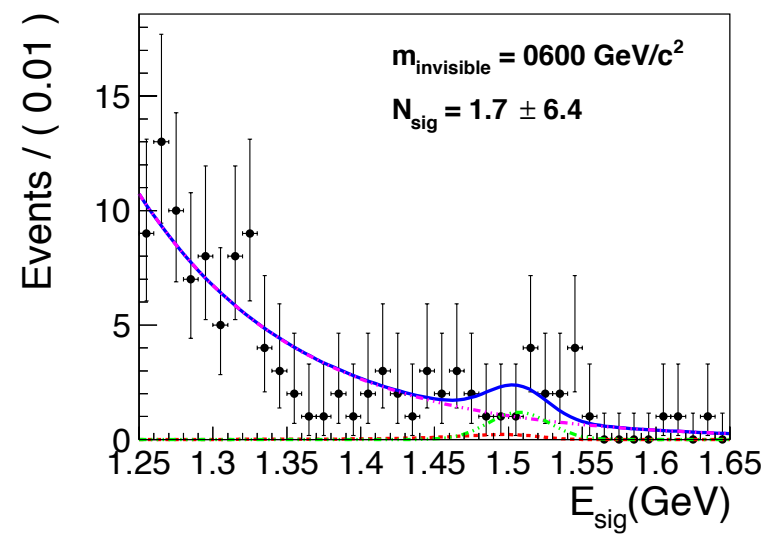
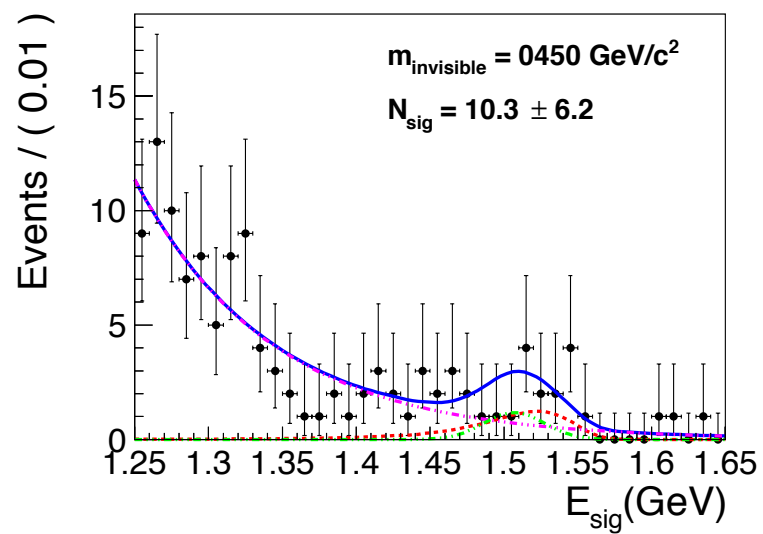
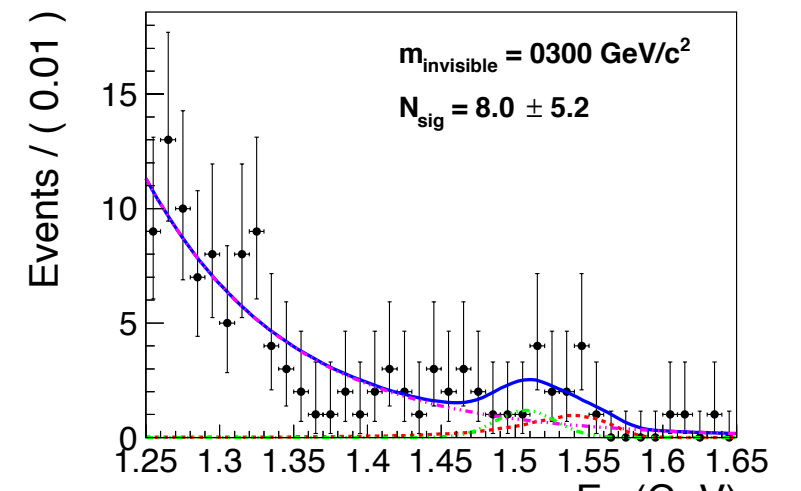
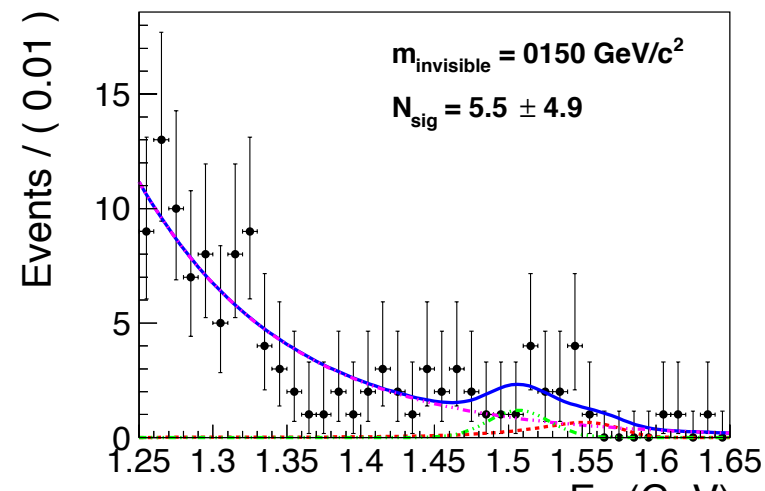
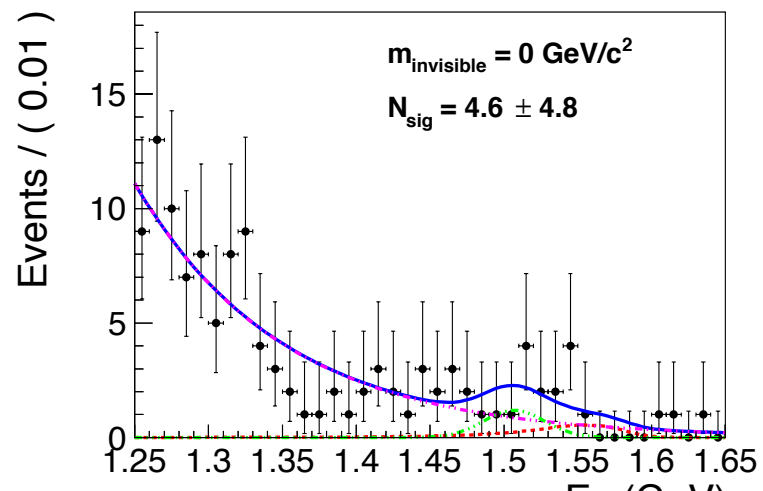


(f) $J/\psi \rightarrow \gamma \eta' / \eta(1405)$

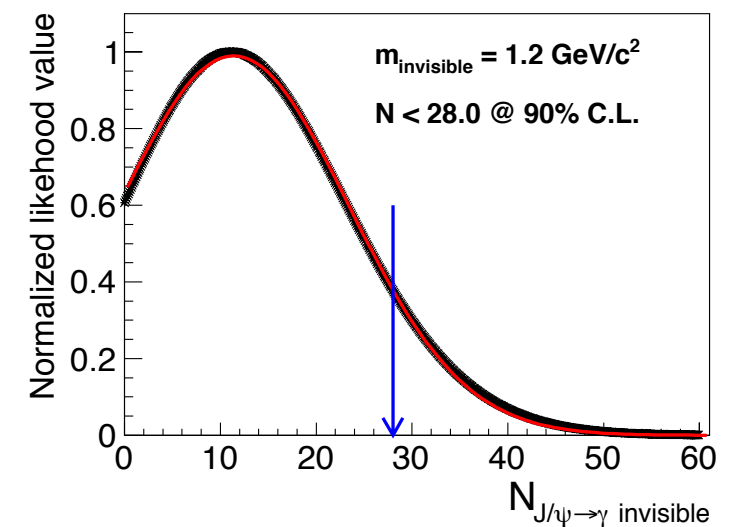
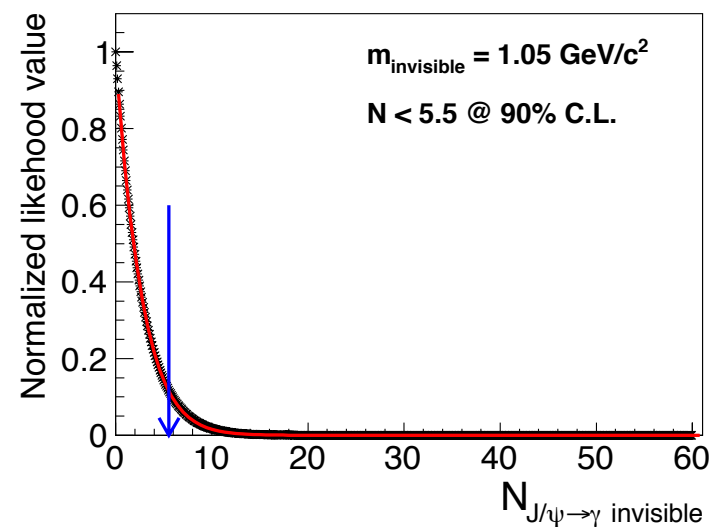
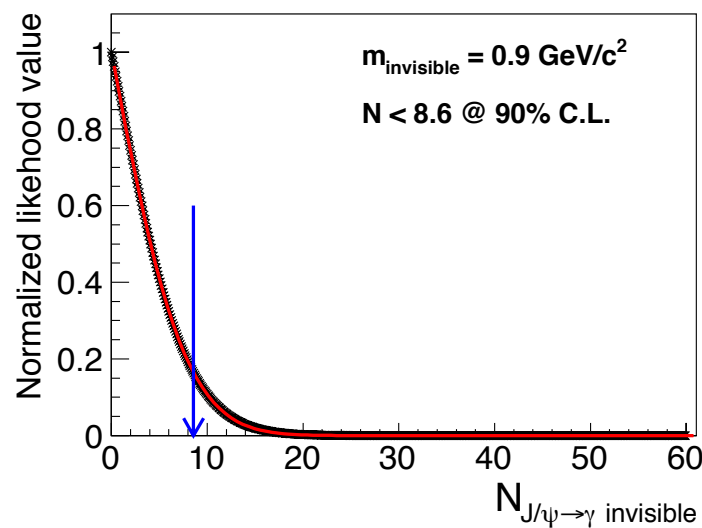
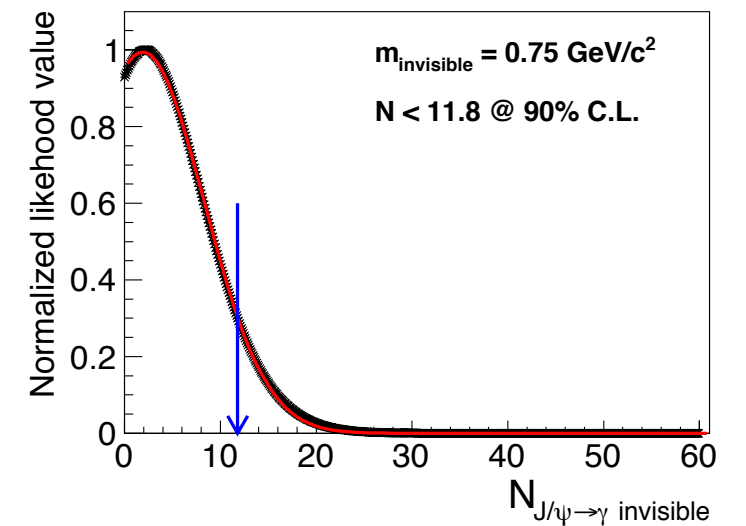
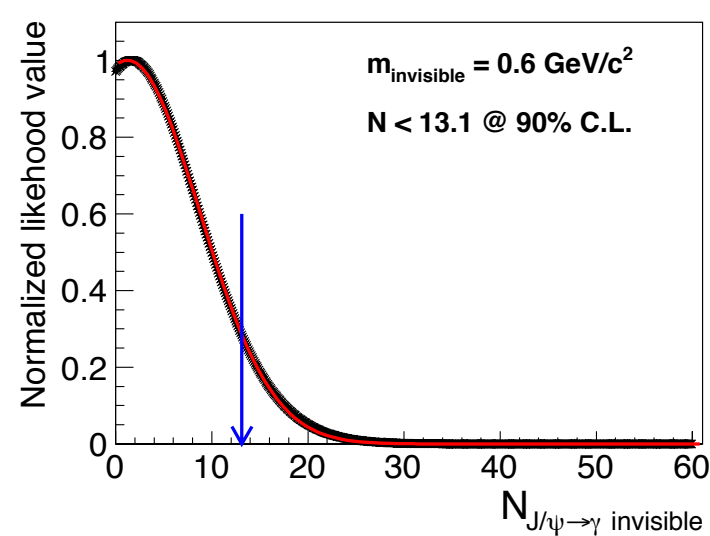
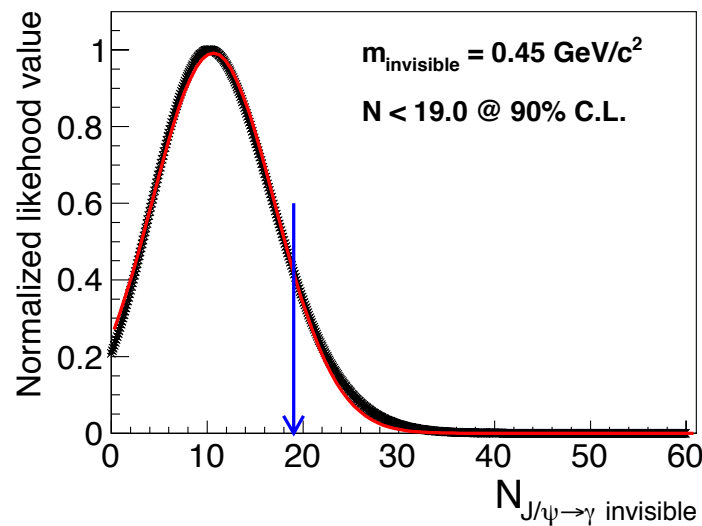
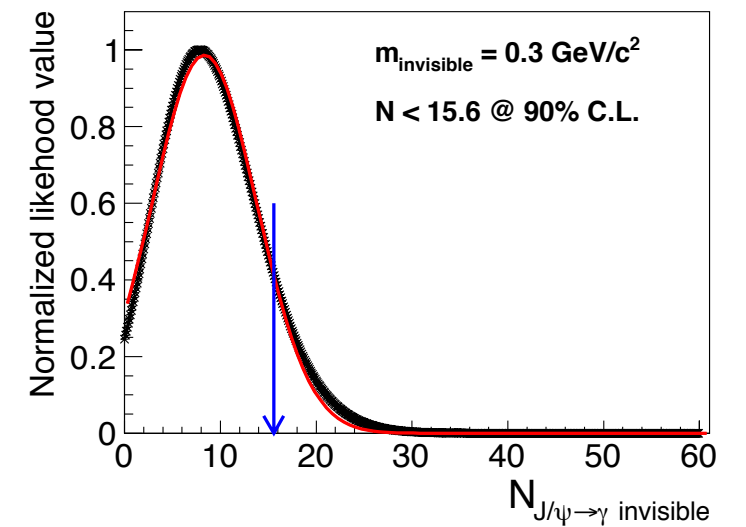
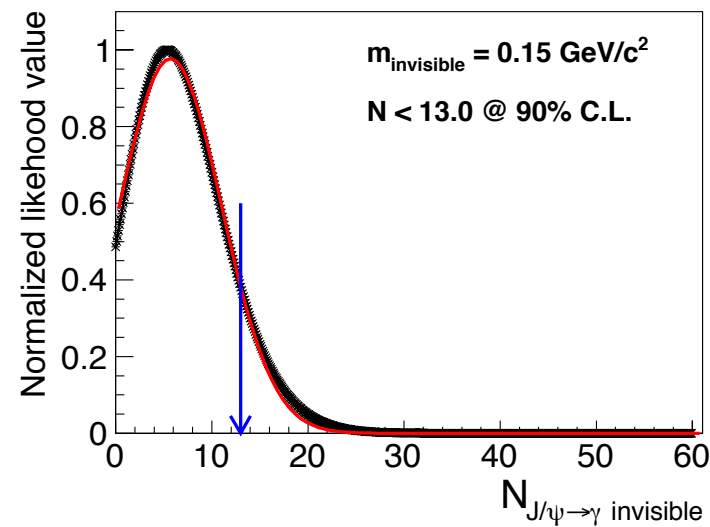
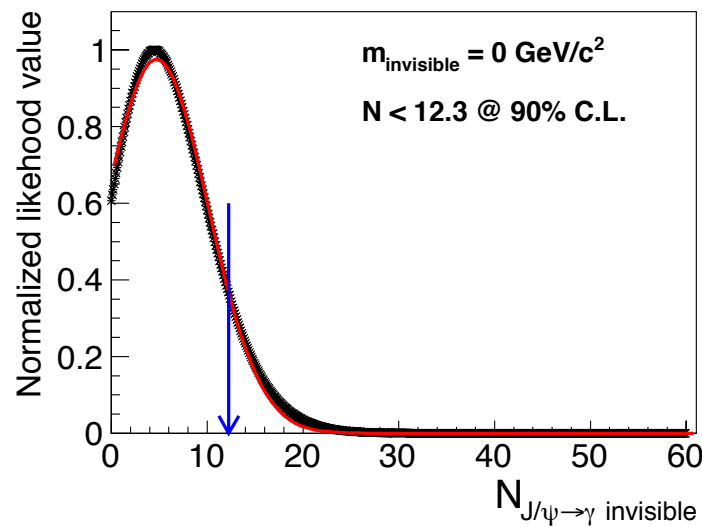
extract peak bkg parameter



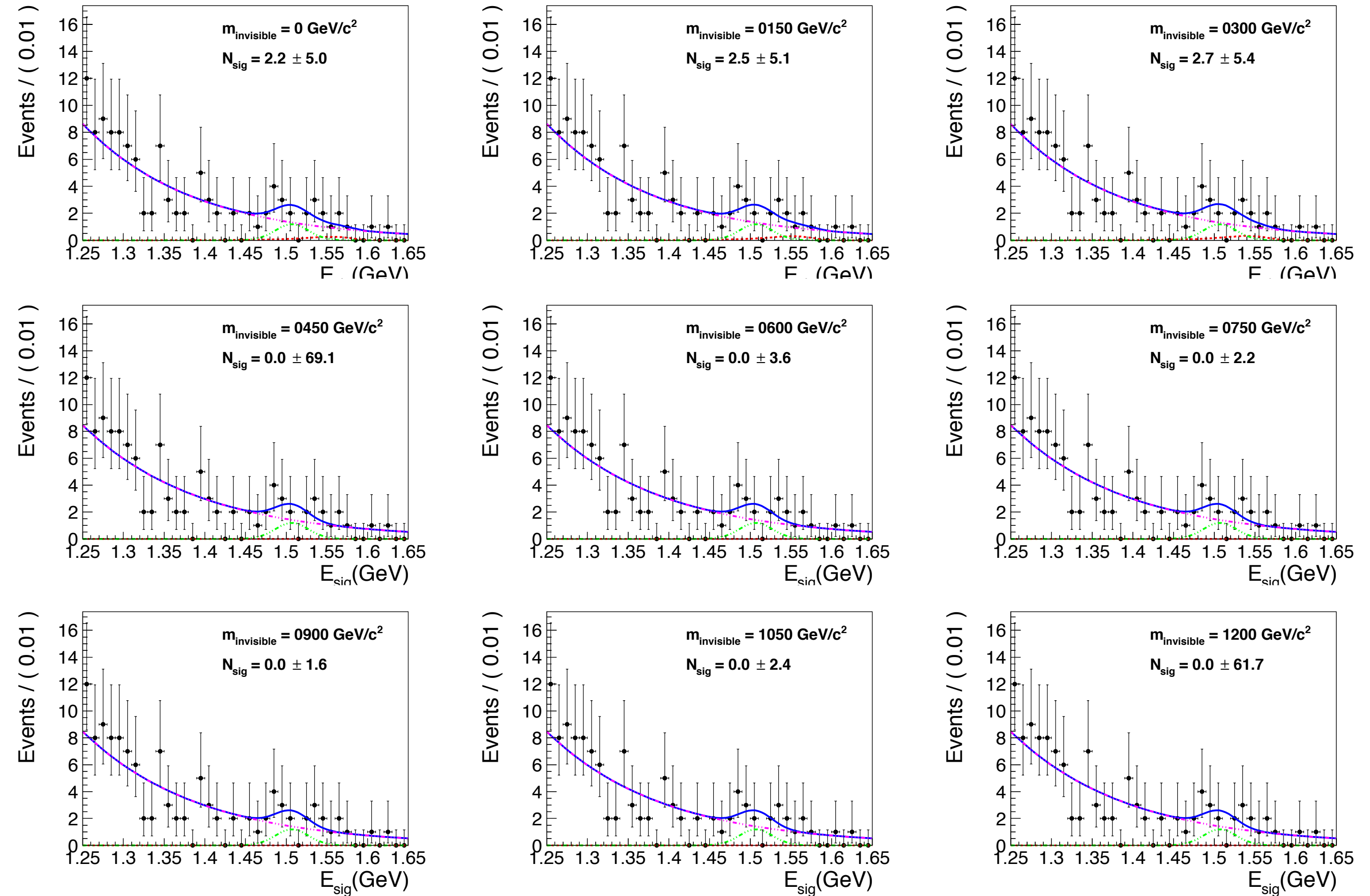
fit result @09data-set



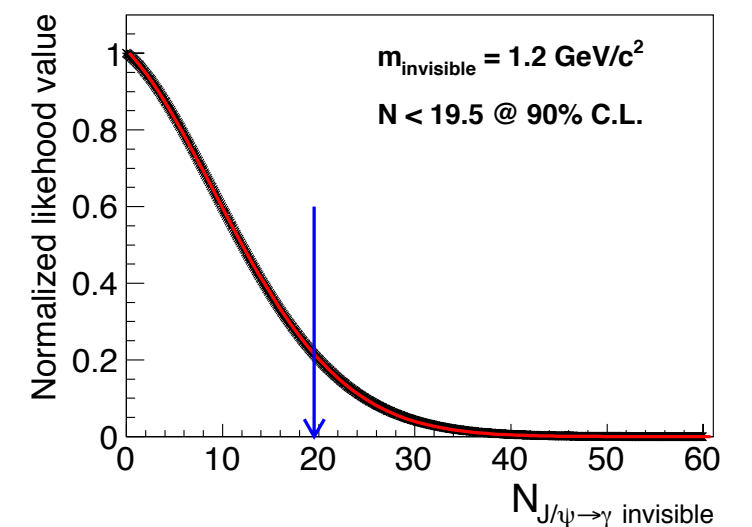
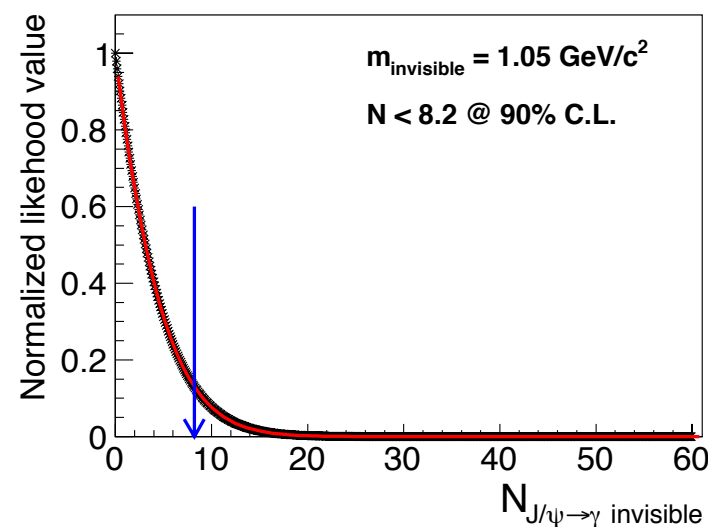
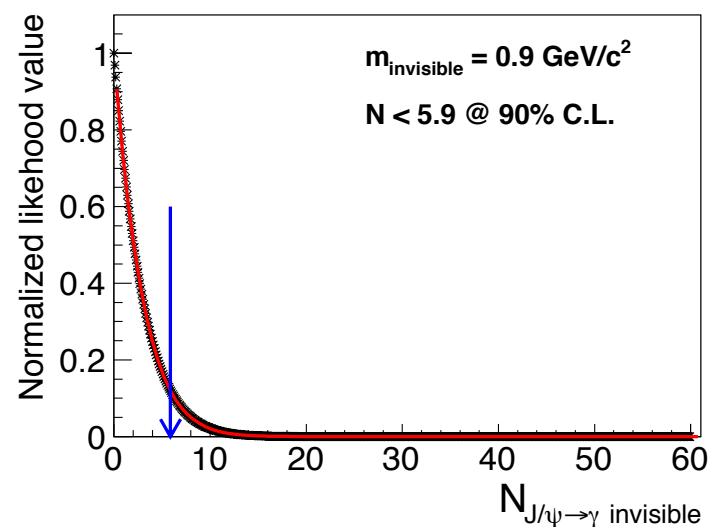
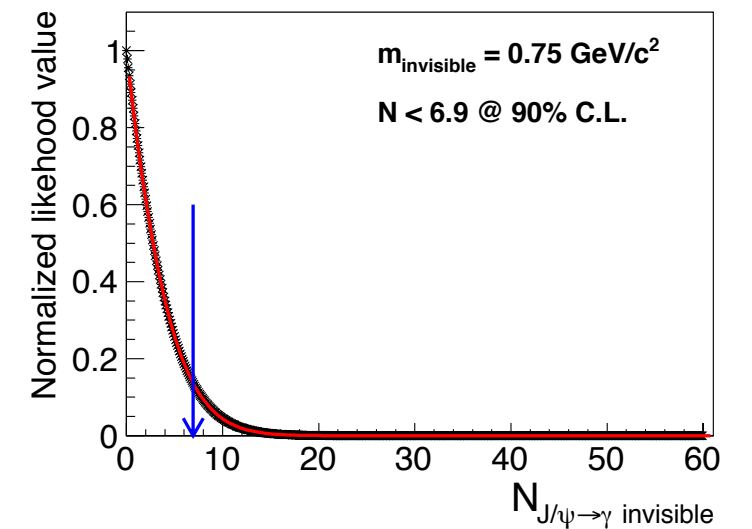
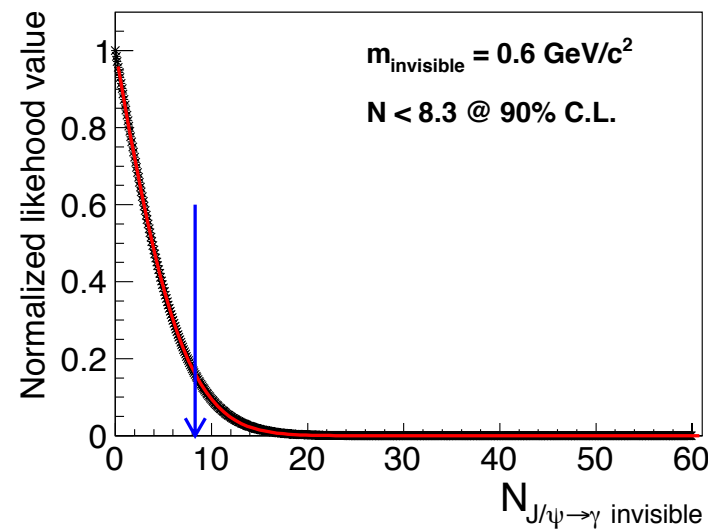
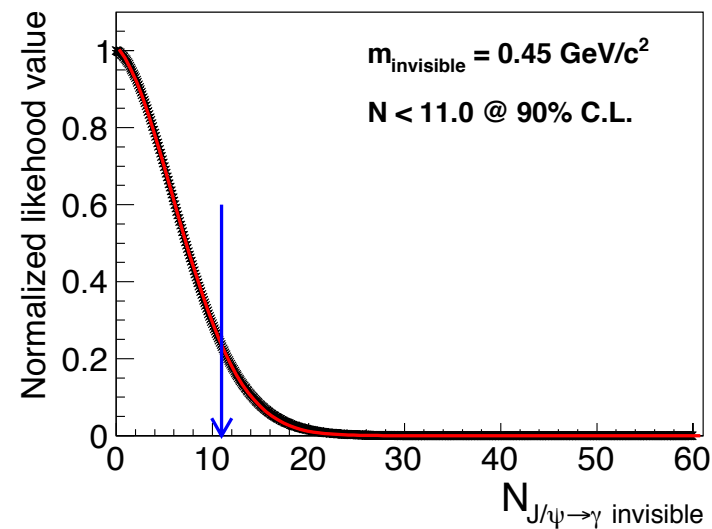
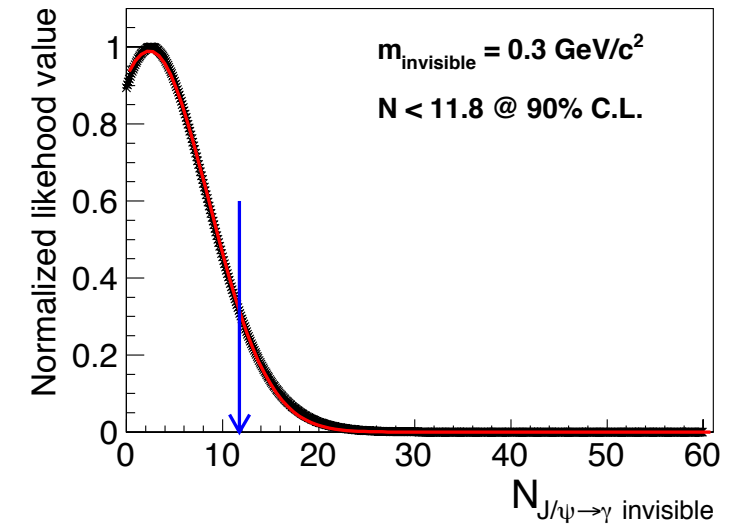
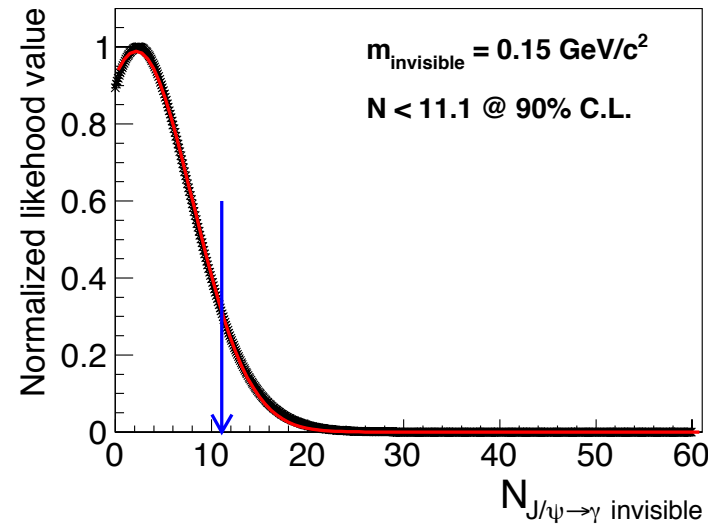
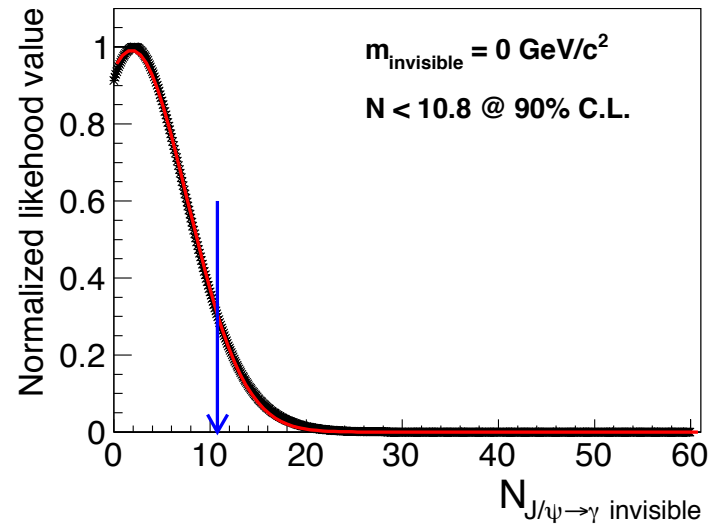
likelihood curve@09data-set



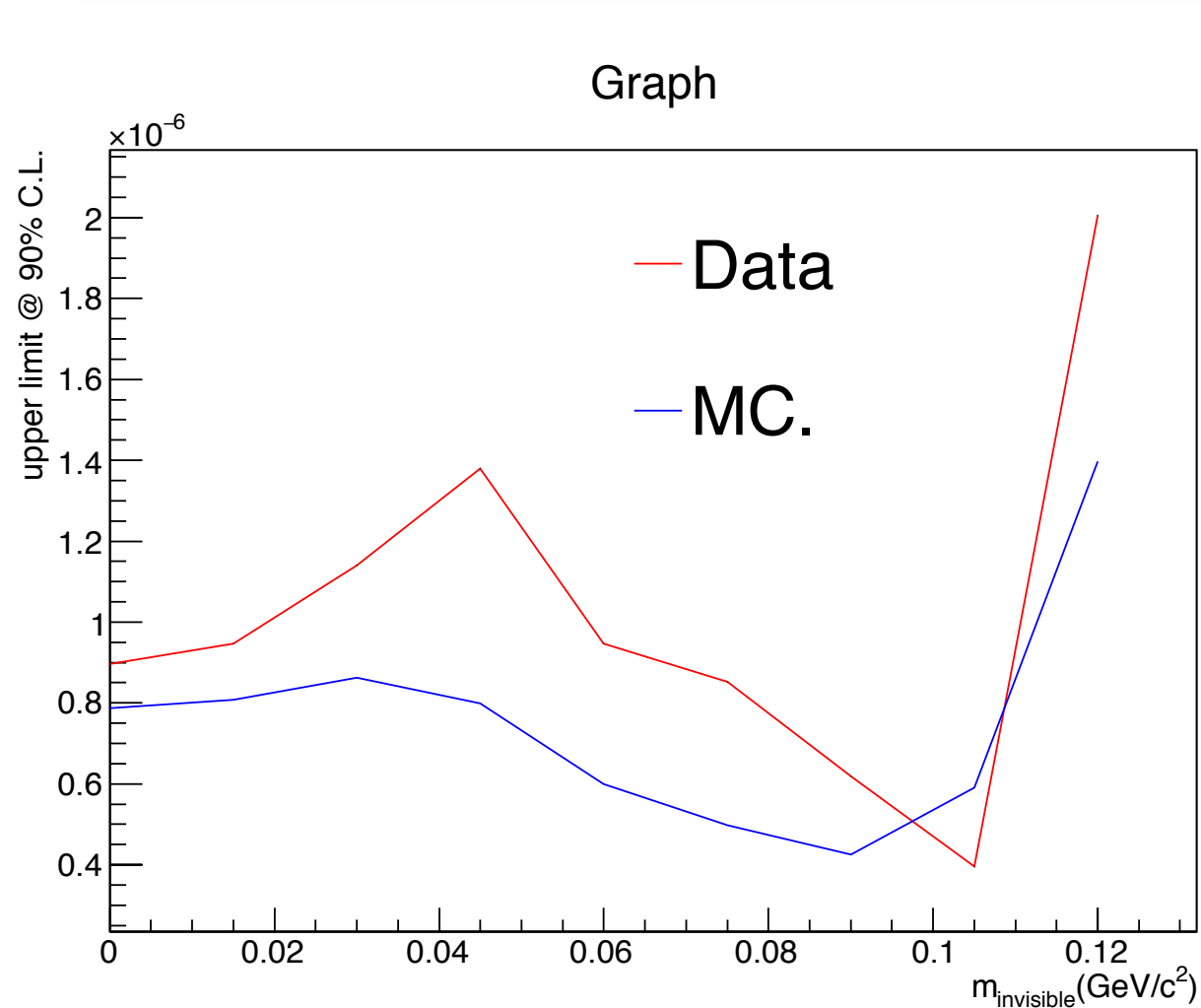
fit result @09 MC-set



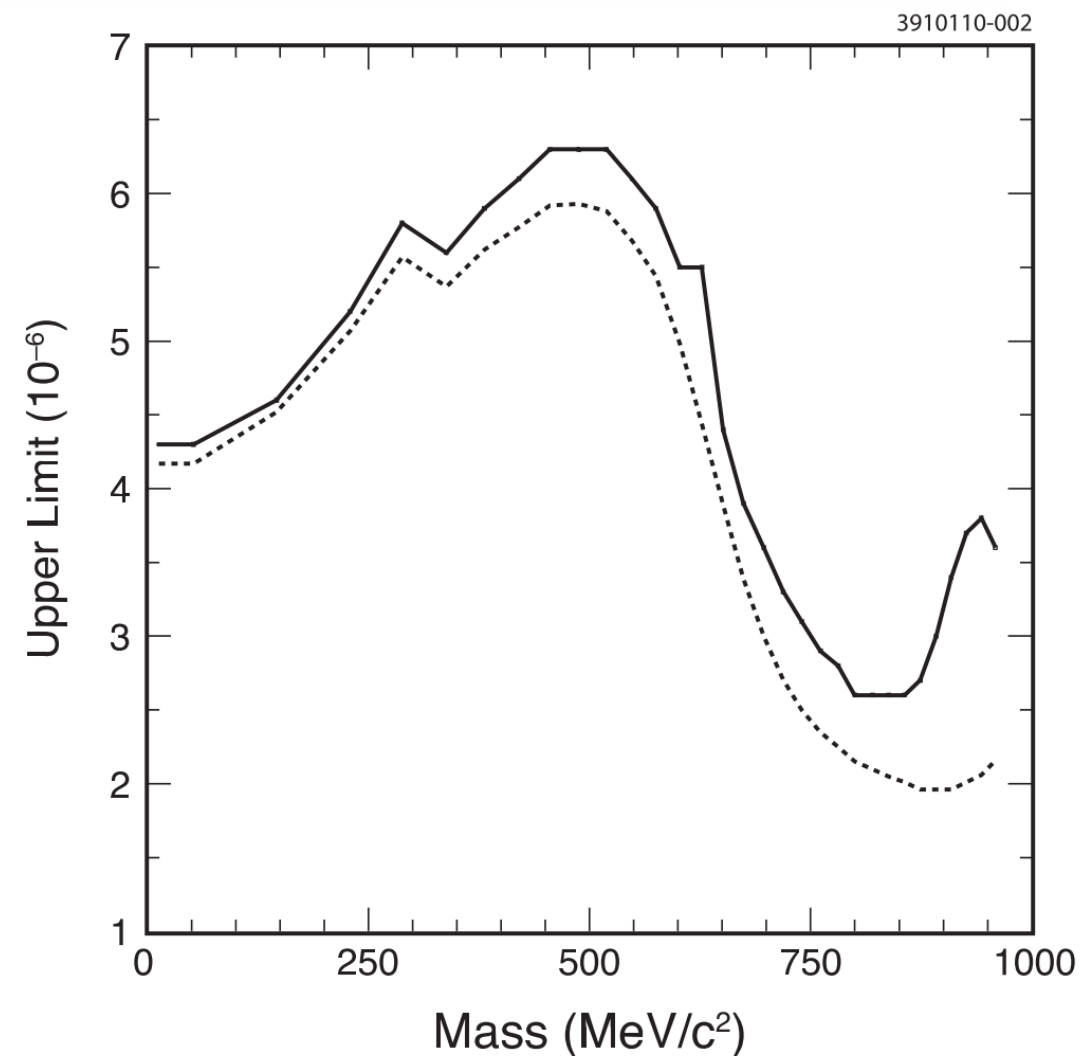
likelihood curve@09MC-set



Upper limit @ 90% C.L.



106M psip(3686)



28M psip(3686)