Update on Luminosity

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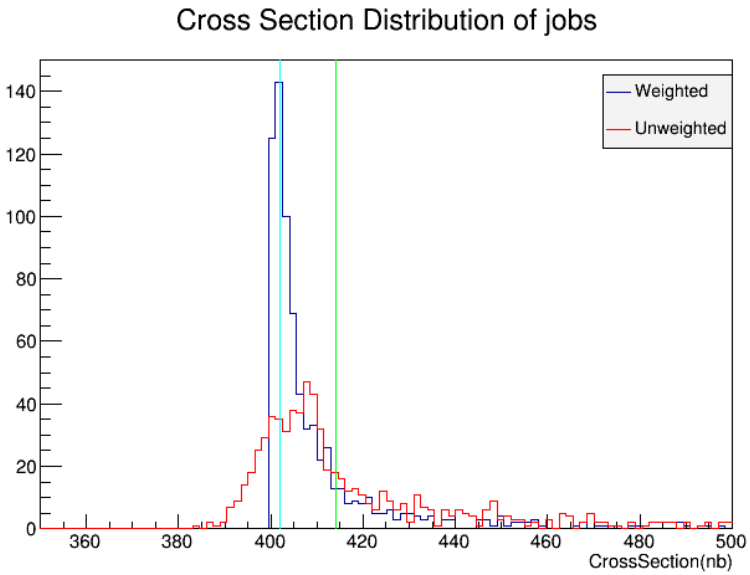
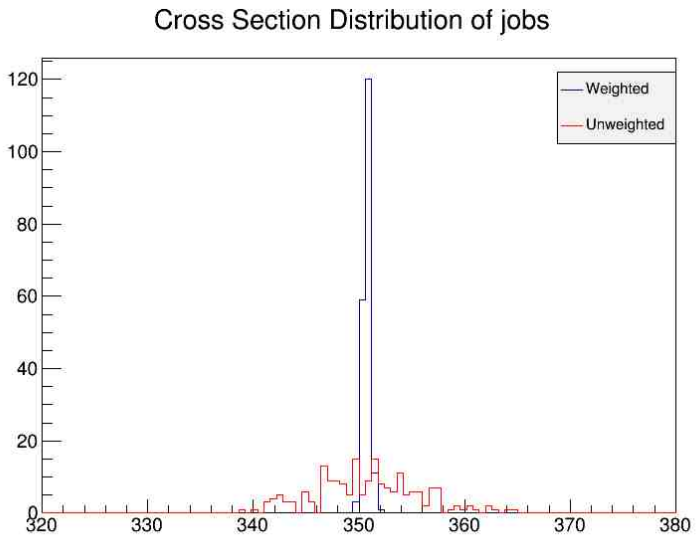
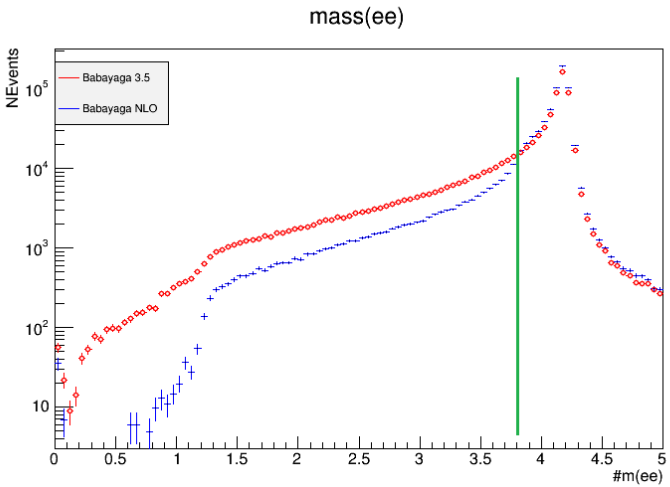
Switching to Babayaga-NLO



- For standard Babayaga NLO, the mean value of cross section deviates because of the long tail.
- It's probably caused by the low numerical precision when sampling narrow resonances.

Switching to Babayaga-NLO





- To deal with this effect,the cut $m(ee) > 3.8GeV$ is added into Babayaga NLO.
- And a cut on M(ee) is added into event selection criteria.

Methods

Event Selection

- 2 good charged tracks with 0 net charge, for each of which $R_{xy} < 1cm$, $R_z < 10cm$ is required.
- $E_{e^-}, E_{e^+} > 1.55/4.26 \times E_{CMS}$
- $|cos\theta_{e^-}^{MDC}|, |cos\theta_{e^+}^{MDC}| < 0.8$
- $P_{e^-}, P_{e^+} > 2/4.26 \times E_{CMS}$
- $m(ee) > 3.8GeV$

MC

- Modified Babayaga-NLO MC sample: 1 million events per energy point.
- Calculate cross section with standalone BabayagaNLO package, which is modified accordingly.

Overall Result

E_{cms}(GeV)	Cross Section(nb)	MC Efficiency(%)	Offline Lum(pb^{-1})
4190_{prev}	422.3 ± 0.4	14.39±0.04	517.5
4190	354.68±0.05	16.99±0.04	521.9
4220	352.14±0.05	16.94±0.04	508.5
4237	350.64±0.05	16.79±0.04	529.0

- 4190 previous result with Babayaga 3.5 is here for comparison.

Comparison by Run