A few remarks on Babayaga at BESIII

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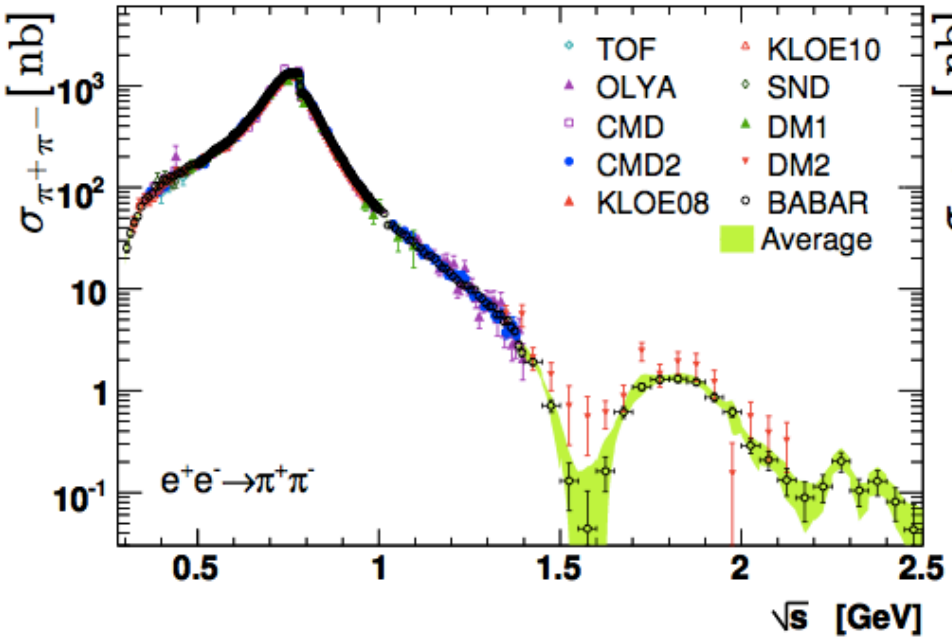
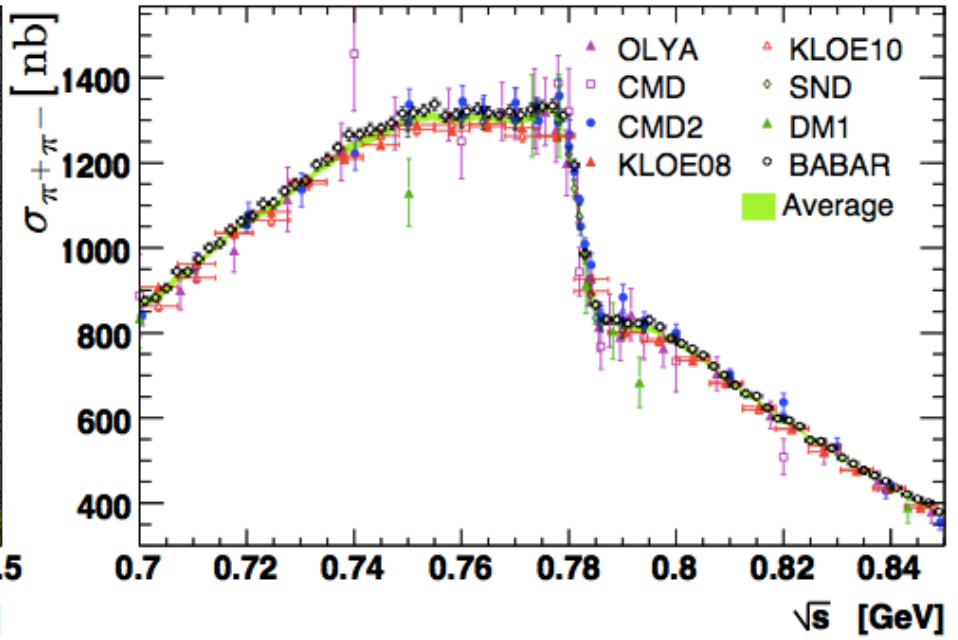
Motivation



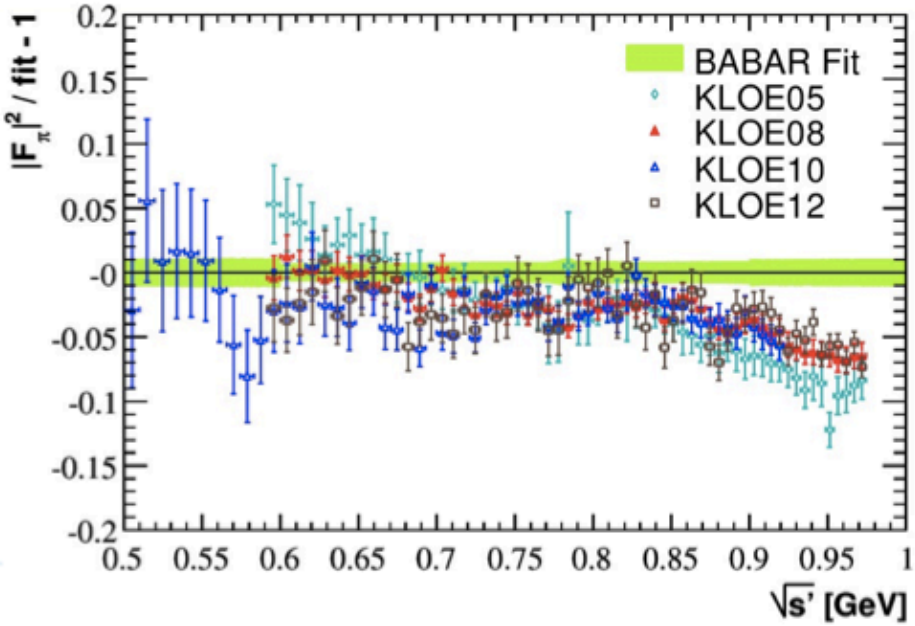


- ρ peak
- $\rho - \omega$ interference
- Dip at 1.6 GeV: excited ρ states
- Dip at 2.2 GeV
- Contribution to a_μ^{had}: 75%!

Systematic Uncertainties (ρ-region)

BABAR:	0.5%
CMD2:	0.8%
SND:	1.5%
KLOE:	0.8%

Motivation



- KLOE and *BABAR* dominate the world average
- Uncertainty of both measurements smaller than 1%
- Systematic difference, especially above ρ peak
- Difference $\rightarrow$ relatively large uncertainty for a_μ^{had}

Luminosity at BESIII

Status:

Luminosity measurement for XYZ states:
16 scan points btw. 3.81- 4.42 GeV

Systematic uncertainty: 1%
Dominated by:
- 0.5% uncertainty due to Bhabha event generator: Babayaga.3.5
- 0.42% uncertainty due to energy calibration (VERY conservative!)

Wanted:

Luminosity for $\sigma(\pi^+\pi^-)$ ISR-measurement at $\psi(2s)$ with systematic uncertainty <1%

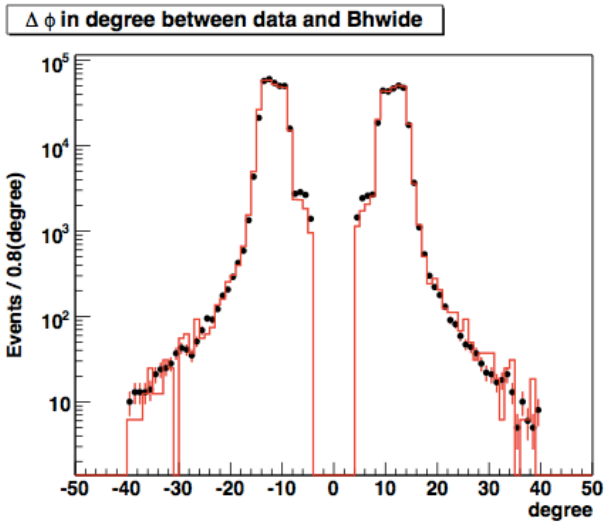
Questions:

Why Babayaga.3.5 instead of Babayaga@NLO?

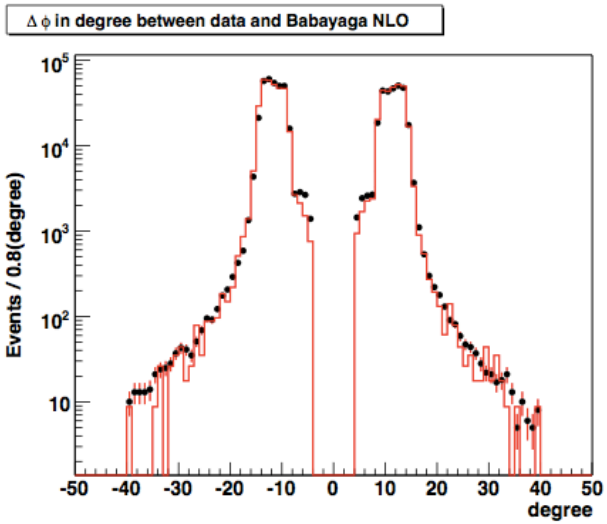
Luminosity at BESIII

Why babayaga.3.5?

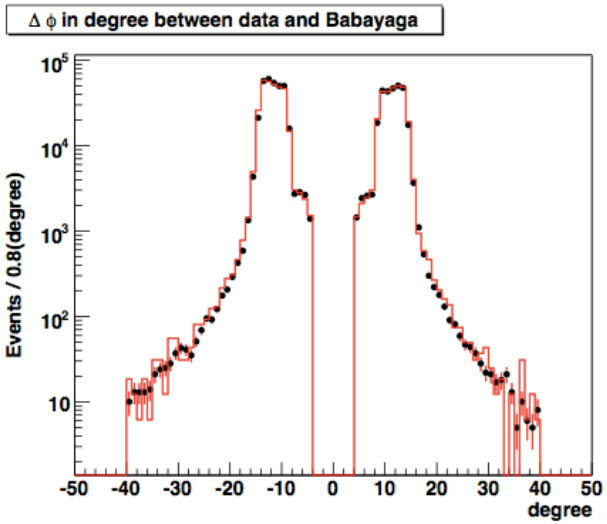
$$\Delta\phi = |\phi_{cluster1} - \phi_{cluster2}| - 180°$$



(a)Bhwide

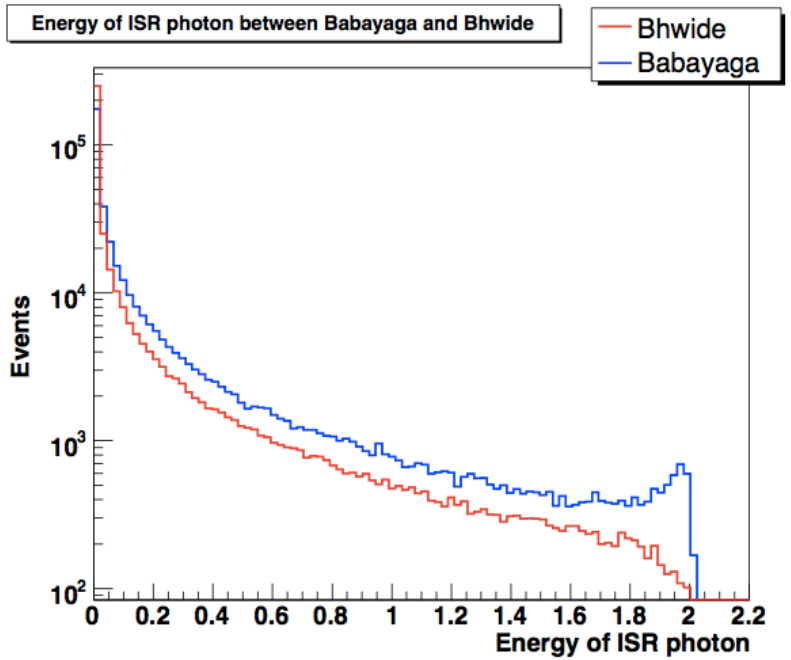


(b)Babayaga@NLO

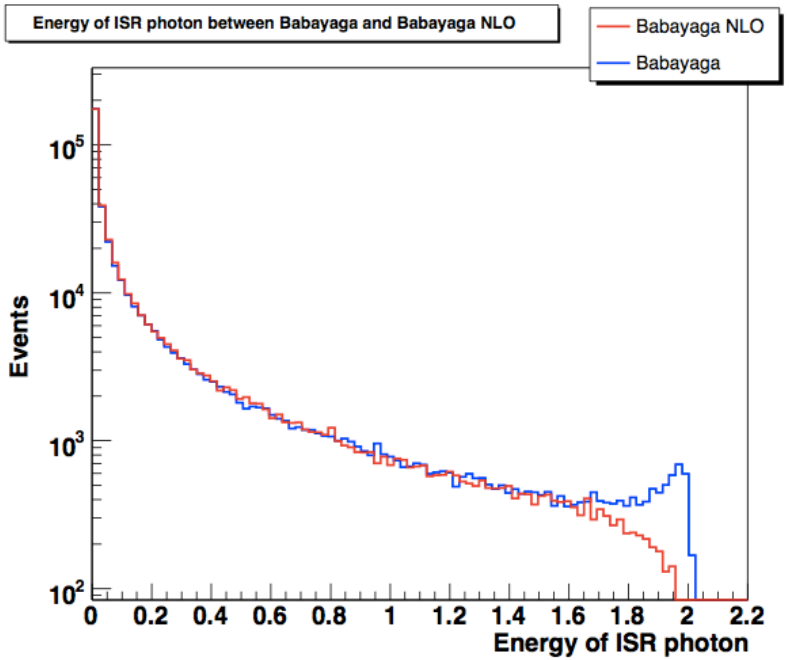


(c)Babayaga v3.5

Luminosity at BESIII



(a)Babayaga V3.5 V.S. Bhwide



(b)Babayaga V3.5 V.S. Babayaga@NLO

Do we understand difference btw. Babayaga.3.5 and Babayaga@NLO?
Does it matter quantitatively?

Summary

- understand 3.5 vs NLO difference quantitatively
- convince us to use babayaga@NLO
- reduce luminosity uncertainty on ψ(2s) to <1%

π^0-transition form factor

Do we understand difference btw. Babayaga.3.5 and Babayaga@NLO?
Does it matter quantitatively?