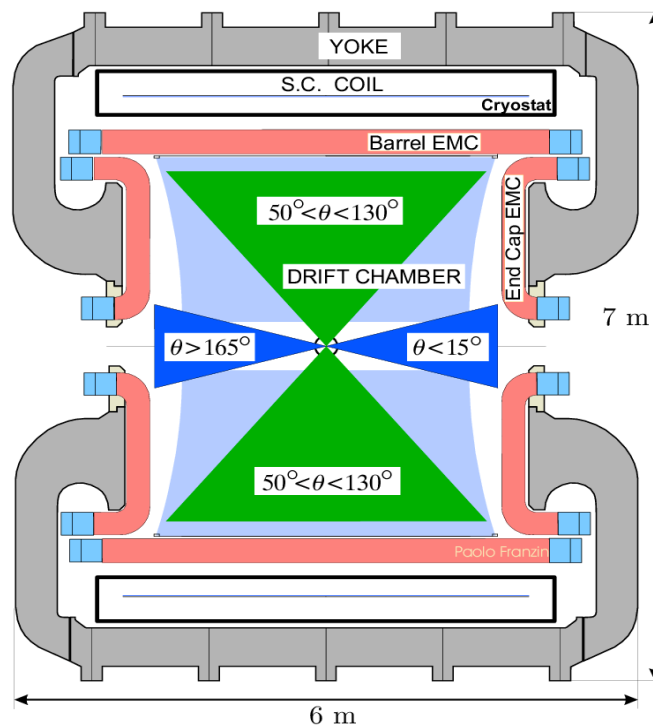# Monte Carlo generators
for the $\pi\pi\gamma$ Large Angle
analysis at KLOE

❑ What we deal with

❑ What we had

❑ What we have

❑ What we conclude, would like to do and… to have

What we deal with (brief reminder)

Pion Form Factor measurement using $\pi\pi\gamma$ events
with the photon at large polar angle: $50° < \theta_\gamma < 130°$

✓ **independent analysis and cross check**
✓ **threshold region $(2m_\pi)^2$ accessible**
✓ γ_{ISR} **photon detected**
   (4-momentum constraints)

✓ **lower signal statistics**
✓ **large γ_{FSR} contributions**
✓ **large $\phi \rightarrow \pi^+\pi^-\pi^0$ background**
   contamination

✓ **irreducible background from**
   ϕ decays ($\phi \rightarrow f_0 \gamma \rightarrow \pi\pi \gamma$)

Phenomenological models
in MC generators

What we had

PRELIMINARY

KLOE 2002 LA

stat.+syst. error
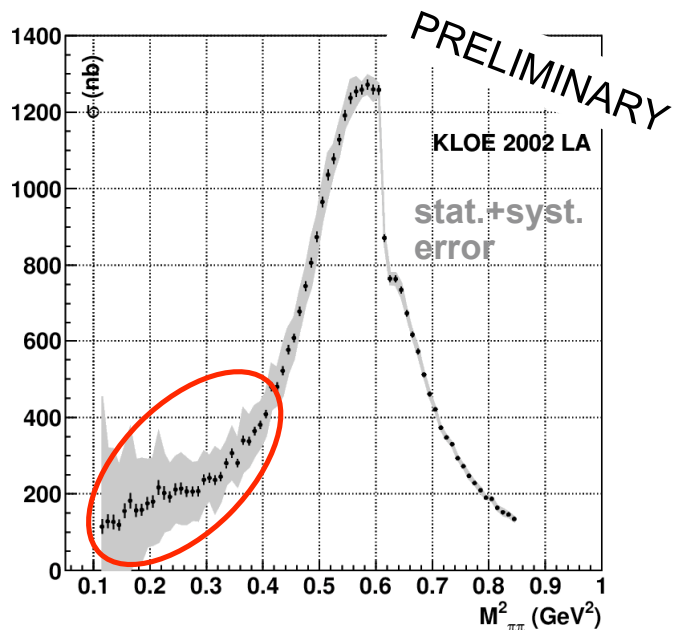
- ✦ **Biggest systematic uncertainty** from model dependence of irreducible background from $\phi \to f_0\gamma \to \pi^+\pi^-\gamma$

  Different models for f_0-decay and input from dedicated KLOE $\phi \to f_0\gamma$ analyses

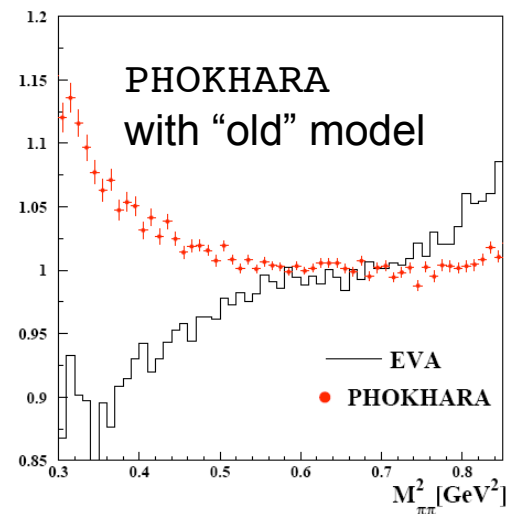 (with $f_0 \to \pi^+\pi^-$ and $f_0 \to \pi^0\pi^0$)

✖ **EVA**

- **best** Achasov model
- **but** ISR-FSR-LO only

✖ **PHOKHARA**

- **best** NLO correction
- **but** semplification of an old Achasov model (and no $\rho \to \pi\gamma$)

$(ISR+sQED+f_0+\rho\pi)/(ISR+sQED)$

PHOKHARA with "old" model
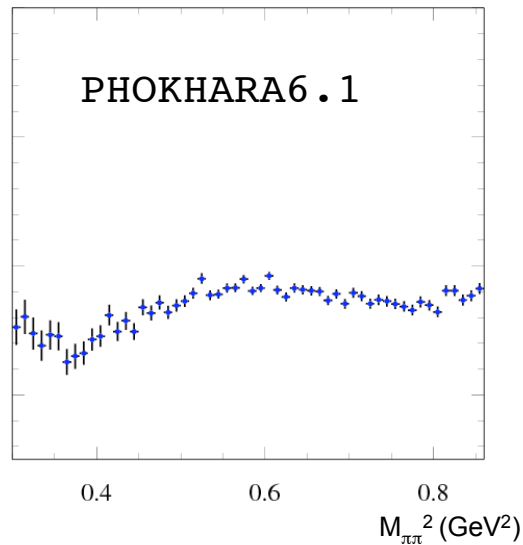
— EVA
● PHOKHARA

$M^2_{\pi\pi}[GeV^2]$

What we have

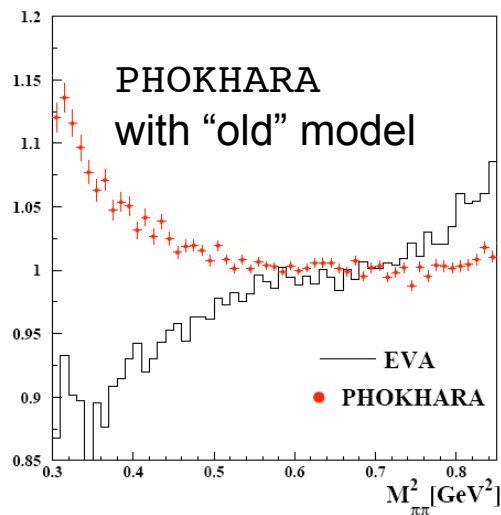➔ **latest Achasov model**

(parameters fitted in the $f_0(980) \to \pi^0\pi^0$)

inserted in **PHOKHARA**

(by Olga Shekhovtsova)

$(ISR+sQED+f_0+\rho\pi\gamma) / (ISR+sQED)$

'new' `PHOKHARA6.1`
NLO correction included

Trkms cut applied
Trkms cut not applied

$M_{\pi\pi}^2$ (GeV^2)

$(ISR+sQED+f_0+\rho\pi)/(ISR+sQED)$

PHOKHARA
with "old" model

EVA
PHOKHARA

$M_{\pi\pi}^2$ [GeV^2]
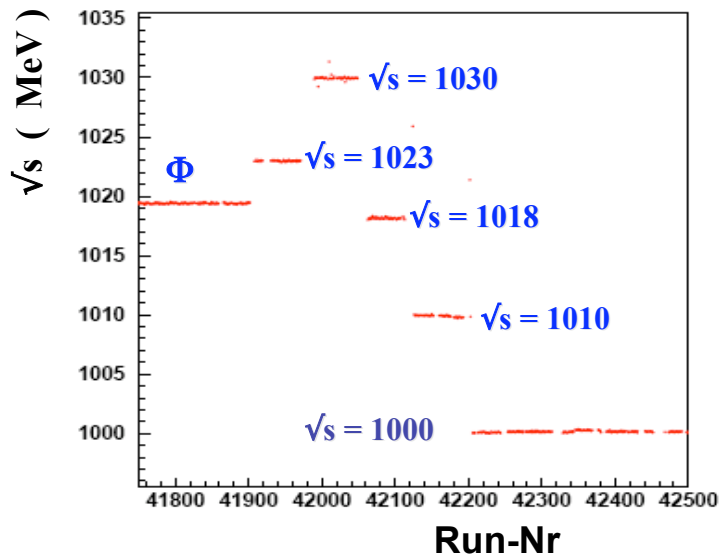

`PHOKHARA6.1`

$M_{\pi\pi}^2$ (GeV^2)
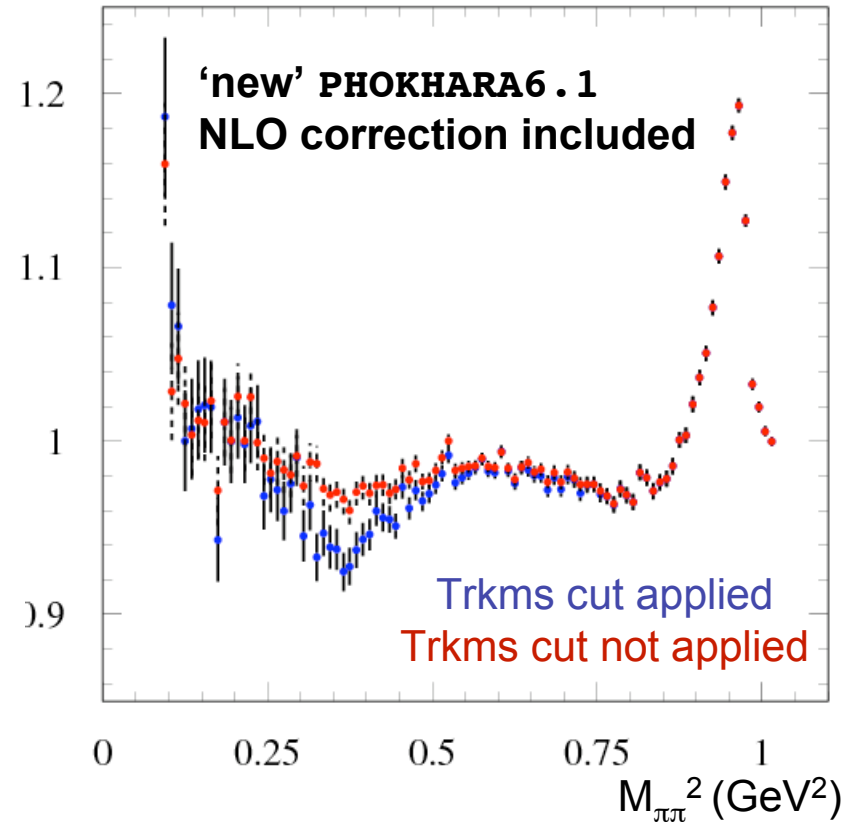
11.04.08

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What we **conclude**, **would like to do** and… **to have**

✖ We are confident to have significantly improved the scalar and $\rho\pi\gamma$ background subtraction

✔ Subtract f_0 and $\rho\pi$ contribution according to PHOKHARA with new model
✔ Systematic study:
  - parameter optimization procedure using the Forward-Backward asymmetry

→ Due to points out from the ϕ-resonance peak, it would be very good to have

(a part Arbuzov & al. generator)

- PHOKHARA not only for ISR events
- and/or BABAYAGA@NLO also for pion channel

✔ Systematic study of BABAYAGA and "Abruzov&al" for the muon channel