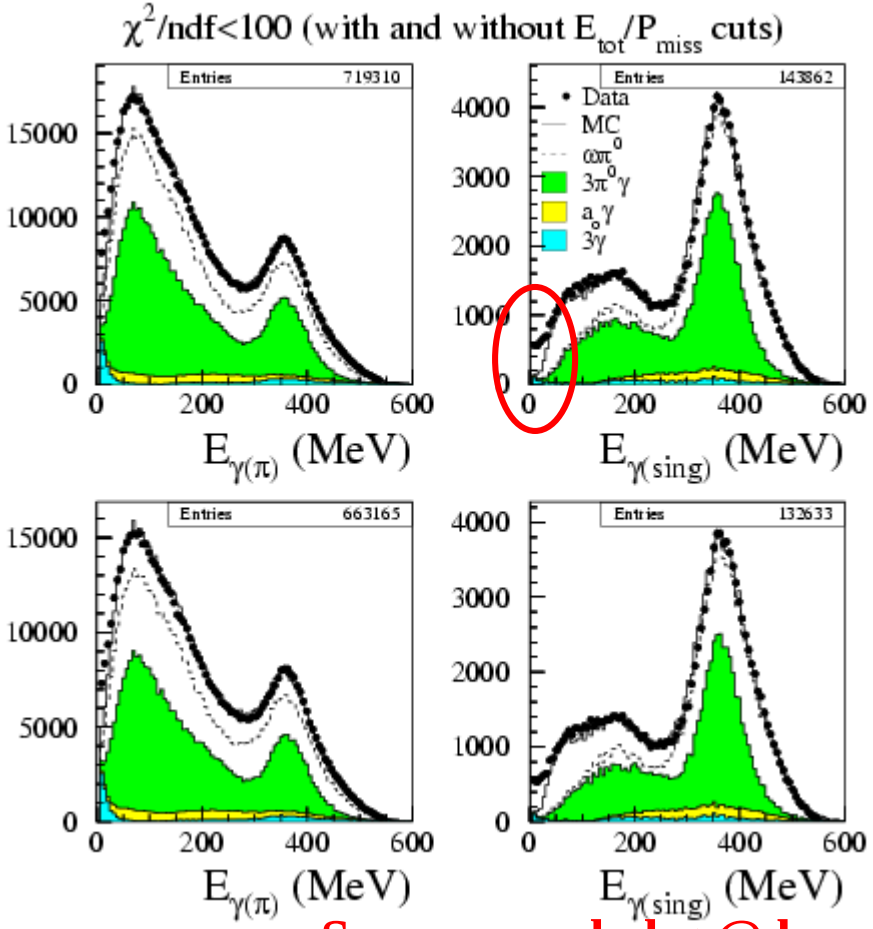
Towards a fit to the $\pi^0\pi^0\gamma$ Dalitz plot...

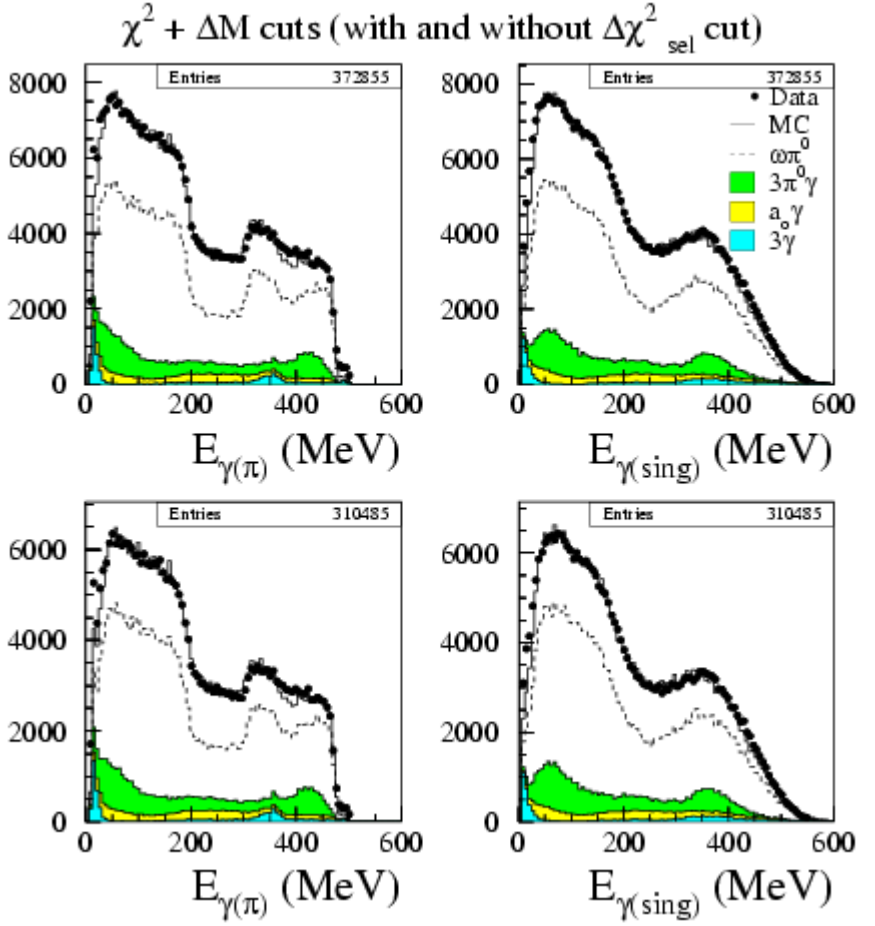
S. Giovannella, S.Miscetti

- ✓ **Background (ϕ ® $\eta\gamma$ ® $\pi^0\pi^0\pi^0\gamma$) check**
- ✓ **E_{ana}, E_{pair} *vs* $M_{\pi\pi}$, $M_{\pi\gamma}$**
- ✓ **Study of theoretical functions**
- ✓ **First try on $M_{\pi\pi}$**

Check of the $\phi \to \eta\gamma \to \pi^0\pi^0\pi^0\gamma$ background

Since we discovered a wrong normalization of the $\eta\gamma$ background in our previous analysis, some control histograms have been produced

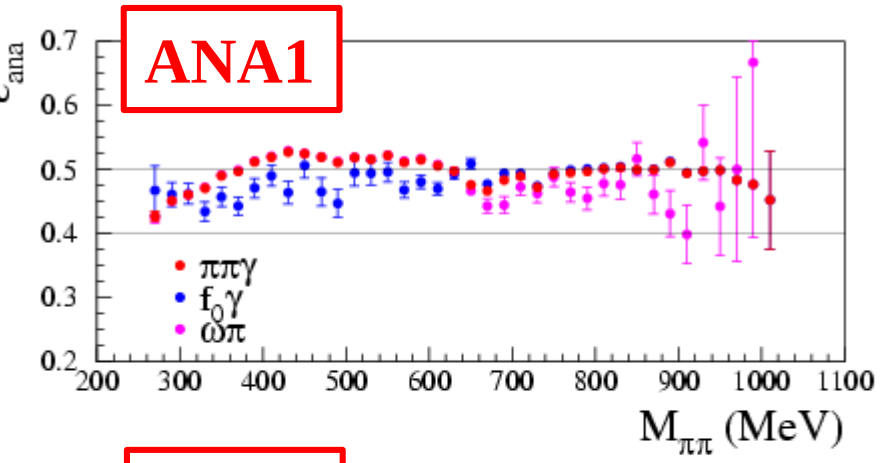


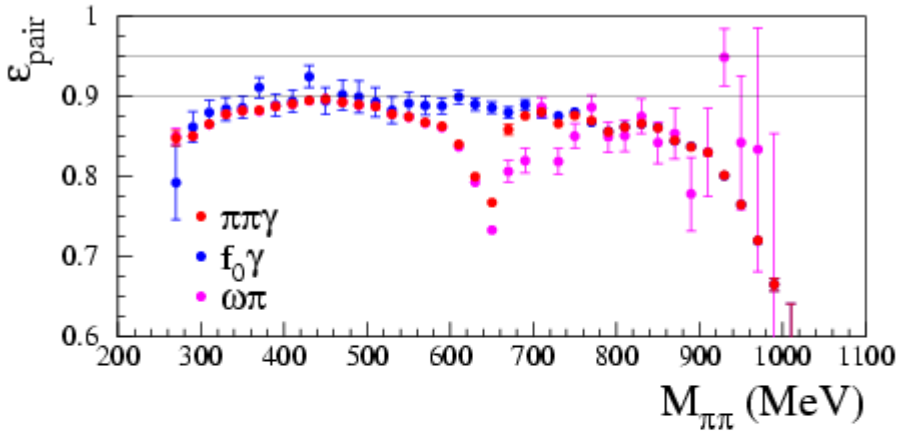


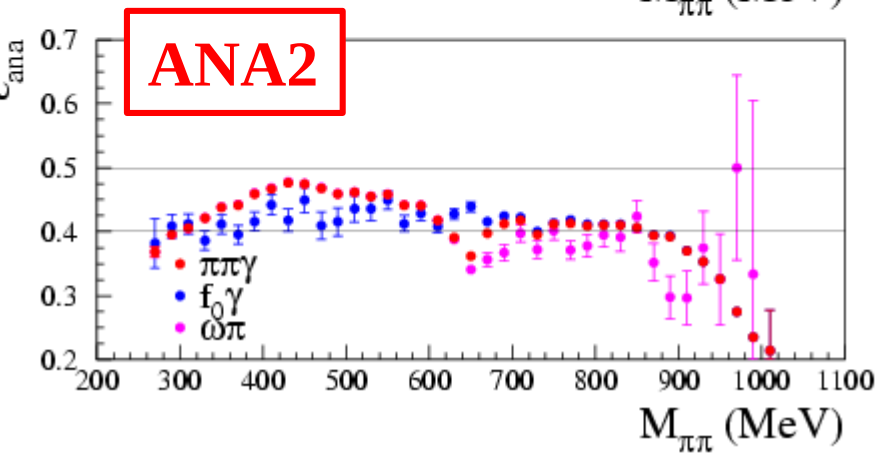
Some more bckg @ low energy

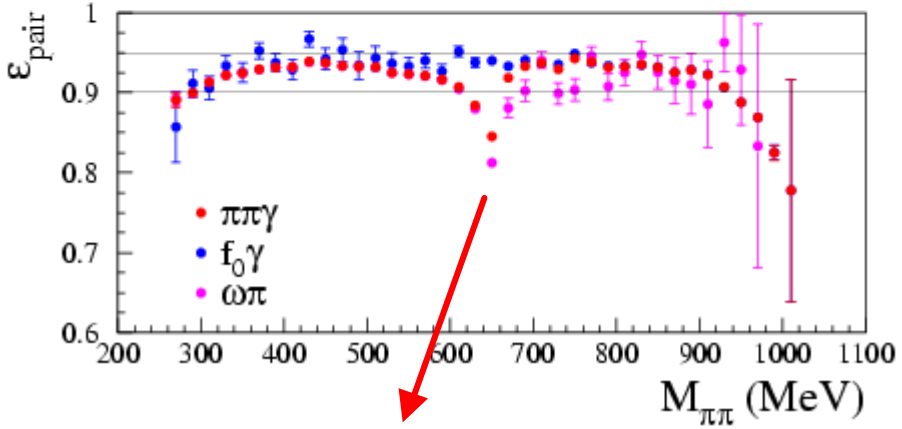
Analysis efficiencies *vs* $M_{\pi\pi}$

New RAD04 MC production used (2001 only)
ε_{pair} includes both pairing and clustering problems
Red is $\phi \to f_0\gamma + e^+e^- \to \omega\pi^0$, with the relative MC proportions









- **ANA1** ($\chi^2+\Delta M_\pi$ cuts): **flatter ε_{ana}**
- **ANA2** ($\chi^2+\Delta M_\pi+\Delta\chi^2_{sol}$ cuts): **higher ε_{pair}**

Dip under investigation: studying vs $M_{\pi\gamma}$

Analysis efficiecies *vs* $M_{\pi\gamma}$

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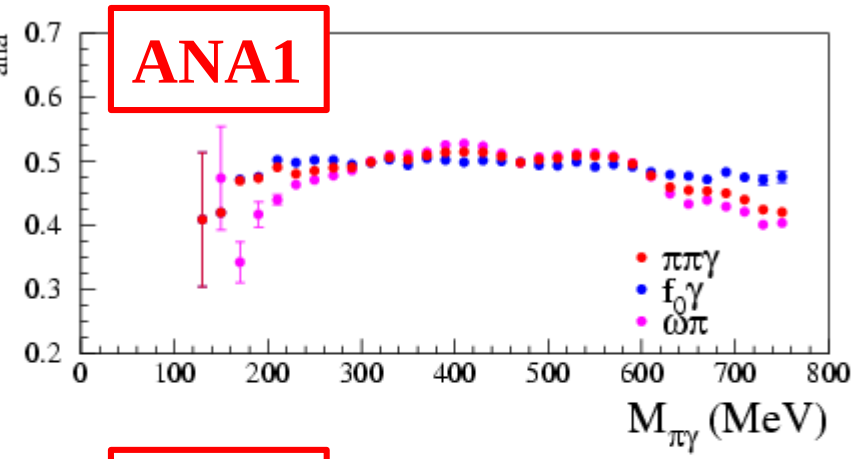
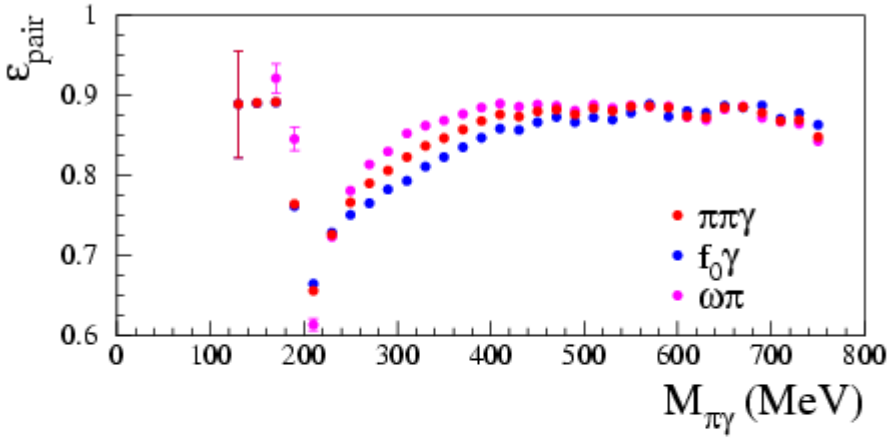
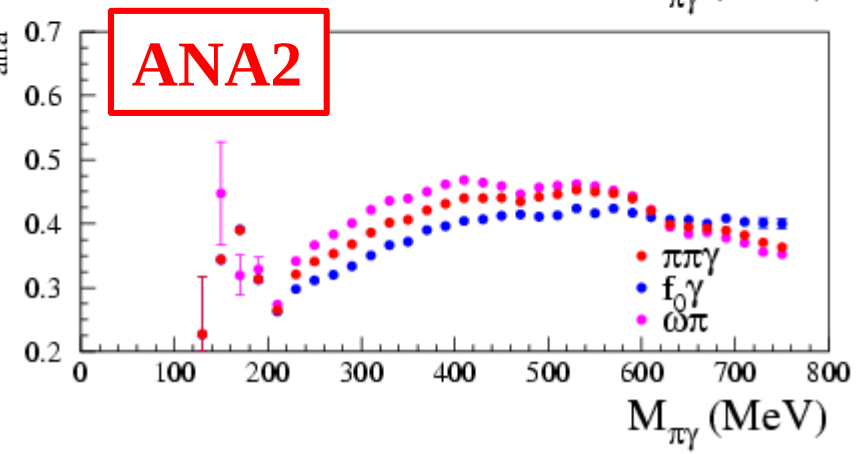
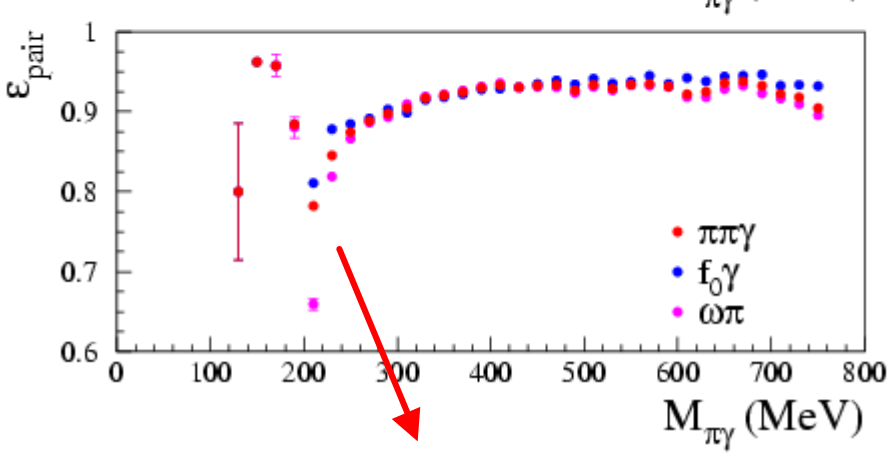
Red is $\phi \to f_0\gamma + e^+e^- \to \omega\pi^0$, with the relative MC proportions









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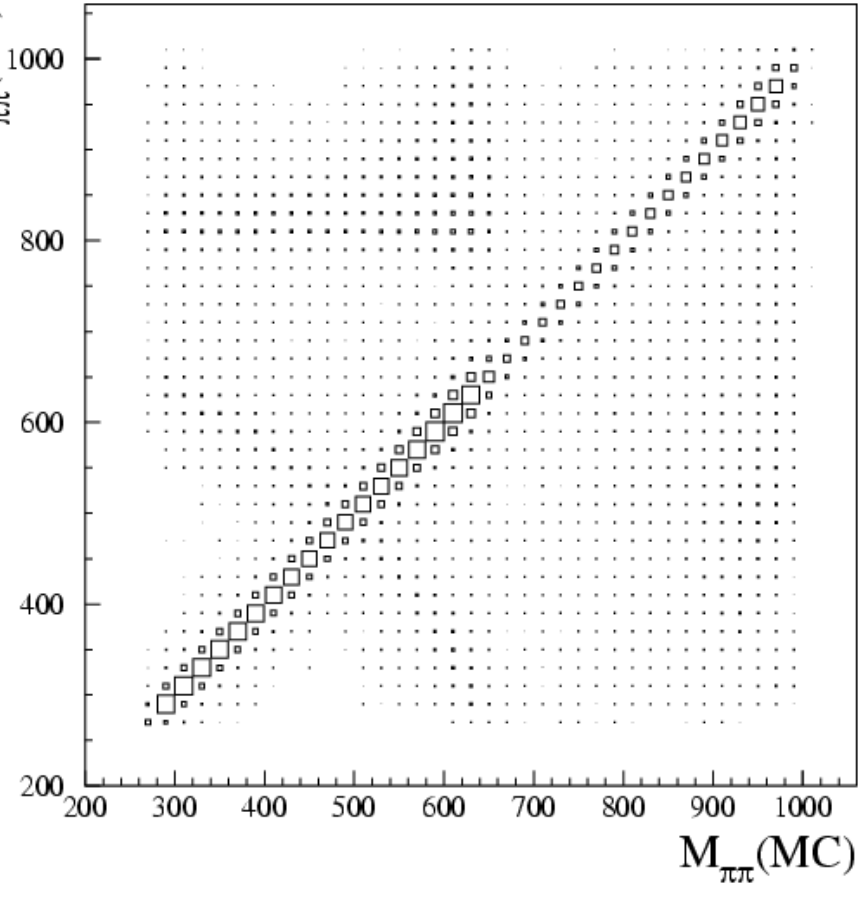
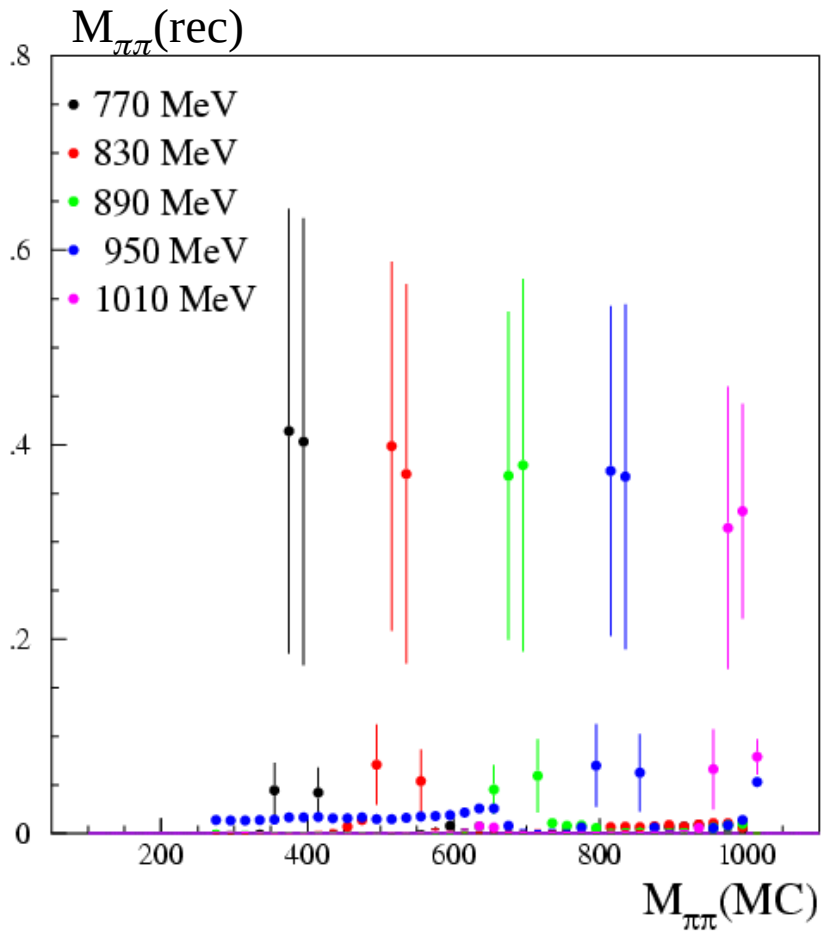
Dip under investigation: studying vs $M_{\pi\pi}$

Smearing Matrix

New RAD04 MC production used (2001 only)
Smearing includes both pairing and clustering problems
Both $\phi \rightarrow f_0\gamma + e^+e^- \rightarrow \omega\pi^0$, with the relative MC proportions



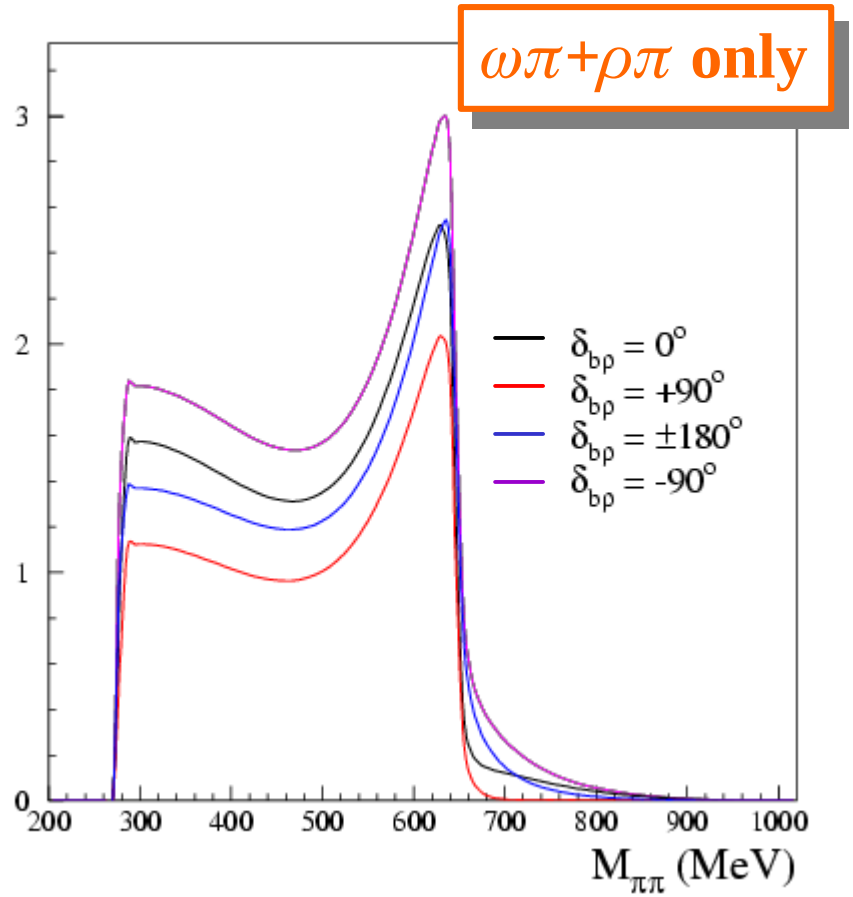


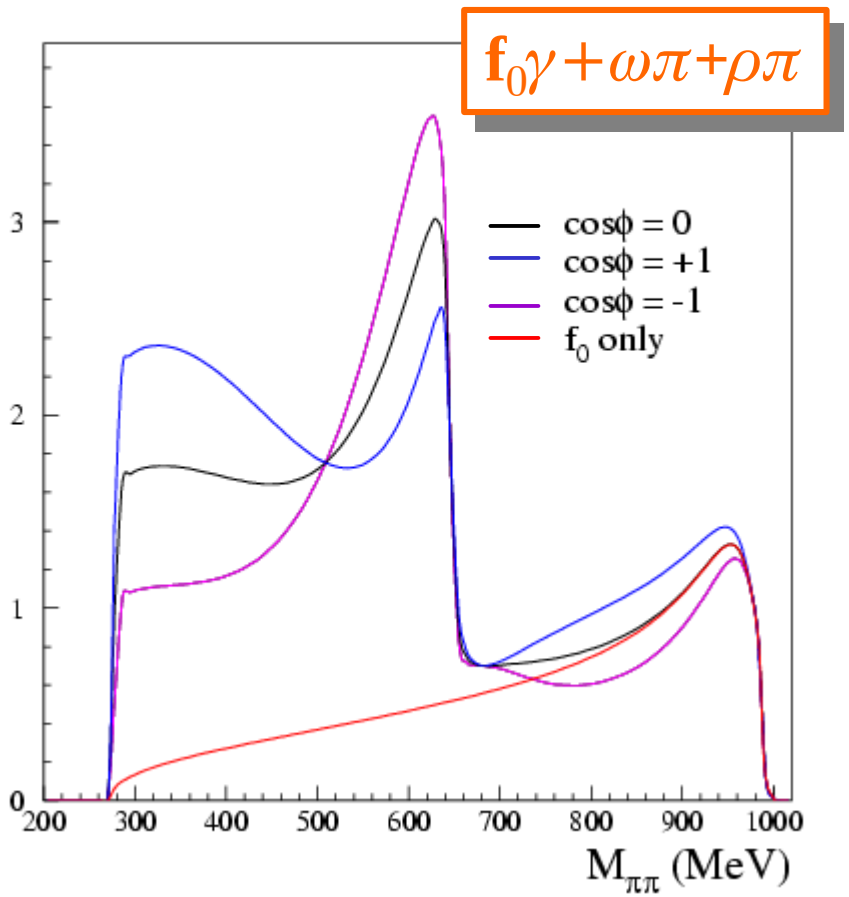
Theoretical functions @ $\sqrt{s}$ = 1919.6 MeV

Dalitz plot [$d^2\sigma_{\pi\pi\gamma} / dM_{\pi\pi}dM_{\pi\gamma}$] parametrization from N. Achasov

Free parameters: $\mathbf{M_{f0}}$, $\mathbf{g_{fKK}}$, $\mathbf{g_{f\pi\pi}}$, ϕ_{SV} (Sγ−VDM rel. phase), $\delta_{b\rho}$ ($\rho\pi - \omega\pi$ rel. phase)

Some complex $\omega\pi$, $\rho\pi$ coupling constants fixed to SND values (~ 20% error on amplitude, phases not reliably determined)





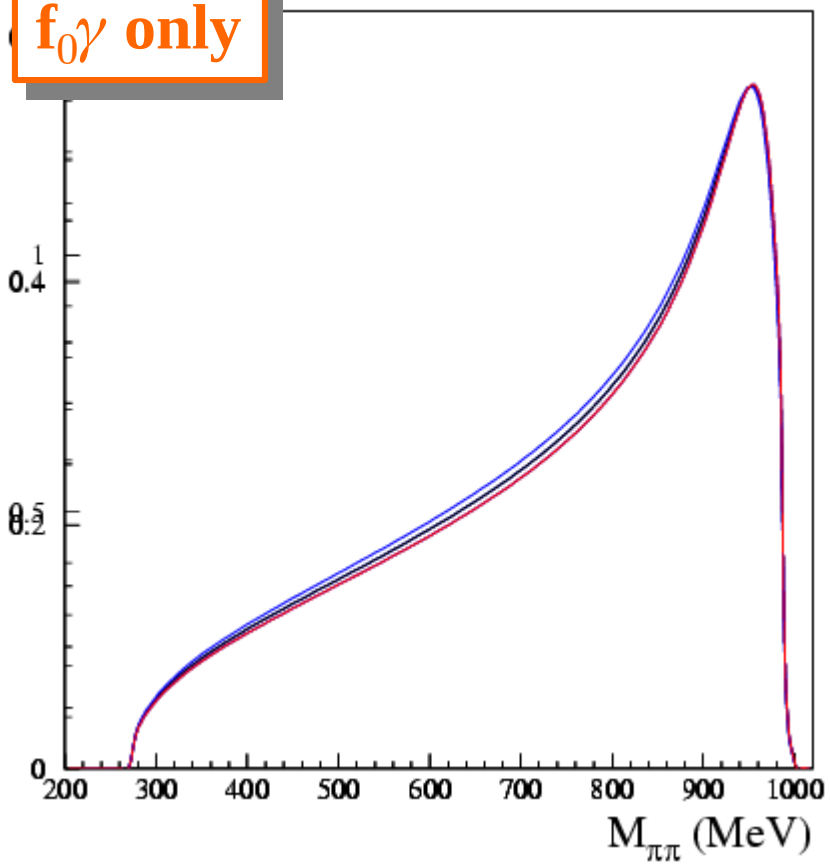
f_0 parameters fixed to KLOE 2000 data

Theoretical functions varying $\sqrt{s}$

- Dependence on $\sqrt{s}$ built in on the x−sec
- Distributions normalized to the peak

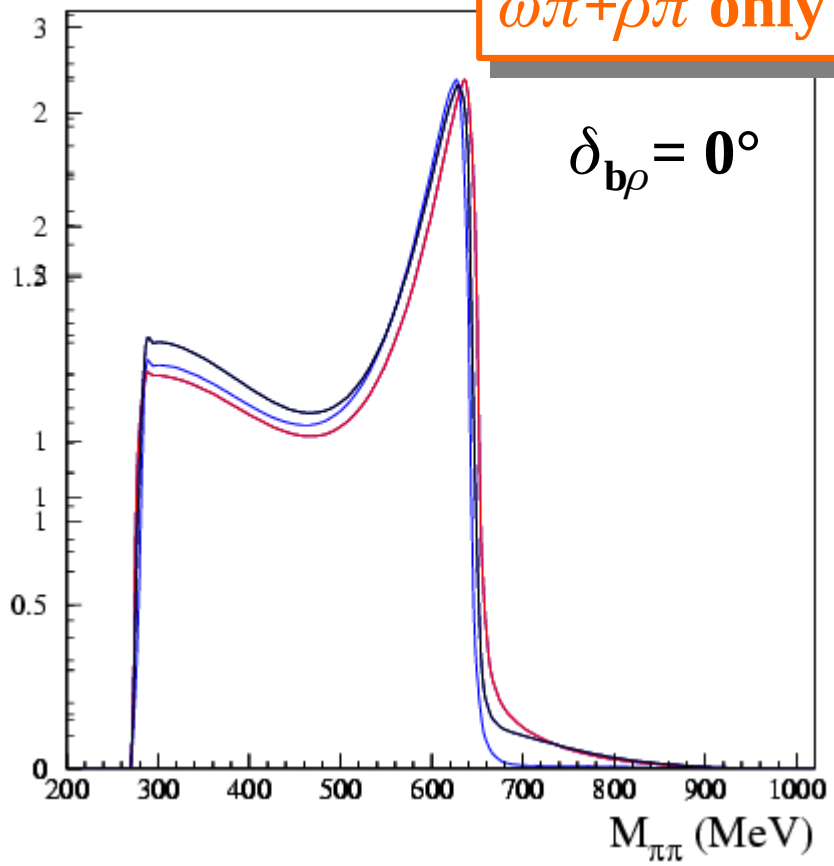
— $\sqrt{s}$ = 1017.0 MeV
— $\sqrt{s}$ = 1019.6 MeV
— $\sqrt{s}$ = 1022.0 MeV

$f_0\gamma$ only



$\omega\pi+\rho\pi$ only

$\delta_{b\rho}$ = **0°**



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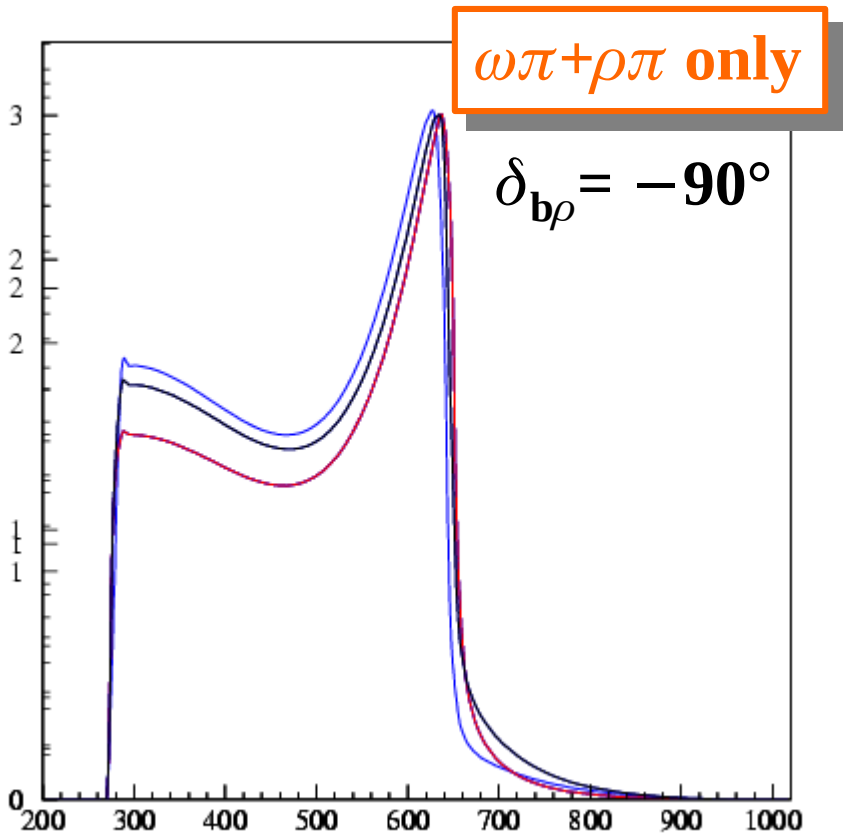

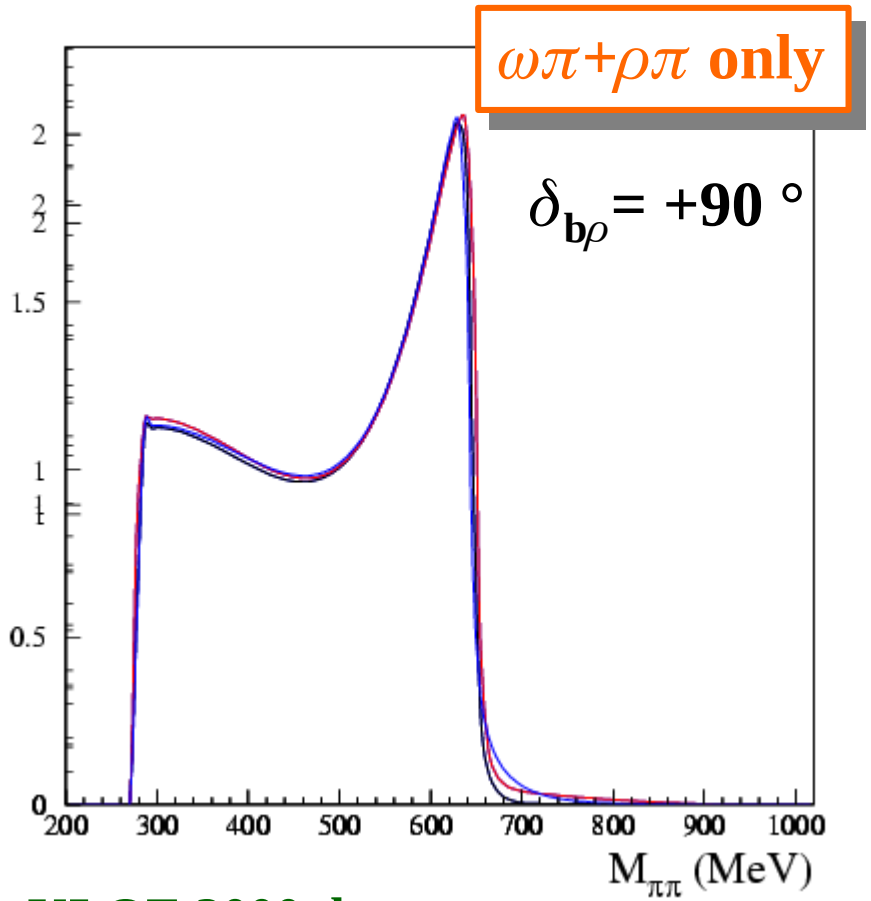

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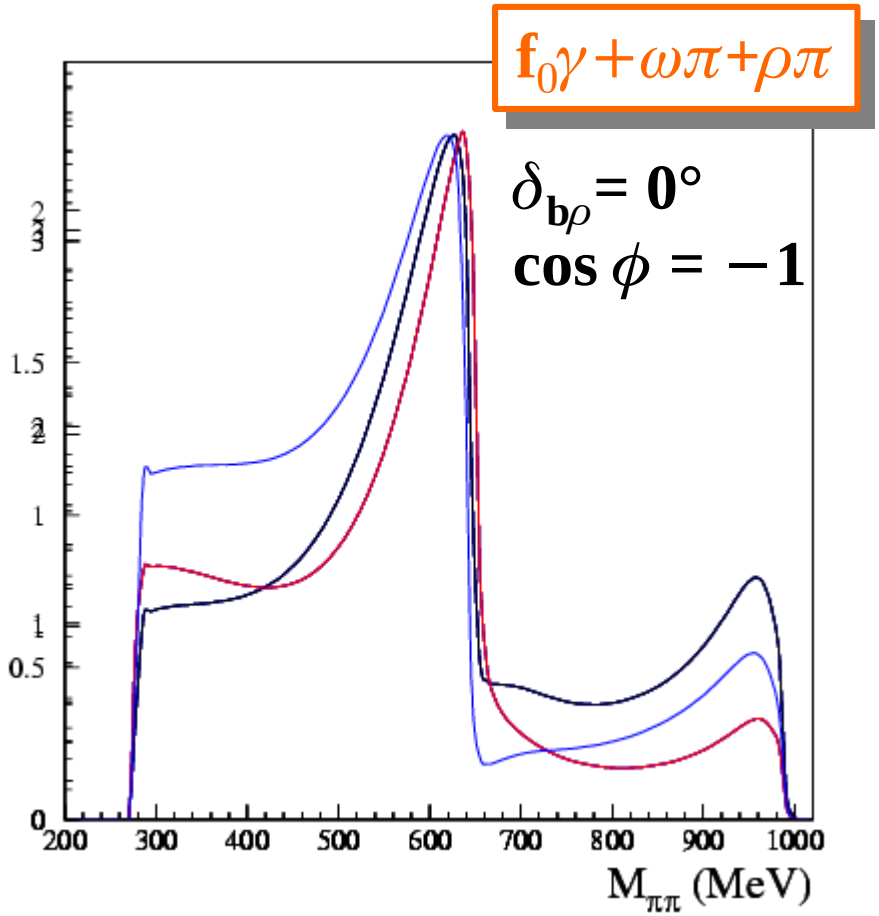
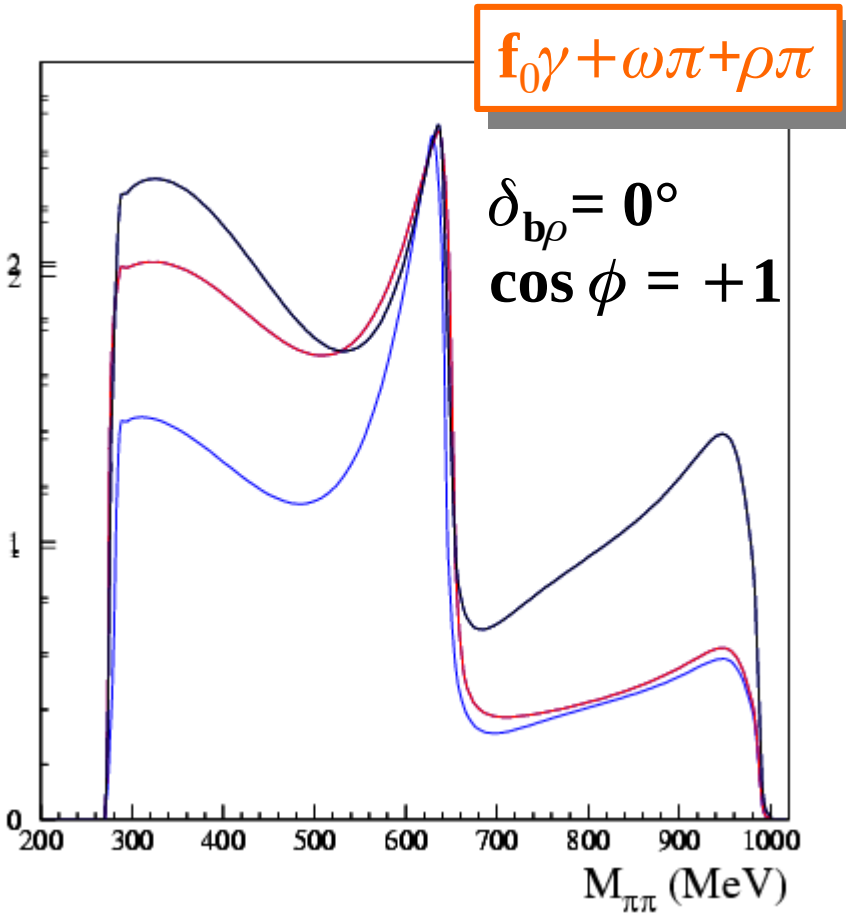
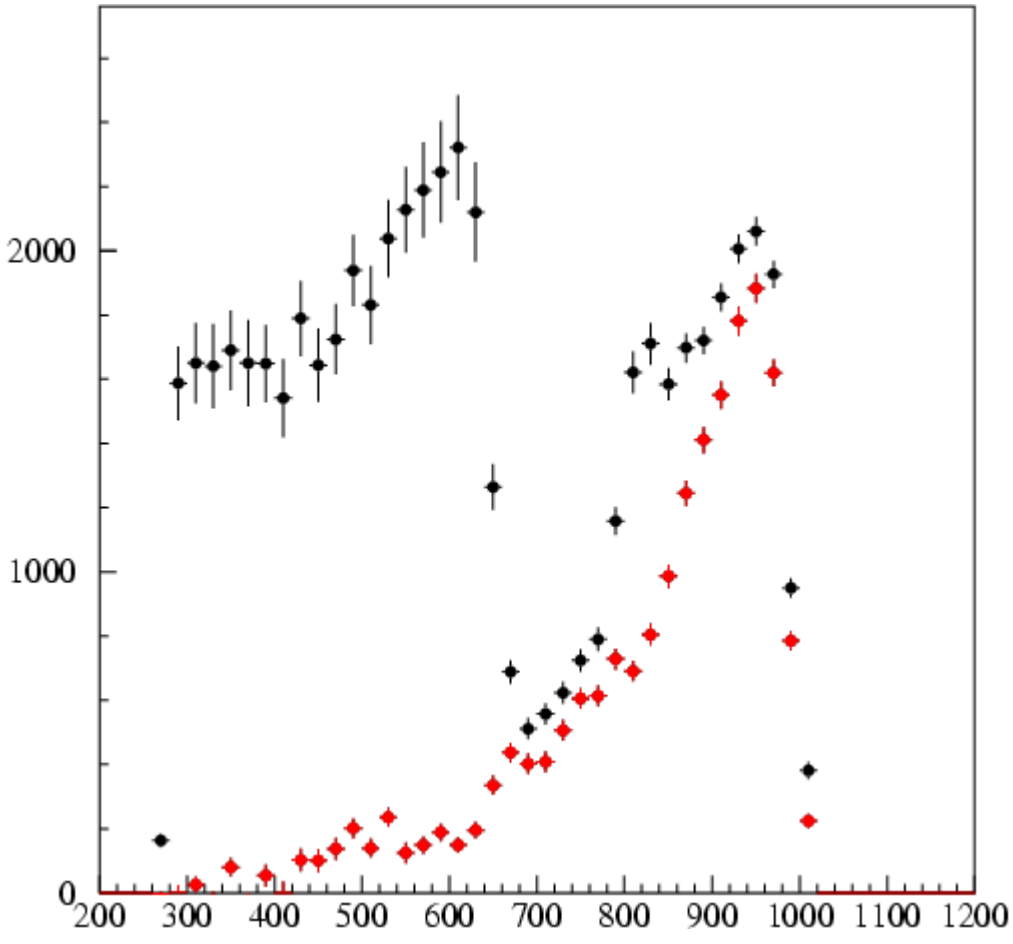




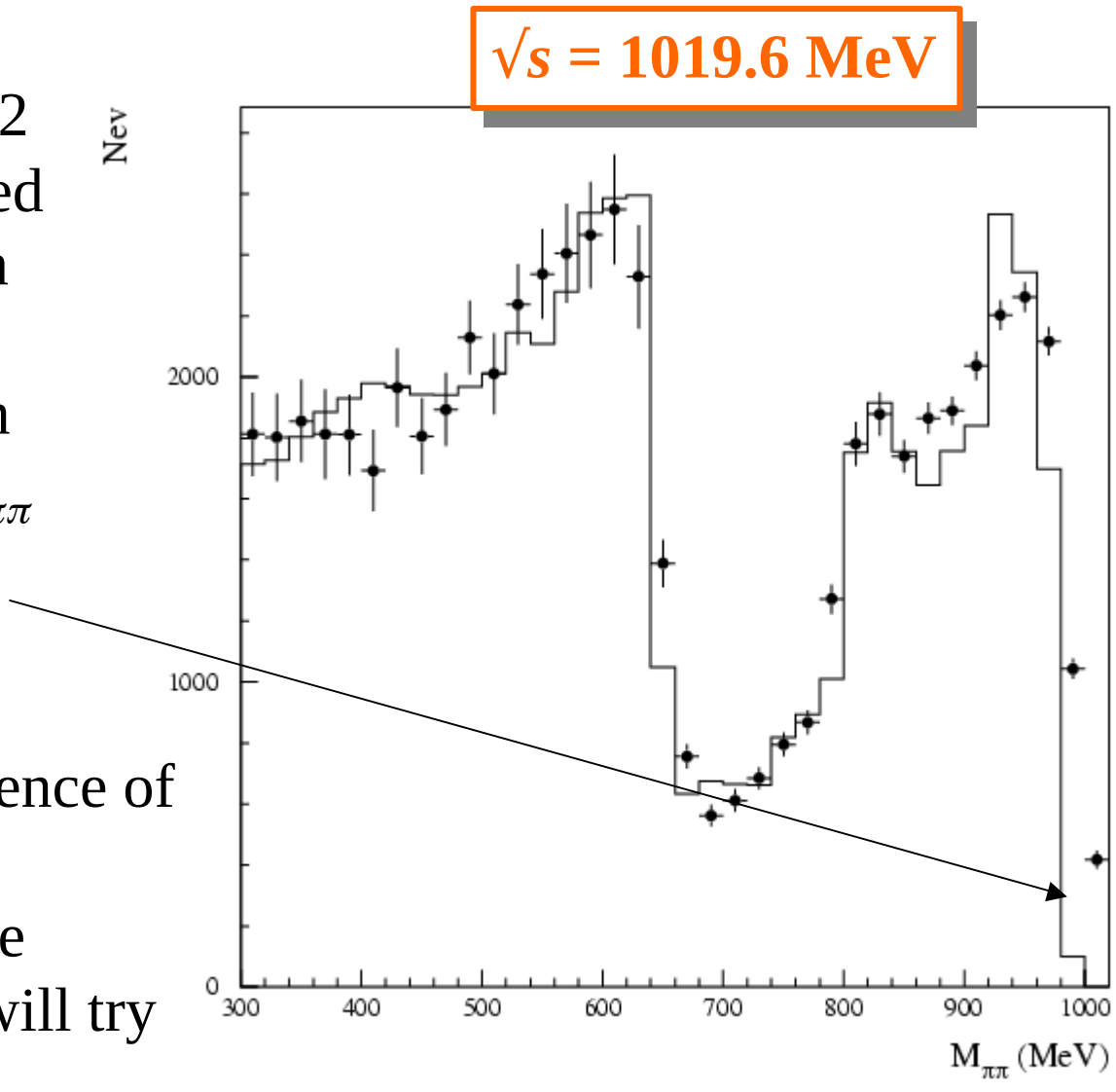
f_0 parameters fixed to KLOE 2000 data

Comparison with old analysis spectrum



First try of the fit-machinery (always fitting M_{pp})

- Only ANA1 tried
- As expected, a factor x2 correction on ε_{pair} needed
- Fit requires a –20% on $\rho\pi - \omega\pi$ constants
- Very slow computation
- Bad control on first $M_{\pi\pi}$ bins
- We will test also $M_{\pi\gamma}$ agreement with the fit parameters and dependence of the x-sec *vs* sqrt(s)
- Once convinced that we do not have errors we will try 2D-fit



First try of the fit-machinery ....

Using parameters found at peak