The KLOE-2 physics program

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On behalf KLOE-2 Collaboration

"Excited QCD 2010", 31 January-6 February 2010- Tatra National Park (Slovakia)

History of DAFNE

- Frascati ϕ-factory :

e^+e^- collider @ $\sqrt{s} \approx 1020$ MeV $\approx M_\phi$;

- Best performances in 2005:
  - $L_{peak} = 1.4 \times 10^{32}$ cm^{-2}s^{-1}
  - $\int Ldt = 8.5$ pb^{-1}/day

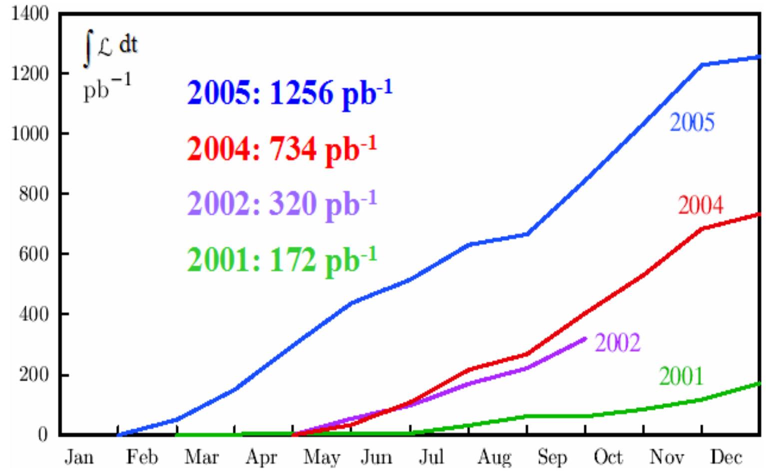
- KLOE: 2.5 fb^{-1} @ $\sqrt{s}=M_\phi$ and
  + 250 pb^{-1} off-peak @ $\sqrt{s}=1$ GeV

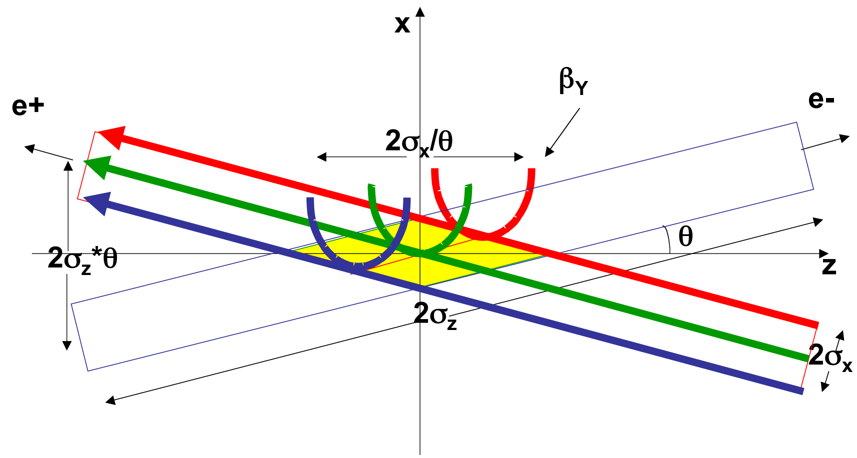
- New interaction scheme implemented : large beam crossing angle + crabbed waist sextupoles

Luminosity increase factor ~ 3

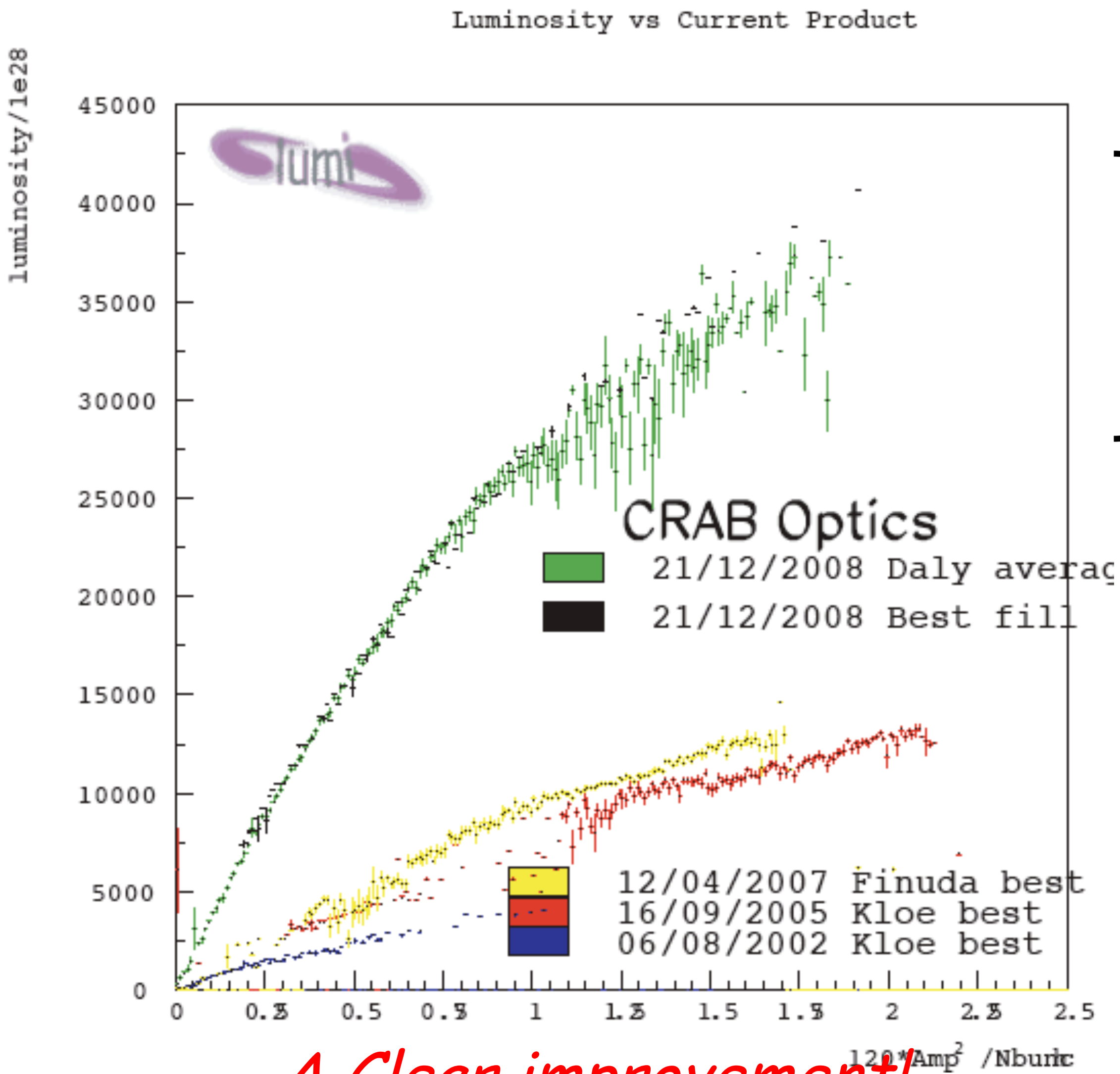
$\int Ldt \approx 1$ pb^{-1}/hour

Integrated luminosity (pb^{-1})





DAΦNE luminosity: new vs old



$4.5 \times 10^{32}\ cm^{-2}s^{-1}$

SIDDHARTA Run (2008/09)

KLOE run (2002/05)

A Clear improvement!

KLOE-2 at upgraded DAΦNE

- We have now a 'new' machine capable of delivering ~ 4 fb^{-1}/yr, even accounting for a reasonable duty cycle
- There is still space for improvements, both in terms of increasing the currents and in terms of operation efficiency

The goal of having the present KLOE statistics increased by ~ an order of magnitude (~20 fb^{-1}) in the next years is therefore realistic

⇒ **KLOE-2**: to extend the KLOE physics program at DAΦNE upgraded in **luminosity** and **energy** (up to 2.4 GeV)

References:
- KLOE-2 LoI: www.lnf.infn.it/lnfadmin/direzione/roadmap/LoIKLOE.pdf
- F.Ambrosino et al., EPJC50(2007)729
- Physics with KLOE2 experiment at the φ-factory, in preparation

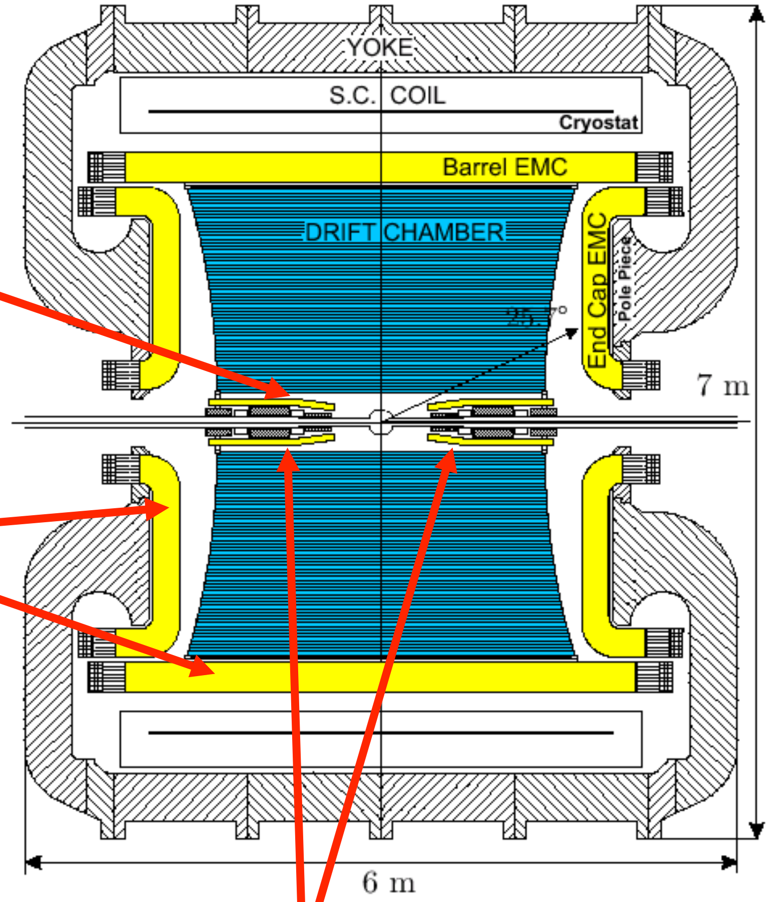
KLOE Detector

Drift chamber:

- gas: 90% He-10% C_4H_{10}
- $\delta p_T/p_T = 0.4\%$
- $\sigma_{xy} \approx 150\ \mu m$; $\sigma_z \approx 2$ mm
- $\sigma_{vertex} \approx 1$ mm

Calorimeter (Pb-Sci.Fi.):

- $\sigma_E/E = 5.7\% / \sqrt{E(GeV)}$
- $\sigma_t = 55\ ps/\sqrt{E(GeV)} \oplus 100\ ps$
- 98% of 4π



Magnetic field: 0.52 T

QCAL vetos: (Pb-scintillator)

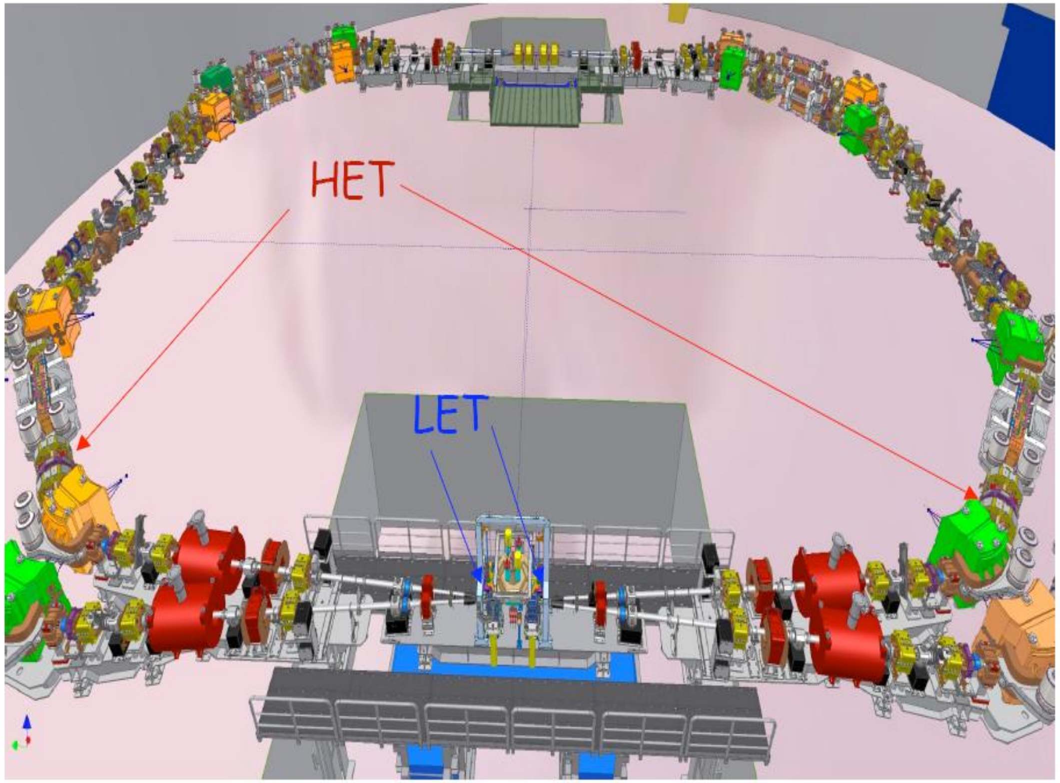
…to KLOE-2…(Step0)

Minimal detector upgrades:

Tagger for $\gamma\gamma$ physics: detection off-momentum $e^{\pm}$ from

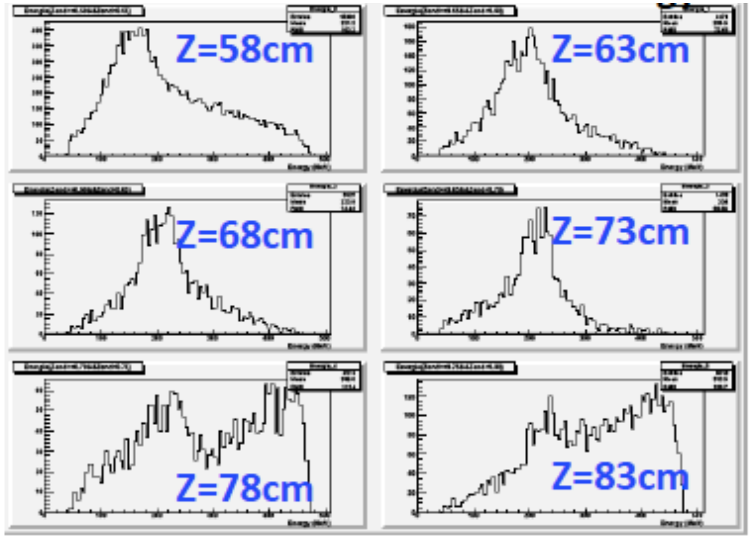
$$e^+e^- \rightarrow e^+e^-\gamma^*\gamma^* \rightarrow e^+e^-\mathbf{X}$$

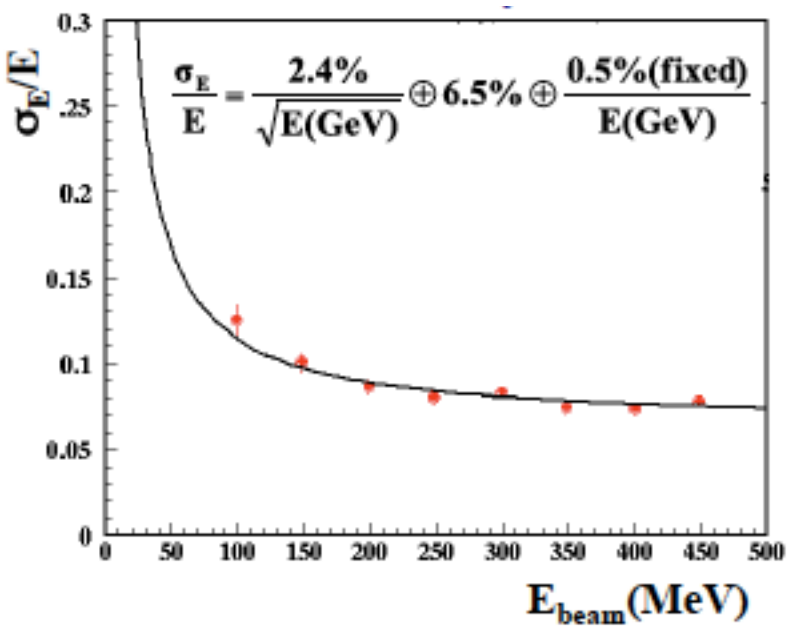
Tagger KLOE

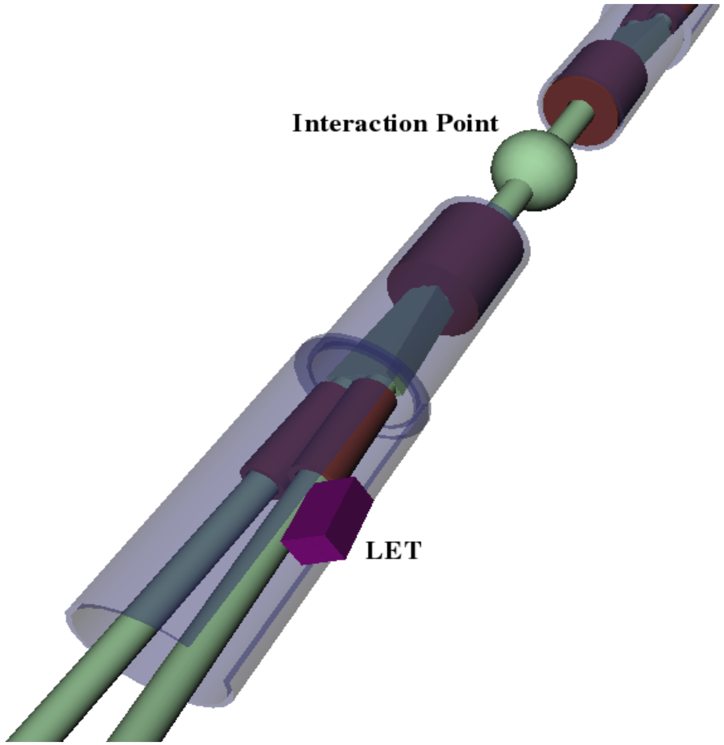


Already founded by INFN. Will be installed in the next months

LET Characteristics



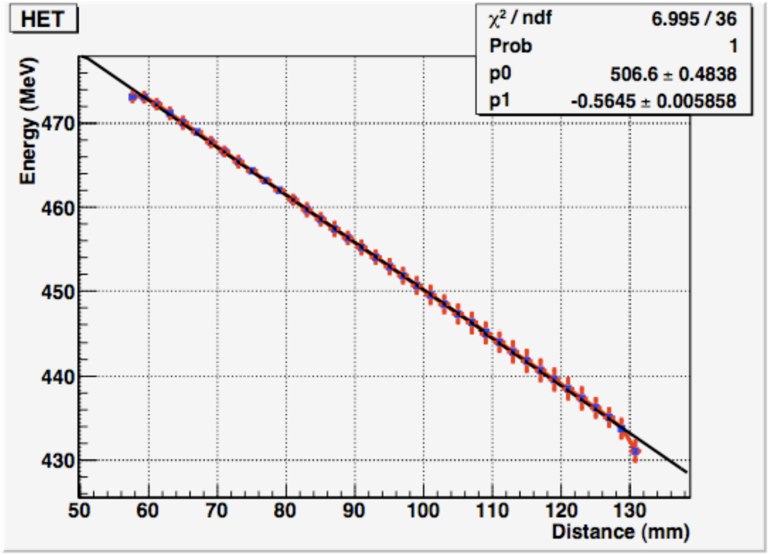


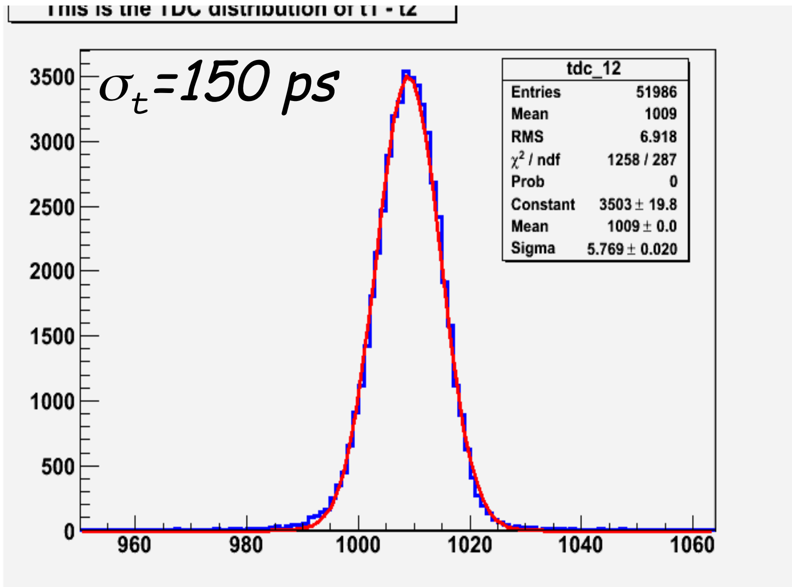


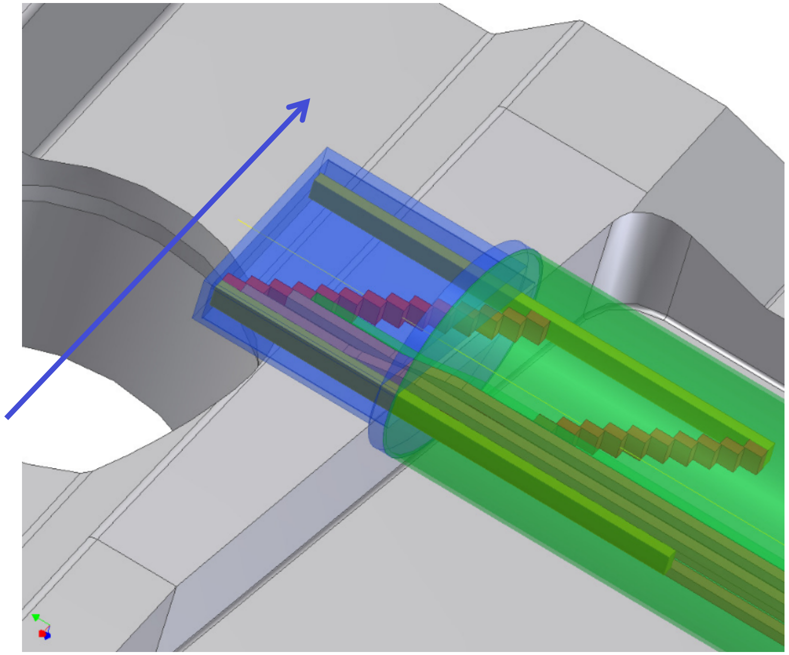
LET: Low Energy Tagger
(130-230 MeV)

calorimeters, LYSO + SiPM

HET Characteristics



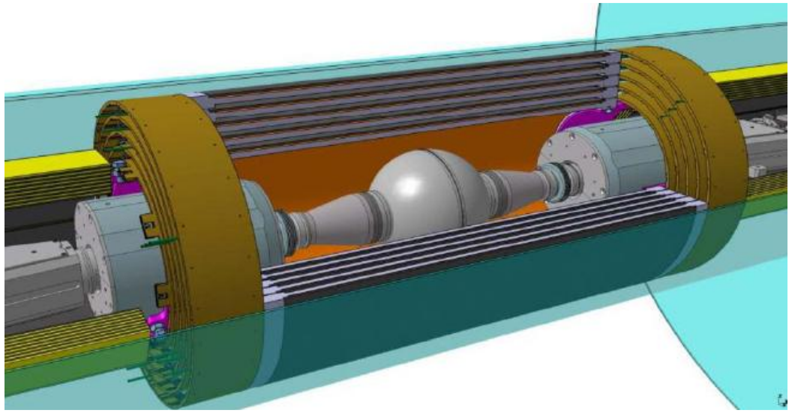




HET: High Energy Tagger
(E > 400 MeV)

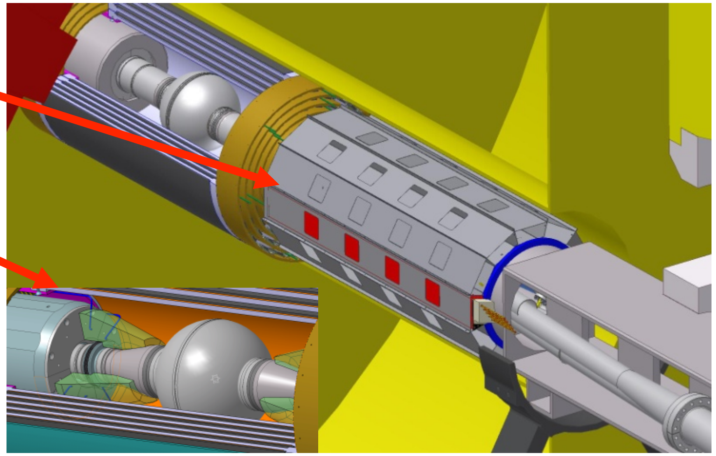
Plastic scintillators (strong energy-position correlation $\Rightarrow$ use the DAΦNE magnets as $e^{\pm}$ spectrometer)

…to KLOE-2…(Step1)



Major detector upgrade

- Inner tracker (between the beam pipe and the DC): 5 layers of cylindrical triple GEM:
  - improve vertex reconstruction near the IP
- QCALT: W + scint. tiles
  readout by SiPM via WLS fibers



- CCAL: LYSO crystals + APD; close to IP to increase acceptance for photons coming from the IP (min. angle: 21°→ 9°)
- Partially funded
  Time scale: installation in late 2011

KLOE-2 Physics program

- $\gamma\gamma$ physics
  - Study of $\Gamma(S/PS \to \gamma\gamma)$, test of χPT, existence and properties of $\sigma(600)$ meson, PS Transition Form Factor

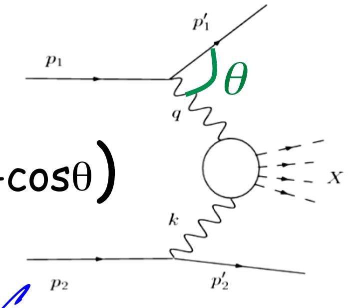
- Kaon Physics
  - Test of CPT (and QM) in correlated kaon decays
  - Test of CPT in K_S semileptonic decays
  - Test of SM (CKM unitarity, lepton universality)
  - Test of χPT (K_S decays)

- Spectroscopy of light mesons
  - η, η', f_0, a_0, σ in ϕ radiative decays

- Dark Matter searches (light bosons at O(1 GeV))

- Hadronic cross section from $2m_\pi$ to 2.4 GeV
  - $\alpha_{em}(M_Z)$ and (g-2)

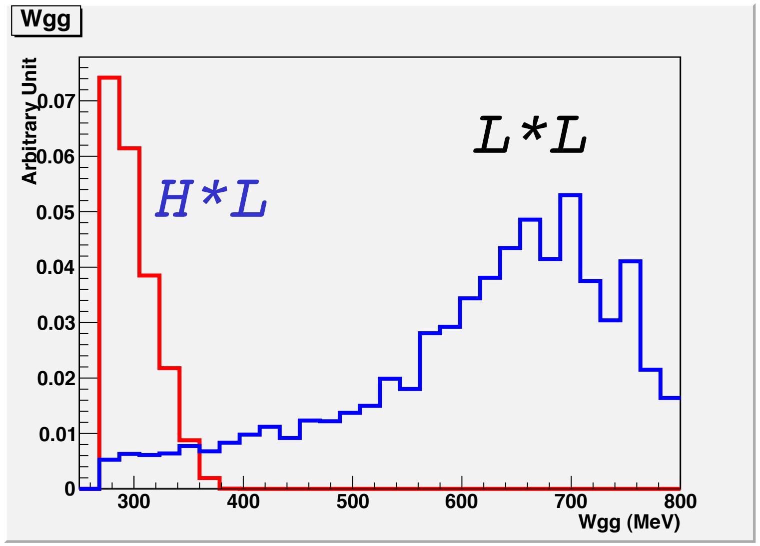
$\gamma\gamma$ - physics: $e^+e^- \rightarrow e^+e^- \gamma^* \gamma^* \rightarrow e^+e^- X$

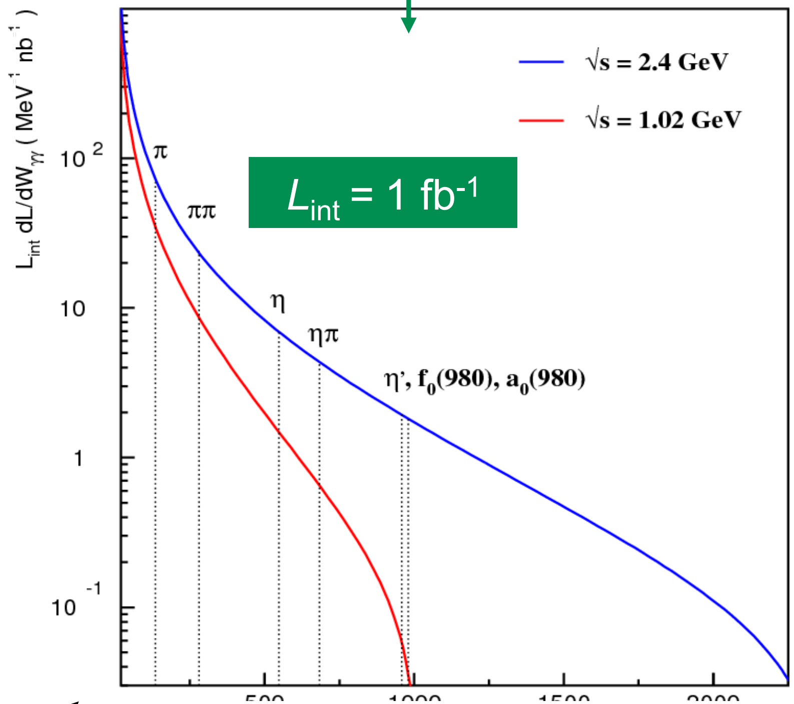


$q^2 = -2EE'(1-\cos\theta)$

- $X = \pi\pi \Rightarrow \sigma$ meson
- $X = \pi^0, \eta, (\eta') \Rightarrow \Gamma(X \rightarrow \gamma\gamma)$; Transition Form Factors $F_{X\gamma\gamma}(q_1^2, q_2^2) \Rightarrow$ LbL?
- Tagger is essential to reduce bckg from ϕ and to close the kinematics

$$\frac{dN_X}{dW_{\gamma\gamma}} = \mathcal{L}_{int} \frac{d\mathcal{L}}{dW_{\gamma\gamma}} \sigma(\gamma\gamma \rightarrow X)$$





At $\sqrt{s} > 1.02$ GeV $\gamma\gamma$ coupling of $a_0(980)$, $f_0(980)$ and larger statistics for π^0, η, η'

$\sqrt{s}$ (GeV)	π^0	η	η'
1.02	4.1×10^5	1.2×10^5	1.9×10^4
2.4	7.3×10^5	3.7×10^5	3.6×10^5

The σ meson case : Theory …

PDG 2008

V. Interpretation of the scalars below 1 GeV: In the literature, many suggestions are discussed such as conventional $q\bar{q}$ mesons, $q\bar{q}q\bar{q}$ or meson-meson bound states mixed with a scalar glueball. In reality, they can be superpositions of these components, and one depends on models to determine the dominant one. Although we have seen progress in recent years, this question remains open. Here, we mention some of the present conclusions.

$f_0(600)$ BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(600–1000) OUR ESTIMATE				
335±67	[35] MURAMATSU	02	CLEO	$e^+e^- \approx$ 10 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$324^{+42}_{-40}\pm21$	AITALA	01B	E791	$D^+ \to \pi^-\pi^+\pi^+$
372^{+229}_{-95}	[36] ISHIDA	01		$\Upsilon(3S) \to \Upsilon\pi\pi$
540	[37] ASNER	00	CLE2	$\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$
372±80	ISHIDA	00B		$p\bar{p} \to \pi^0\pi^0\pi^0$
119±13	ALEKSEEV	99	SPEC	1.78 $\pi^- p_{polar} \to \pi^-\pi^+ n$
77±22	ALEKSEEV	98	SPEC	1.78 $\pi^- p_{polar} \to \pi^-\pi^+ n$
35±12	[38] TROYAN	98		5.2 $np \to np\pi^+\pi^-$
780±60	ALDE	97	GAM2	450 $pp \to pp\pi^0\pi^0$
385±70	[39] ISHIDA	97		$\pi\pi \to \pi\pi$
290±54	[40] SVEC	96	RVUE	6–17 $\pi N_{polar} \to \pi^+\pi^- N$
~ 880	[41,42] TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\bar{K}$, $K\pi$, $\eta\pi$
460±40	[43,44] ANISOVICH	95	RVUE	$\pi^- p \to \pi^0\pi^0 n$, $\bar{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\pi^0\eta$, $\pi^0\eta\eta$
~ 3200	[45] ACHASOV	94	RVUE	$\pi\pi \to \pi\pi$
494±58	[40] AUGUSTIN	89	DM2	

In such models inspired by the linear sigma model the light $\sigma(600)$ is often referred to as the "Higgs boson of strong interactions", since the σ plays a role similar to the Higgs particle in electro-weak symmetry breaking. It is important for chiral symmetry breaking which generates most of the proton and η' mass, and what is referred to as the constituent quark mass.

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Mass and Width of the Lowest Resonance in QCD

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(Received 29 December 2005; published 5 April 2006)

We demonstrate that near the threshold, the $\pi\pi$ scattering amplitude contains a pole with the quantum numbers of the vacuum—commonly referred to as the σ—and determine its mass and width within small uncertainties. Our derivation does not involve models or parametrizations but relies on a straightforward calculation based on the Roy equation for the isoscalar S wave.

$$M_\sigma = 441^{+16}_{-8}\ \text{MeV}, \qquad \Gamma_\sigma = 544^{+18}_{-25}\ \text{MeV}.$$

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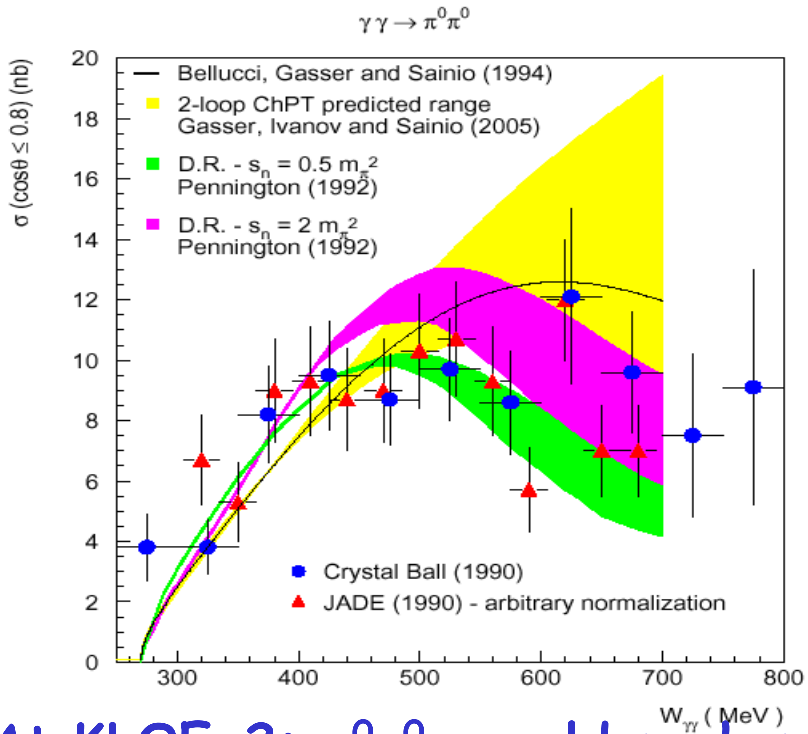
PHYSICS LETTERS B
Physics Letters B 662 (2008) 424–430
www.elsevier.com/locate/physletb

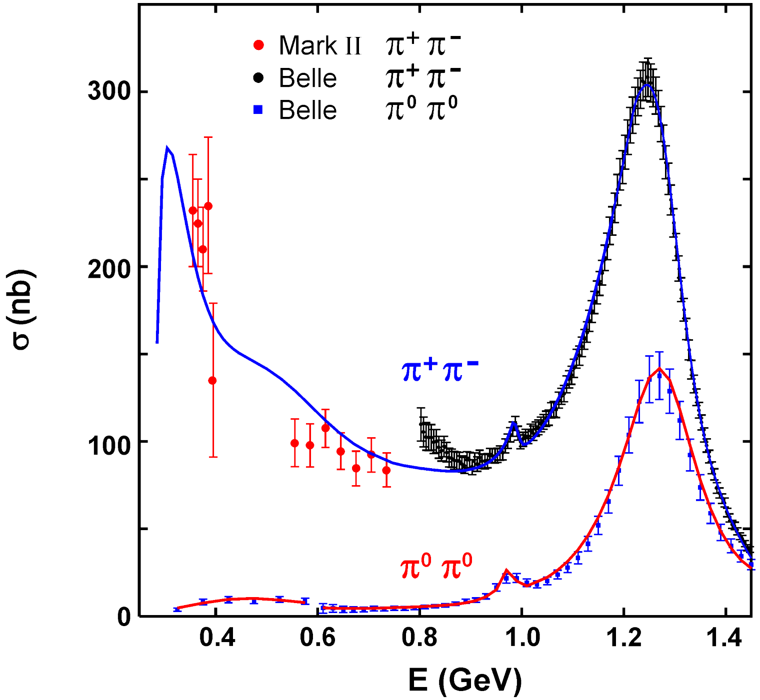
A theory of scalar mesons

G. 't Hooft [a], G. Isidori [b,c], L. Maiani [d,e], A.D. Polosa [e,*], V. Riquer [e]

The σ meson case : Experimental point of view

Cleanest channel to assess existence & nature (2q *vs* 4q) of the σ is $\gamma\gamma \rightarrow \pi^0\pi^0$ at low energy





•At KLOE-2: $\pi^0\pi^0 \Rightarrow$ golden channel (with $\mathcal{L}$=5 $fb^{-1} \Rightarrow$ err. ≈ 2%); $\pi^+\pi^-$ possible?

Recent measurements from Belle limited at $m_{\pi\pi}$> 0.6 GeV

Preliminary results from KLOE

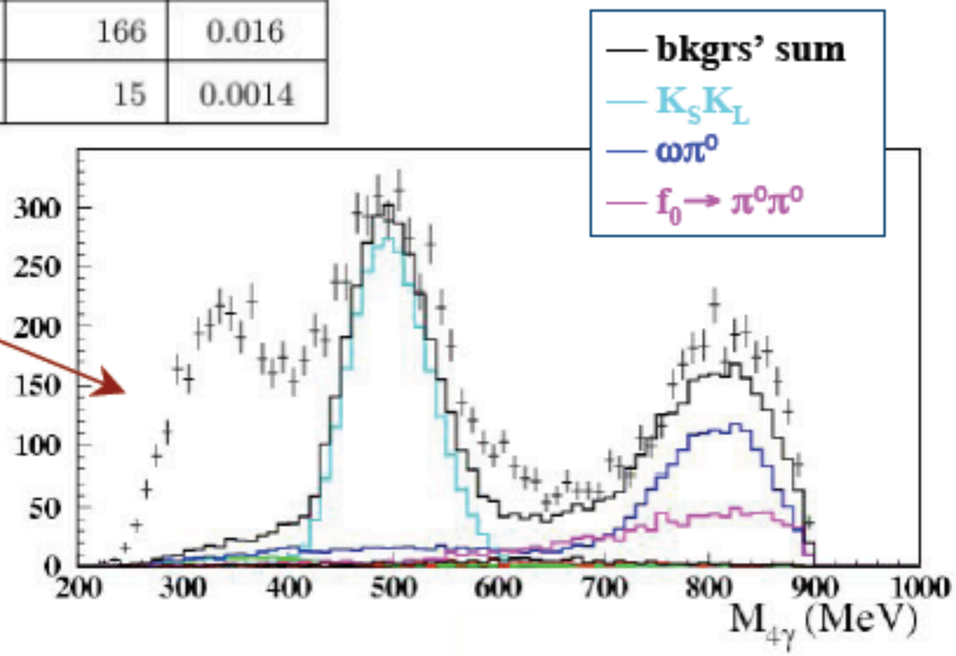
$e^+e^- \to e^+e^-\pi^0\pi^0$: expected background yields

	ϵ	σ (nb)	$n = \epsilon L \sigma$	$n/10188$
$K_S K_L$	5.60×10^{-3}	2.0	2 682	0.26
$\eta \to 3\pi^0$	1.79×10^{-3}	0.33	142	0.014
$\omega\pi^0$	1.55×10^{-2}	0.55	2 045	0.2
$f_0 \to 2\pi^0$	2.58×10^{-2}	0.17	1 052	0.10
$a_0 \to \eta\pi^0$	4.55×10^{-3}	0.11	120	0.012
$e^+e^- \to \gamma\gamma$	1.92×10^{-5}	360	166	0.016
$\eta \to \gamma\gamma$	1.57×10^{-4}	0.39	15	0.0014

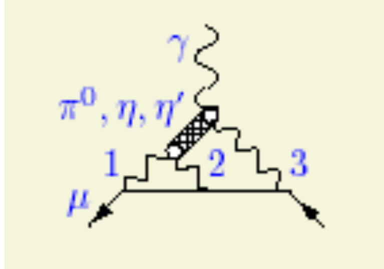
from 239.6 pb^{-1}
10188 events after selection

we observe a clear evidence of $e^+e^- \to e^+e^-\pi^0\pi^0$ events at low $M_{4\gamma}$

the precise yield estimate depends on assumptions for the background processes



Impact of $\gamma^*\gamma^*$ on Light-by-Light?



- The LbL contribution is dominated by the π^0 exchange with 2 virtual $\gamma \Rightarrow F_{\pi^0\gamma^*\gamma^*}(q_1^2,q_2^2)$
- No available data in the low energy region

ELSEVIER

Nuclear Physics B (Proc. Suppl.) 131 (2004) 162–169

NUCLEAR PH… PROCEED… SUPPLEM… www.elsevierphy…

The muon $g-2$ in the Standard Model and beyond

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We review the present status of the theoretical evaluation of the anomalous magnetic moment of th… a_μ in the Standard Model. We mainly focus on the hadronic contributions due to vacuum polarization light-by-light scattering and higher order electroweak corrections and their uncertainties. We also discus… new physics contributions to the muon $g-2$ and bounds on such models from the experimental value for…

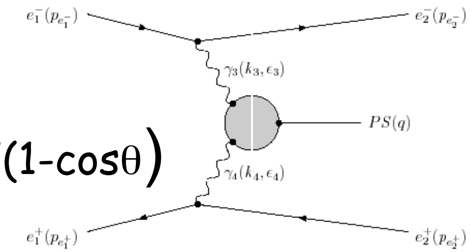
Pion-pole contribution

The contribution from the neutral pion intermediate state is given by a two-loop integral that involves the convolution of two pion-photon-photon transition form factors $\mathcal{F}_{\pi^0\gamma^*\gamma^*}(q_1^2,q_2^2)$, see Fig. 3(c). We refer to Ref. [30] and references therein for all the details. Since no data on the doubly off-shell form factor $\mathcal{F}_{\pi^0\gamma^*\gamma^*}(q_1^2,q_2^2)$ is available, one has to resort to models. We considered a certain class of form factors which includes the ones based on large-N_C QCD that we had studied in Ref. [32]. These form factors include

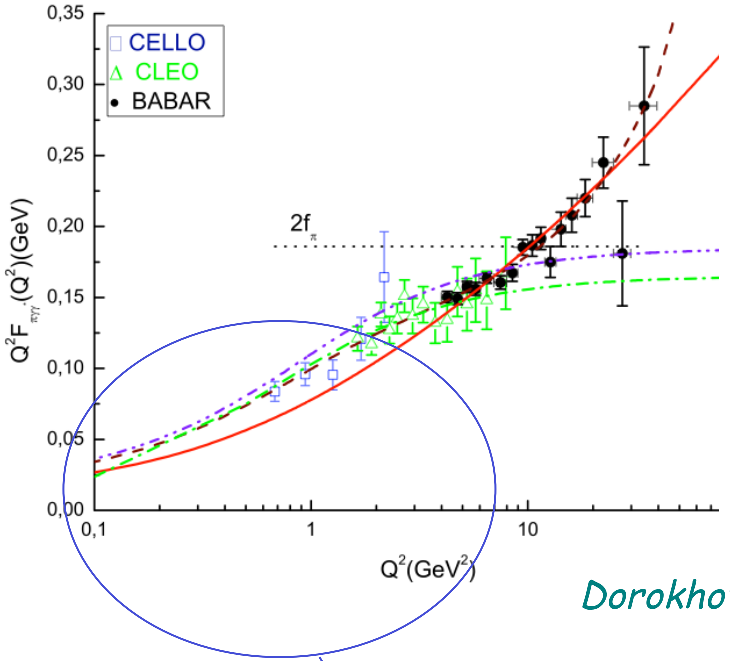
$F_{\pi^0\gamma^*\gamma^*}(q_1^2,q_2^2)$ *can be obtained from* $e^+e^- \rightarrow e^+e^-\pi^0$ ($\theta_{e\pm}$>20°).

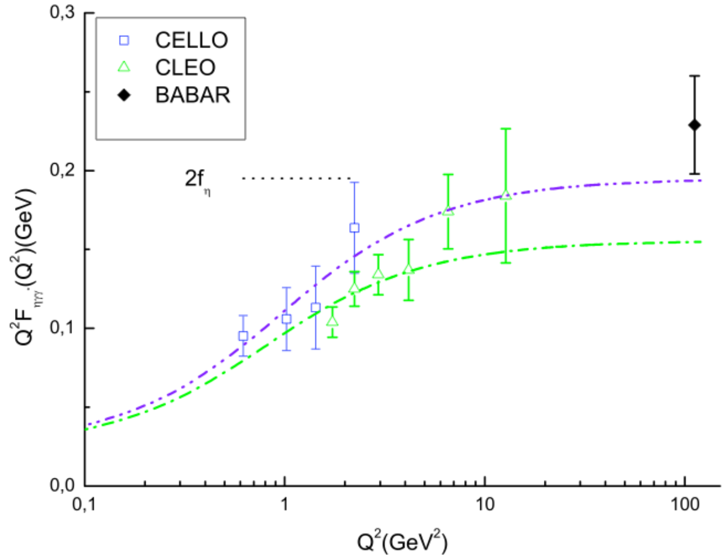
q^2 *is obtained by measuring E and θ of* $e^\pm$

$q^2 = -2EE'(1-\cos\theta)$



Transition form factors $F_{P\gamma\gamma}(Q^2,0)$





Dorokhov: 0912.5278

KLOE-2 could fill this region

$K_S \to \gamma\gamma$

- It is a good test for ChPT
  (PRD 49 (1994) 2346)
- From 2003 it is known with a small error (3%) :

$BR(K_S \to \gamma\gamma) = (2.71 \pm 0.06 \pm 0.04) \times 10^{-6}$

due to a measurement of NA48/1 collaboration

- Differs from ChPT $O(p^4)$ by 30% (large $O(p^6)$ contribution ??).

In KLOE the major background is $K_S \to 2\pi^0$ with 2 photons lost in the beam-pipe and/or colliding into QCAL.

$$BR(K_S \to \gamma\gamma) = \\ = (2.26 \pm 0.12_{stat} \pm 0.06_{syst}) \times 10^{-6}$$

6% total uncertainty.
3σ far from NA48/1 result, but confirming ChPT prediction.

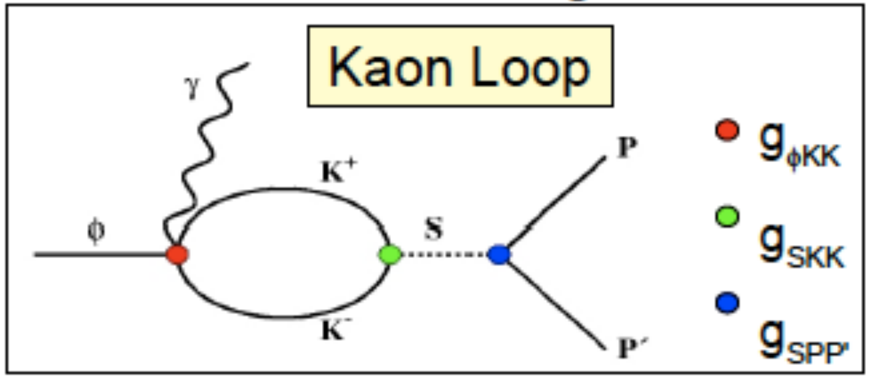
@ *Step1* HW upgrade → bkg reduction of ×3

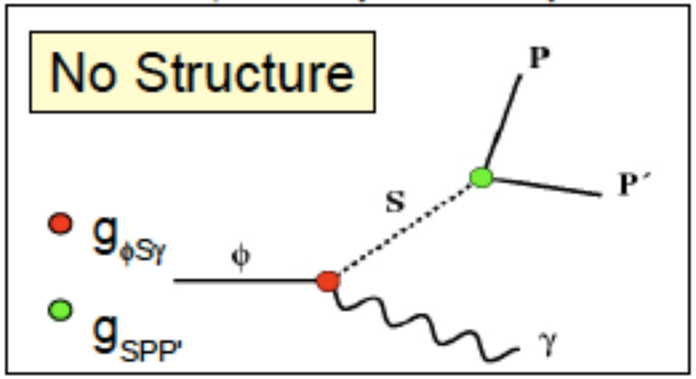
- *new QCALT*
- *CCALT added.*

S/B from 1/3 to 1. ***Total uncertainty less than 3% to solve $K_S \to \gamma\gamma$ puzzle.***

Scalars @ KLOE-2 : $\phi \to S\gamma \to PP'\gamma$

The scalar structure below 1 GeV : ($q\bar{q}$, $qq\bar{q}\bar{q}$, $K\bar{K}$, ..) is a open question





Channel	M_{f0} (MeV)	g_{f0KK} (GeV)	$g_{f0\pi\pi}$ (GeV)	$g^2_{f0KK}/g^2_{f0\pi\pi}$
$\pi^0\pi^0\gamma$	$984.7 \pm 1.9_{mod}$	$3.97 \pm 0.43_{mod}$	$-1.82 \pm 0.19_{mod}$	~4.8
$\pi^+\pi^-\gamma$	983.7	4.74	−2.22	~4.6

In our case PP':

$\pi^o\pi^o \to f_0(980)/\sigma(600)$

$\pi^+\pi^- \to f_0(980)/\sigma(600)$

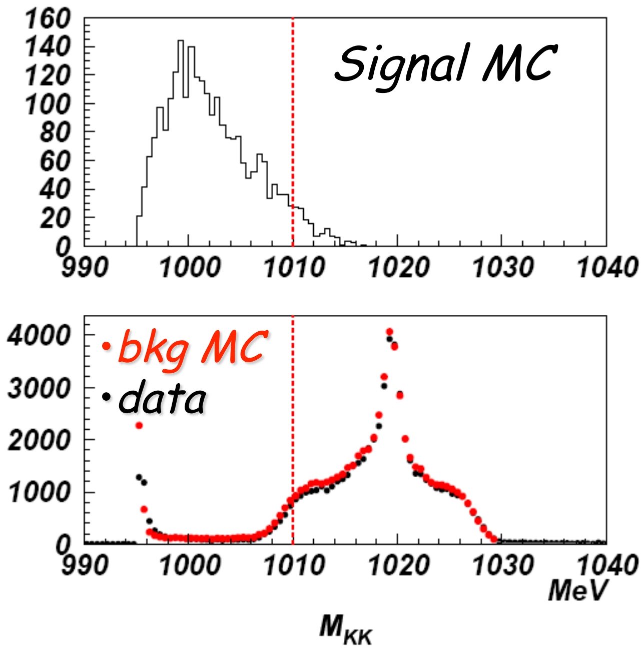
$\eta\pi^o \to a_0(980)$

The parameter of the "Kaon Loop" was extracted by 500 pb^{-1} of data. KLOE-2 aspect 20 times more statistics

$\phi \to (f_0/a_0)\gamma \to K^0\overline{K}^0\gamma$

- $K^0\overline{K}^0$ *with scalar quantum numbers ($J^{PC}=0^{++}$)*
- *Small phase space($2M_K \le M_{KK} \le M_\phi$)*
  $\Rightarrow$ *small Br expected (10^{-9} - 10^{-7})*
- *"Golden channel"* $\phi \to K_S K_S \gamma \to \pi^+\pi^-\pi^+\pi^-\gamma$
- *Analyzed sample: 2.18 fb^{-1}*
- *5 events in data and 3.2 background events (MC) ($\pi^+\pi^-\pi^+\pi^-(\gamma)$ from $\phi \to K_S K_L$ and from continuum)*

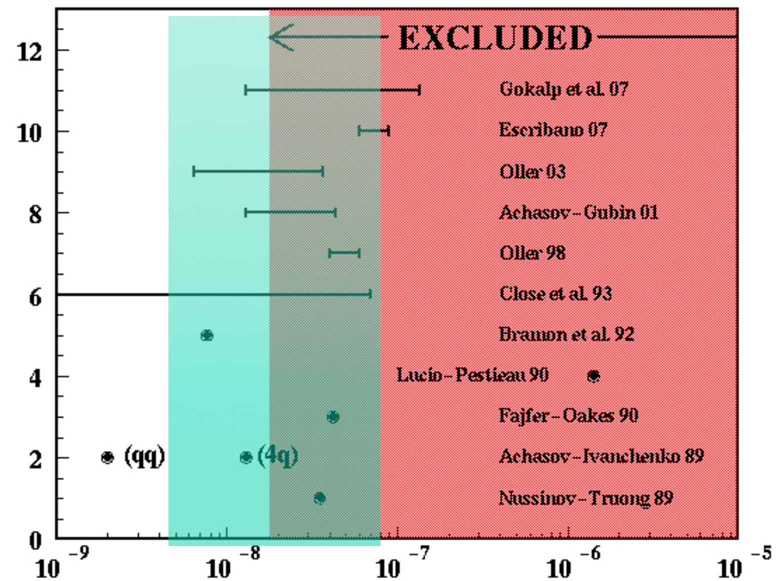
$$\mathrm{Br}(\phi \to K^0\overline{K}^0\gamma) < 1.9\times10^{-8}\ @\ 90\%\ \mathrm{C.L.}$$



- *Consistency check: using the KLOE couplings from $\phi \to \pi\pi\gamma$, $\eta\pi^0\gamma$ in the Kaon Loop model*

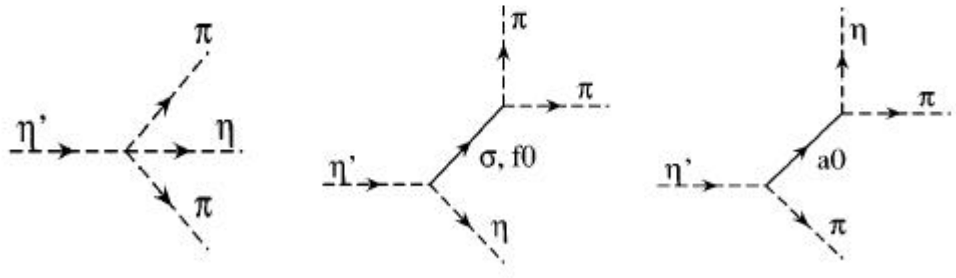
$$\Rightarrow \mathrm{Br}(\phi \to K^0\overline{K}^0\gamma) = 4\times10^{-9} - 6.8\times10^{-8}$$

- *KLOE-2 sensitivity (with Inner Tracker)* $\Rightarrow$ *0.5×10^{-8}*
  $\Rightarrow$ *First observation possible*

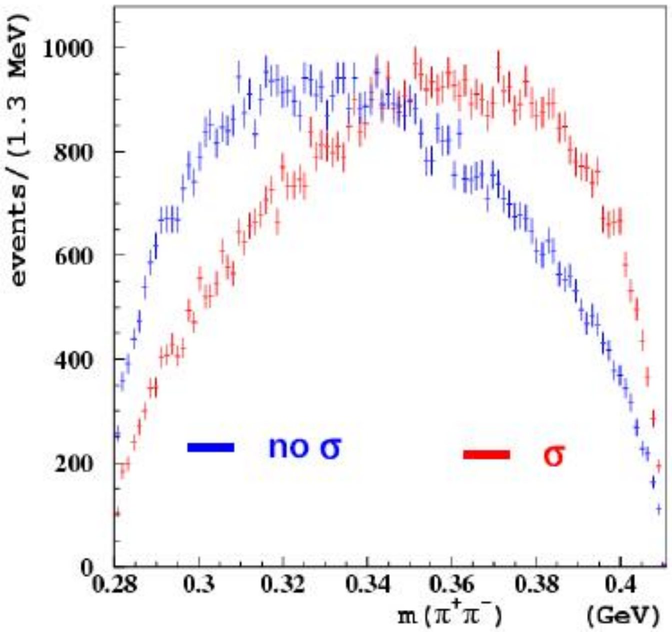


Starting from $\phi \to \eta' \gamma$...

The $\eta' \to \eta\pi\pi$ decay is sensitive to scalar mesons



Expected at KLOE-2:
287000 $\eta' \to \eta\pi^+\pi^-$ ($\eta \to \gamma\gamma$) ε=22.8%
$\Rightarrow$65500 events



η−η' mixing

If we define $|N\rangle = (|u\bar{u}\rangle + |d\bar{d}\rangle)/\sqrt{2}$ $|S\rangle = |s\bar{s}\rangle$ $|G\rangle = |\text{gluonium}\rangle$

$$|\eta'\rangle = \cos\psi_G \sin\psi_P |N\rangle + \cos\psi_G \cos\psi_P |S\rangle + \sin\psi_G |G\rangle$$
$$|\eta\rangle = \cos\psi_P |N\rangle - \sin\psi_P |S\rangle$$

where ψ_P is the η-η' mixing angle

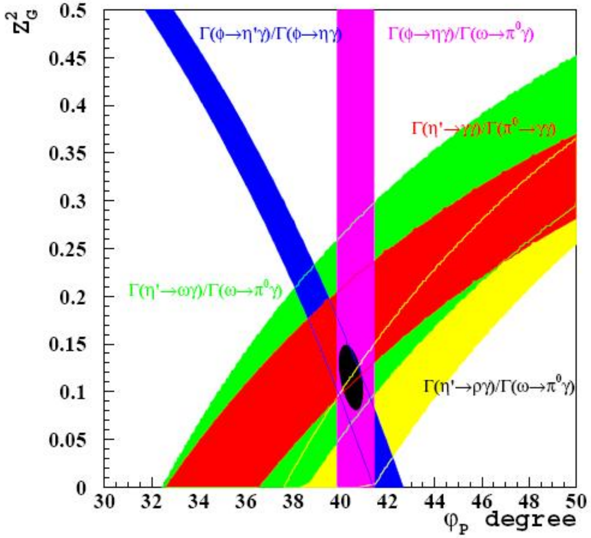
$Z_G^2 = \sin^2\psi_G$ is the gluonium fraction in the η'

η′ gluonium content

KLOE extracted ψ_P=(40.4±0.6)° and a gluonium content of η′, Z^2=0.12±0.04 from

$$R = \frac{Br(\phi \to \eta'\gamma)}{Br(\phi \to \eta\gamma)} = (4.77 \pm 0.09 \pm 0.19) \times 10^{-3}$$

[systematics dominated by $\delta Br(\eta' \to \eta\pi\pi)$]



Fit result driven by $\Gamma(\eta' \to \gamma\gamma)/\Gamma(\pi^0 \to \gamma\gamma)$

$e^+e^- \to e^+e^-\eta' \to e^+e^- X$ @ $\sqrt{s}$ = 1.4 GeV

expected evts/1 fb^{-1}:

	$\mathcal{B}_{\eta' \to F}$ (%)	preferable chain ↔ $\mathcal{B}_{eff}$ (%)	events
$\pi^+\pi^-\eta$	44.6 ± 1.4	$\pi^+\pi^-\eta(\to 2\gamma) \leftrightarrow 17.5$	7 000
$\pi^+\pi^-\gamma$	29.4 ± 0.9		12 000
$\pi^0\pi^0\eta$	20.7 ± 1.2	$\pi^0\pi^0\eta(\to \pi^+\pi^-\pi^0) \leftrightarrow 4.7$	2 000
$\omega\gamma$	3.02 ± 0.31	$\omega(\to \pi^+\pi^-\pi^0)\gamma \leftrightarrow 2.7$	1 200
$\gamma\gamma$	2.10 ± 0.12		800

Measuring all the main Br's @ 1% :

1) the sensitivity to Z^2 will not depend on $\eta' \to \gamma\gamma$

2) statistical significance of Z^2 will increase to 4 – 5 σ

More exotic channels

Example of CPT and QM tests: $\phi \to K_S K_L \to \pi^+\pi^- \pi^+\pi^-$

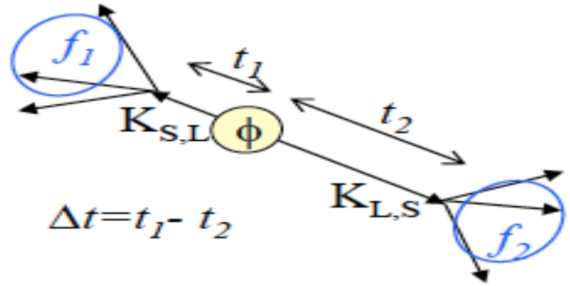
$$I(\pi\pi,\pi\pi;|\Delta t|) \propto e^{-\Gamma_L|\Delta t|} + e^{-\Gamma_S|\Delta t|} - 2\cdot(1-\zeta_{00})\cdot e^{-(\Gamma_S+\Gamma_L)|\Delta t|/2}\cos(\Delta m|\Delta t|)$$

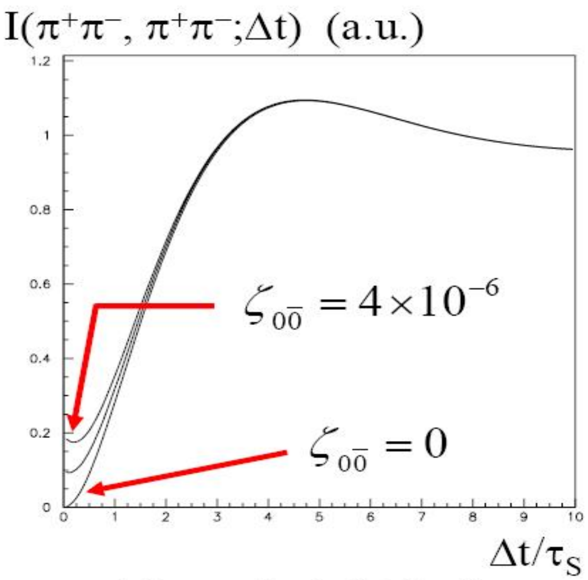
interference term modified introducing a decoherence parameter ζ_{00}.

CPT violation could also change initial state

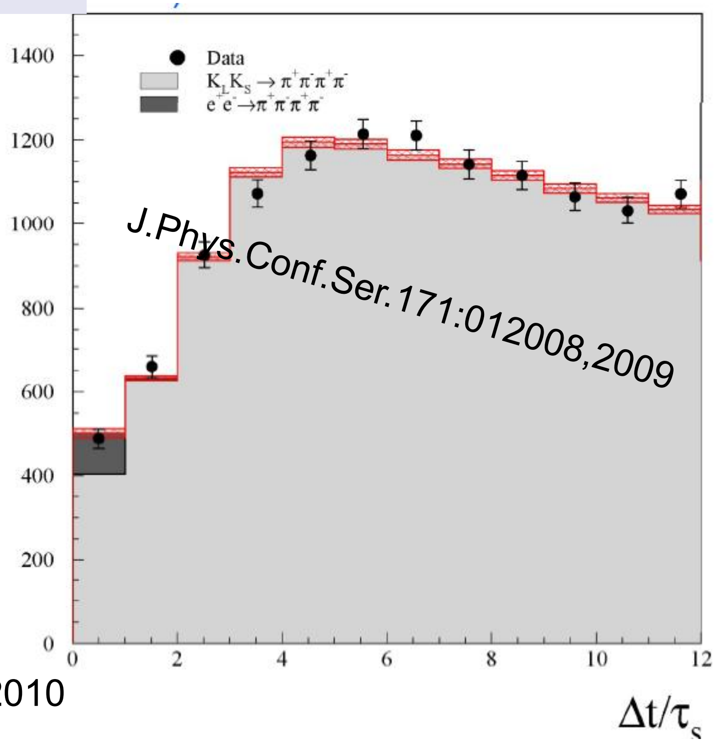
$$|i\rangle \propto (K_S K_L - K_L K_S) + \omega(K_S K_S - K_L K_L)$$

$|\omega| < 1.0\ 10^{-3}$ @ 95% C.L:





Theoretical distribution



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What KLOE-2 can do ?

$$\zeta_{0\bar{0}} = (1.4 \pm 9.5_{STAT} \pm 3.8_{SYST}) \times 10^{-7}$$

Present situation

From CPLEAR data, Bertlmann et al. (PR D60 (1999) 114032) obtain:

$$\zeta_{0\bar{0}} = 0.4 \pm 0.7$$

In the B-meson system, BELLE coll. (PRL 99 (2007) 131802) obtains:

$$\zeta^{B}_{0\bar{0}} = 0.029 \pm 0.057$$

	KLOE L=1.5 fb^{-1}	KLOE-2 L=5 fb^{-1}	KLOE-2 L=50 fb^{-1} with IT
ζ_{00}	$(1.4 \pm 10.2) \times 10^{-7}$	$\pm 6.4 \times 10^{-7}$	$\pm 0.1 \times 10^{-6}$
ζ_{SL}	$(0.3 \pm 1.9) \times 10^{-2}$	$\pm 1.2 \times 10^{-2}$	$\pm 0.2 \times 10^{-2}$
γ	$(0.7 \pm 1.2) \times 10^{-21}$ GeV	$\pm 0.7 \times 10^{-21}$ GeV	$\pm 0.1 \times 10^{-21}$ GeV
Re(ω)	$(-1.6 \pm 3.0) \times 10^{-4}$	$\pm 1.7 \times 10^{-4}$	$\pm 2 \times 10^{-5}$
Im(ω)	$(-1.7 \pm 3.5) \times 10^{-4}$	$\pm 2.2 \times 10^{-4}$	$\pm 2 \times 10^{-5}$

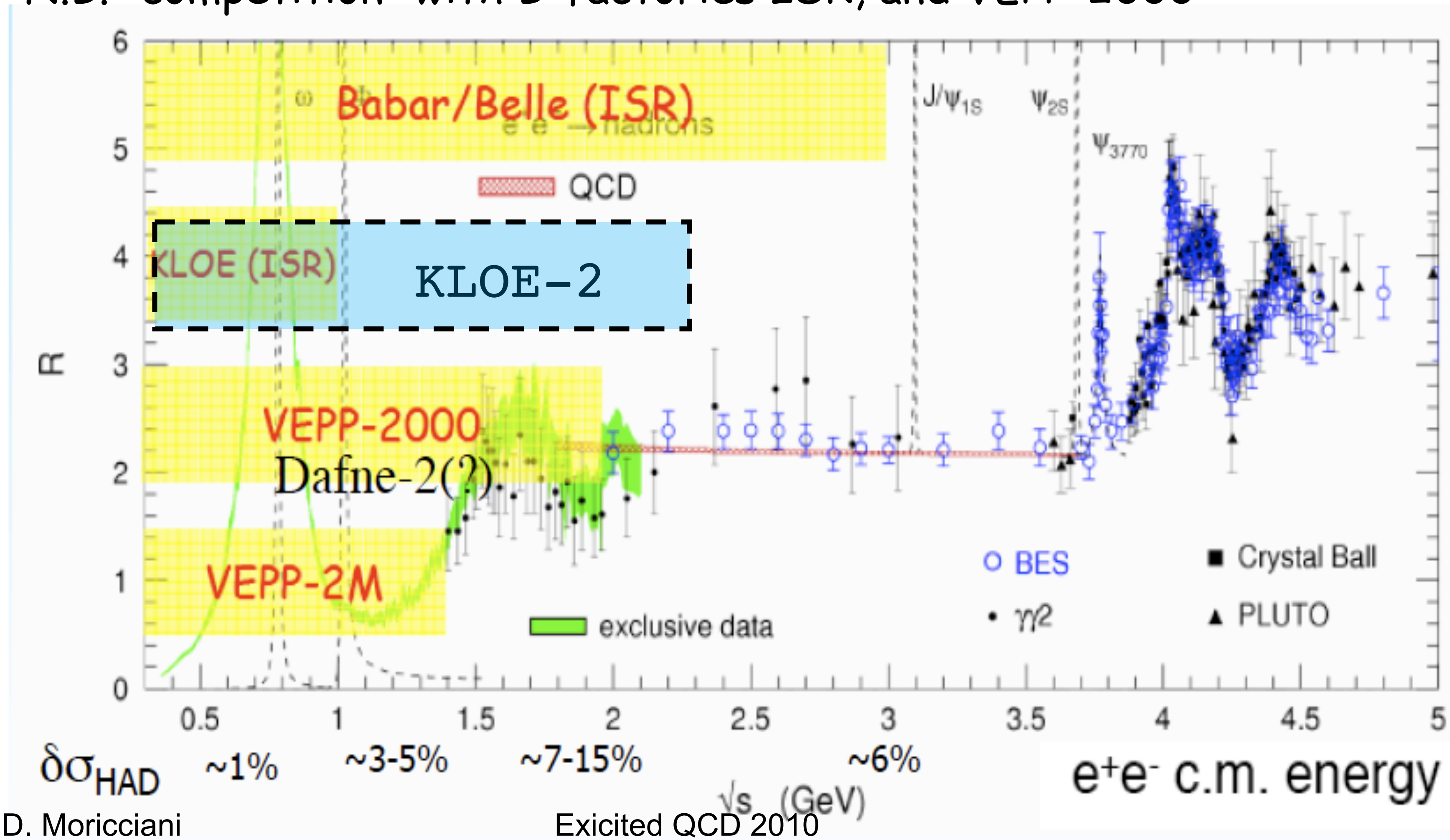
Large improvement !

Measurement of hadronic cross sections from $2m_\pi$ to 2.4 GeV

➔ Hadronic contribution to $(g-2)_\mu$ and α_{em}

➔ Spectroscopy of vector mesons

N.B. "competition" with B-factories ISR, and VEPP-2000



A rough estimation of a_μ

$a_\mu^{exp} - a_\mu^{theo,SM} = (27.7 \pm 8.4) \cdot 10^{-10}$ $(3.3\ \sigma)$

$8.4 =\sim 5_{HLO} + 3_{LbL} + 6_{EXP}$

There is real option to news $(g-2)_\mu$ experiment @ FNAL, KEK : $6_{EXP} \rightarrow 1.6_{EXP}$

$\delta a_\mu^{HLO} = 5.29 \approx 3(\sqrt{s} < 1GeV) + 3.9(1GeV < \sqrt{s} < 2GeV)$

KLOE2 (Step2) would like to measure σ_{HAD} at energy below 2GeV : $\delta\sigma_{HAD} \sim 0.4\ \%$ $(\sqrt{s} < 1GeV)$ and $\delta\sigma_{HAD} \sim 2\ \%$ $(1GeV < \sqrt{s} < 1GeV)$. This implies $\delta a_\mu^{HLO} = 3$ and δa_μ of the order $(7 \div 8)\ \sigma$

→ CLEAR SIGNATURE OF SUSY SHOULD BE VISIBLE

Conclusion

- New DAFNE interaction scheme (crab waist) successfully implemented, luminosity increased by a factor of ~3 ($\mathcal{L}_{MAX}$~4 $10^{32}cm^{-2}s^{-1}$)
- KLOE-2: extended KLOE physics program at DAFNE upgraded both in **luminosity** O(20 fb^{-1}) and **energy** ($2m_\pi<\sqrt{s}<2.4$ GeV)
- Rich physics program:
  - Kaon physics - e.g. quantum interferometry, K_S decays
  - Scalar/PS physics - $f_0/a_0 \rightarrow KK\gamma$; η-η'-mixing, $\eta \rightarrow \pi\gamma\gamma$, Dalitz and double-Dalitz decays, CP violation,...
  - $\gamma\gamma$ physics ($\Gamma(S/PS \rightarrow \gamma\gamma)$), test of χPT, σ meson, PS Transition FF LbL?)
  - Precision measurement (~1%) of the hadronic cross section $2m_\pi<\sqrt{s}<2.4$ GeV
  - Search for new physics at O(1 GeV) (Light bosons? Dark Matter particles?)
- KLOE detector will be upgraded by a $\gamma\gamma$ tagger (funded), an Inner Tracker, and calorimeters in the forward regions (partially funded)

- KLOE-2 will restart data taking next months. The next 3 years are essentially approved, while the rest of the running will depend very much on the future of the laboratory (SuperB?)

New collaborators are WELCOME!!!