9th meeting of the WG Radio Monte CarLow

H. Czyz/G. Venanzoni

Frascati 28-29 April 2011

Disclaimer: This is the first meeting with a (a small) fee…

- Sorry for that but this time we got almost “0” support from INFN and we think this is a preferable solution wrt not having social dinner, coffee breaks, etc...

- Rita has prepared the receipts. So please ask her (in the case you haven’t taken it)

Agenda: Today

Monday 28 March 2011

top

14:30->*15:00* **Introduction H. Czyz/G. Venanzoni**

15:00->*16:00* **MonteCarlo for R Measurements and Luminosity with energy scan**

- 15:00 MCGPJ and BabaYaga@NLO for BES-III (30') — Ping Wang (*IHEP*)
- 15:30 Studies on accuracy of the contributions from pair production in Babayaga generator - a status report (30') — Michal Gunia (*Institute of Physics, Univ. of Silesia*)

16:00->*16:30* **FSR**

- 16:00 Forward-Backward Asymmetry and Pion Form Factor Contributions to e^+ e^- --> pi^+ pi^- Gamma (30') — Sandro Gorini (*University of Mainz*)

16:30 Coffee Break (30')

17:00->*17:30* **Status of Dafne and KLOE-2**

- 17:00 Status of Dafne and KLOE-2 (30') — Fabio Bossi (*LNF*)

17:30->*19:00* **(g-2) and alpha_em**

- 17:30 Updates on g-2 and alpha_em (30') — Thomas Teubner (*University of Liverpool*)
- 18:00 rho -gamma mixing and e+e- vs. tau spectral functions (30') — Robert Szafron (*Institute of Physics, Univ. of Silesia*)
- 18:30 Status of LbL calculation after Seattle (30') — Fred Jegerlehner (*DESY Zeuthen*)

19:00->*19:30* **Discussion**

Agenda: Tomorrow

Tuesday 29 March 2011 top

09:00->*10:00* **Gamma Gamma physics**

09:00	EKHARA: a Monte Carlo tool for gamma-gamma physics (30')	Henryk Czyz (*Institute of Physics, Univ. of Silesia*)
09:30	Status of gamma taggers and measurement of pi^0 width at KLOE-2 (30')	Dario Moricciani (*RM2*)

10:00->*11:00* **Tau**

10:00	Resonance Chiral Theory and its predictions, case of 2pi 3pi final staes in TAUOLA MC: status report (30')	Olga Shekhovstova (*LNF*)
10:30	Experimental status of tau decays into three pseudoscalars and comparison to MC (20')	Simon Eidelman (*Budker Institute of Nuclear Physics*)
11:00	Coffee Break (30')	

11:30->*13:00* **Common session with KLOE-2**

11:30	Status of CMD-3 detector at VEPP-2000 (30')	Gennady Fedotovich (*Budker Institute of Nuclear Physics*)
12:00	Status of g-2 and alpha_em (20')	Thomas Teubner (*University of Liverpool*)
12:20	Tau vs e+e- (20')	Fred Jegerlehner (*DESY Zeuthen*)
12:40	Report from Seattle on LbL (20')	Simon Eidelman (*Budker Institute of Nuclear Physics*)

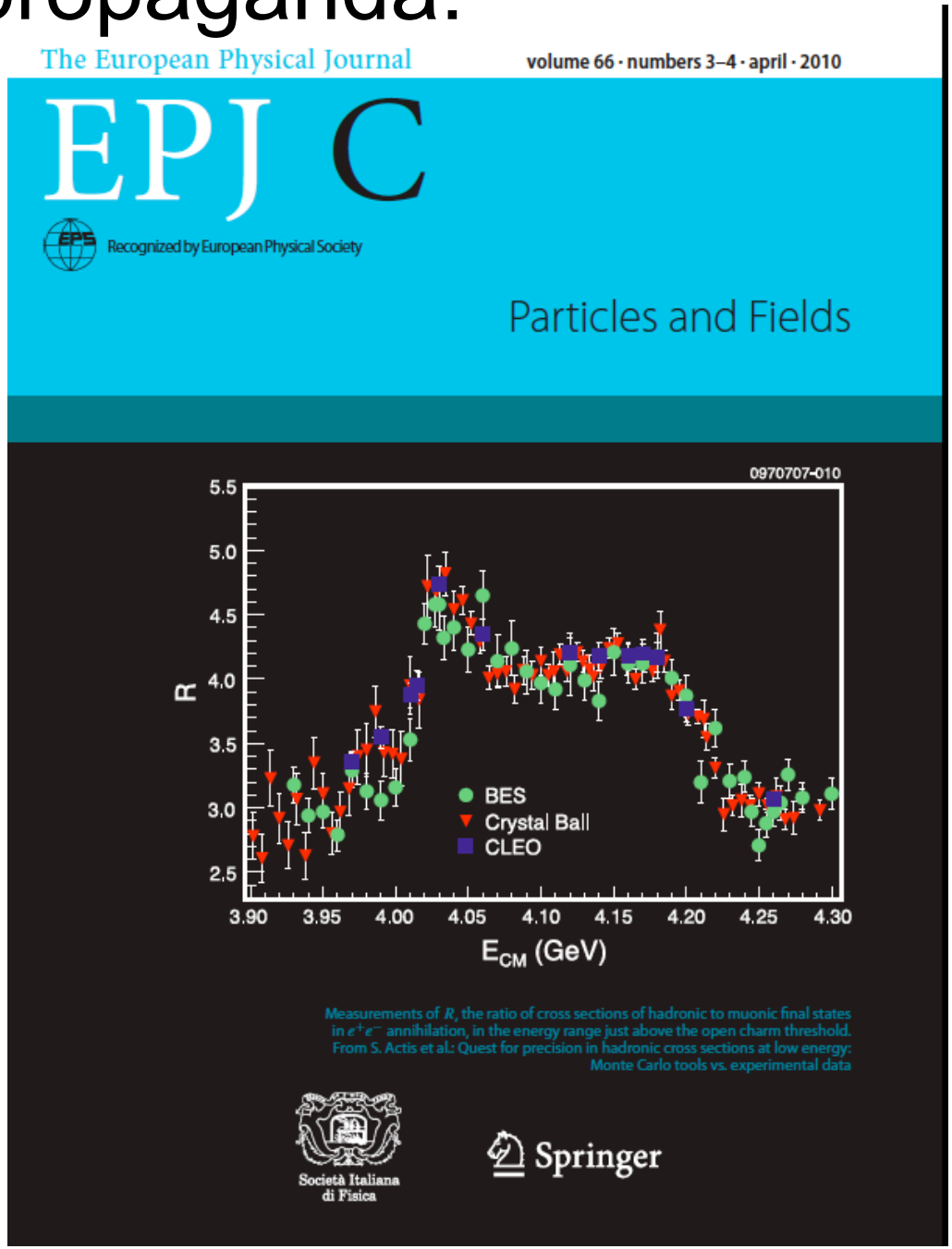
At 11:30 we will move to Aula Toushek for the session with KLOE2

Usual propaganda:

The paper "Quest for precision in hadronic cross sections at low energy: Monte Carlo tools vs. experimental data" has been published on the **Eur. Phys. J. C. Volume 66, Issue 3 (2010), Page 585**

Thanks again to all authors!!!

Remember to quote the paper



News respect to Liverpool:

Well…the most “scientific” important news for our community is that Italian SUPERB has been approved.

Just last week the CIPE (Italian interministerial committee which decides on money) has decided to give 250 Meur for SUPERB for the next 3 years!

On the other side, despite the terrible earthquake in Japan (please Simon pass our heartfelt sympathy to our Japanese friends, colleagues and families), there should be also SUPERBelle.
In addition a SuperC-Tau factory is planned in Novosibirsk.
So, together with the existing factories (BEPC,DAFNE,VEPP-2000, KEKB, PEPC, etc…) we should have a brighting future.

Unfortunately this probably means also:

No space for DAFNE-2 at high energy (above 1.4 GeV)

A High-Luminosity e+ e- Collider for Precision Experiments at the GeV scale

Participant no.	Participant organization name	Country
1	Istituto Nazionale di Fisica Nucleare	Italy
2	Uppsala Universitet	Sweden
3	Uniwersytet Jagiellonski	Poland
4	The University of Liverpool	United Kingdom
5	Johannes Gutenberg Universitaet Mainz	Germany
6	Agencia Estatal Consejo Superior de Investigaciones Cientificas	Spain
7	Budker Institute of Nuclear Physics of SB	Russia

Thanks everyone who contributed to the paper!
We did a great job!

Another good news:

The New g-2 @FNAL got a stage-1 approval from DOE.

They are planning a fourfold improvement on the error (δa_μ^{EXP} : $6 \rightarrow 1.4\ 10^{-10}$)

$\delta a_\mu^{HLO} \sim 4 \times 10^{-4}$; $\delta a_\mu^{LbL} \sim 3 \times 10^{-4}$

Improvement of σ_{HAD} at low/intermediate energy will be needed. MC tools very important!
Improving HLbL (by using also $\gamma\gamma$ data) will also be mandatory!

How to reach <1% on σ_{HAD} ?

- Improve experimental accuracy
  - Systematic errors under control?
- Improve theory:
  - RC?
  - Modelling of hadron-photon interaction?
- Tuning comparison of MC generator very important:
  - For luminosity this was done;
  - For ISR and scan still the situation is unsatisfactory, and we should try to improve it.
  - FSR modelling should be improved

This will be more important at Super Flavour factories…

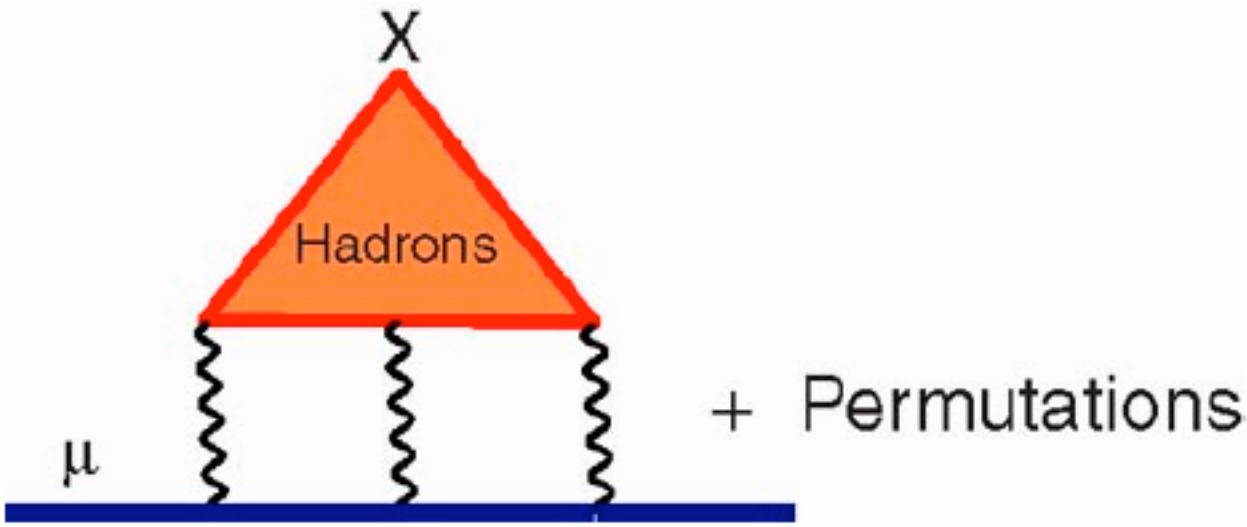
HLbL contribution can be a limiting factor for the calculation of a_μ

- As today $\delta a_\mu^{LbL} = [2.5\text{-}4]10^{-10}$
- $\delta a_\mu^{BNL} = 610^{-10} \rightarrow 1.5\ 10^{-10}$
- How to improve? $\gamma\gamma$ physics can help?
- $\gamma\gamma$ physics (will) is done at (Super) Bfactories. It will also be done at KEDR, KLOE-2 and BESIII with dedicated detectors, in a region where data are scarse
- Also $e^+e^- \rightarrow PS\gamma$

An important meeting

INT Workshop on
The Hadronic Light-by-Light Contribution to the Muon Anomaly

February 28 - March 4, 2011



- Almost all the experts on the field
- More news from Fred, Henryk, Simon, etc…

Structure of the WG

- **Luminosity (G. Montagna, F. Nguyen)**
- **R scan (A. Arbuzov, G. Fedotovich)**
- **ISR (H. Czyz, G. Venanzoni)**
- **Tau (Z. Was, D. Epifanov)**
- **Hadronic VP, g-2 and Δa_{em} (T. Teubner, S. Eidelman)**
- **gamma-gamma physics(S. Ivashin, D. Moricciani)**
- **FSR models (S. Gorini, A. Denig)**

The usual question:

How to improve the critical mass: can we access to European funds (especially for positions)?

Any idea/suggestion ?

- Next meeting in Novosibirsk on 23 September 2011 as satellite of PHIPSI11 Conference. Please contact Simon for more information

International Workshop on e+e- collisions from Phi to Psi

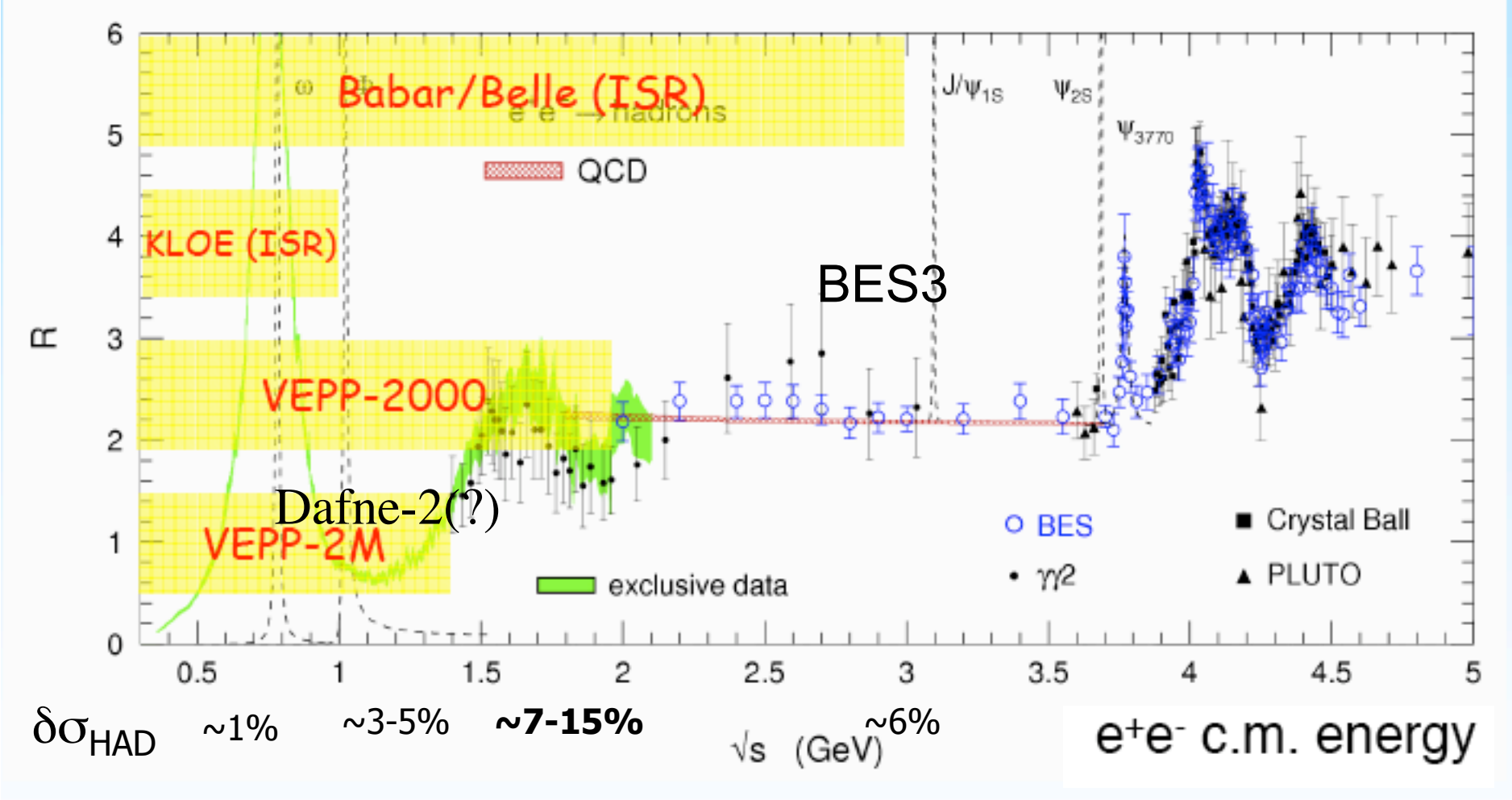
Budker Institute of
Nuclear Physics,
Siberian Branch of Russian
Academy of Science,
Novosibirsk, Russia
September 19-22, 2011

http://phipsi11.inp.nsk.su/

Have a nice meeting!!!!

spare

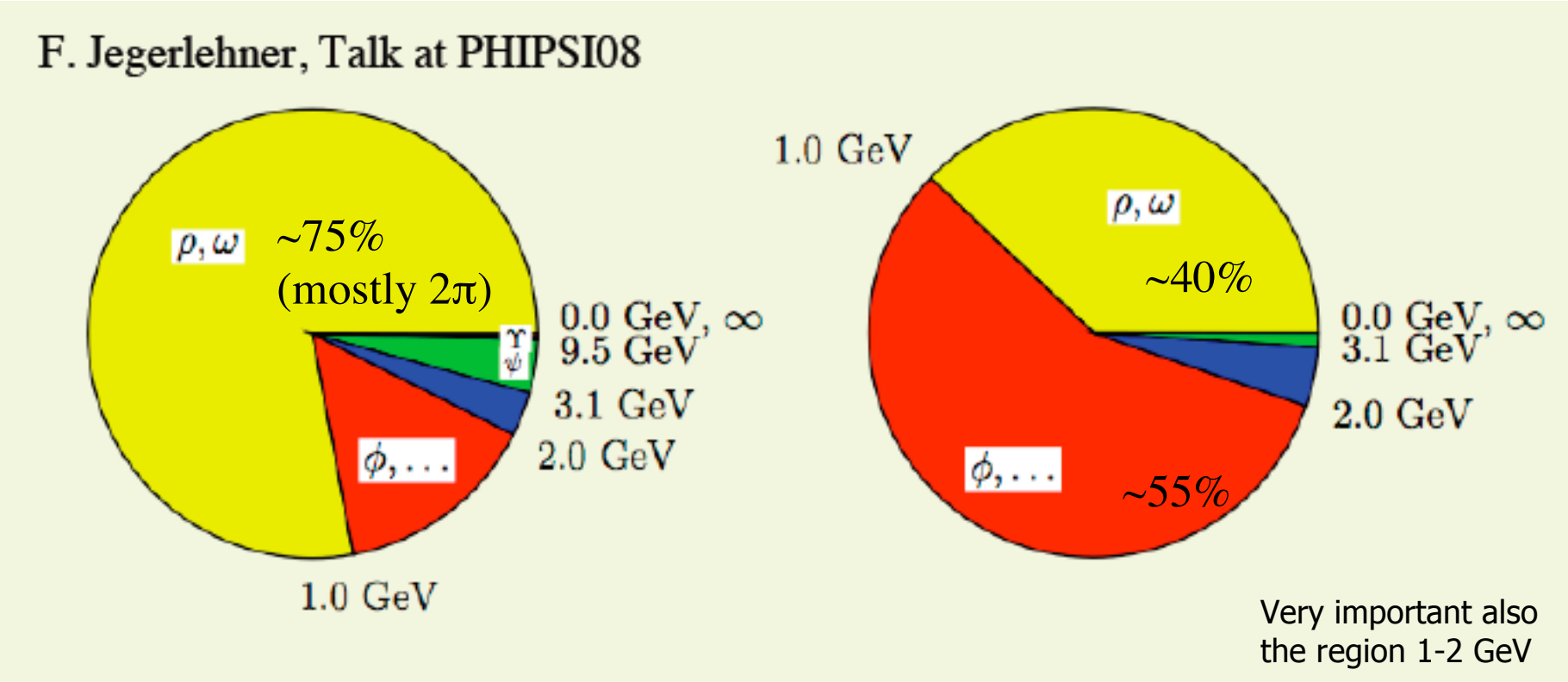
Ultimate goal of σ_{HAD}: 1% up to J/ψ (Ψ(4s)?)



Which is the situation on MC above 1 GeV?

(see S. Eidelman presentation)

Contribution of different energy regions to the dispersion integral and the error to a_μ^{had}



contributions *error²*

Experimental errors on σ^{had} translate into theoretical uncertainty of a_μ^{had}!

→ Needs precision measurements!

A rough estimate for g-2

$a_\mu^{exp} - a_\mu^{theo,SM} = (27.7 \pm 8.4)10^{-10}$ (3.3σ) [Eidelman, TAU08]

$8.4 = \sim 5_{HLO} \oplus \sim 3_{LbL} \oplus 6_{BNL}$

4 3 3 1.6 NEW G-2 $7\text{-}8\sigma$ (if 27.7 will remain the same))

$\delta a_\mu^{HLO} = 5.29 = 3.0(\sqrt{s}<1GeV) \oplus 3.9(1<\sqrt{s}<2GeV)$ FJ08

$\delta a_\mu^{HLO} \rightarrow 3 = 2.5\ (\sqrt{s}<1GeV) \oplus 1.5\ (\sqrt{s}<1GeV)$

This means:

$\delta\sigma_{HAD} \sim 0.4\%\ \sqrt{s}<1GeV$ (instead of 0.7% as now))

$\delta\sigma_{HAD} \sim 2\%\ 1<\sqrt{s}<2GeV$ (instead of 6% as now))

Precise measurement of σ_{HAD} at low energies very important also for α_{em} !!!