5th meeting of the WG Radio Monte CarLow

H. Czyz/G. Venanzoni

LNF/INF Frascati 6-7 Apr 09

Goals of the Workshop

- Exchange theoretical and experimental ideas. Discuss issues and perspectives
- Discuss the writeup of the report (deadline July 09)

Working Group on Radiative Corrections and Generators for Low Energy Hadronic Cross Section and Luminosity / Monday 06 April 2009 Programme

Monday 06 April 2009

Introduction - Aula Seminari (06 April 14:30-15:00)

time	[id] title	presenter
14:30	[0] Introduction	CZYZ/VENANZONI

Monte Carlo for R Measurements with energy scan - Aula Seminari (06 April 15:00-16:00)

time	[id] title	presenter
15:00	 Cross section of the process e+e> 3pi with FSR. 	FEDOTOVICH, Gennadiy
15:30	[2] Comparison of MCGPJ with BABAYAGA@NLO, PHOKHARA and KKMC for BES III experiment	WANG, Ping

MC for R Measurements using ISR (1) - Aula Seminari (06 April 16:00-16:30)

time	[id] title	presenter
16:00	[3] Using PHOKHARA to test kinematic fitting for the cross section measurement or	CRNKOVIC, Jason
	e+e> pi+pi-eta by ISR at belle	

MC for R Measurements using ISR (2) - Aula Seminari (06 April 17:00-18:00)

time	[id] title	presenter
17:00	[4] Strong and Electromagnetic J/Psi and Psi(2S) Decays into Pion and Kaon Pairs	CZYZ, Henryk
17:30	[5] Final state radiative correction in gamma*> pi+pi- (n gamma)	WAS, Zbigniew

Luminosity - Aula Seminari (06 April 18:00-18:45)

time [id] title

Agenda: Tomorrow

Tuesday 07 April 2009

Tau (2) - Aula Seminari (07 April 09:00-10:00)

time	[id] title	presenter
09:00	[8] MC Generators of Tau Decays (Experiment)	EIDELMAN, Simon
09:30	[9] MC Generators of Tau Decays (Theory)	WAS, Zbigniew

Discussion on the Working Group Report - Aula Seminari (07 April 10:00-11:00)

time	[id] title	presenter
10:00	[10] Report from Luminosity	MONTAGNA/NGUYEN
10:30	[11] Report from Direct Scan	ARBUZOV/FEDOTOVICH

Discussion of Working Group Report (2) - Aula Seminari (07 April 11:30-13:00)

time	[id] title	presenter
11:30	[13] Report from ISR	CZYZ/MUELLER
12:00	[14] Report from Tau	EIDELMAN/WAS
12:30	[15] Report from Vacuum Polarisation	TEUBNER, Thomas

Discussion on Report (3) - Aula Seminari (07 April 14:30-18:00)

time	[id] title	presenter
14:30	[17] Open Discussion	

An important news:

A <u>proposal</u> to measure the muon anomalous magnetic moment to 0.14 ppm precision

 $\delta a_{\mu}^{exp} \rightarrow 1.5 \ 10^{-10} = 0.2\% \ on \ a_{\mu}^{had, LO}$

- Is the science compelling?
- Is Fermilab the right place?
- Is the experiment well designed?
- Is it cost effective?

The New q-2 Collaboration



D. Hertzog and L. Roberts - PAC Fermilab - March 6, 2009

Presented on March at PAC of FNAL. Dave can tell us more (he will give a talk on Fri 9 at KLOE2 PW) Experimental activities at low energy:

- VEPP-2M will start soon data taking
- BES3 will start soon data taking
- KLOE2 will start soon data taking
- KLOE/Belle/Babar will continue to improve σ_{HAD} measurement

Precision measurement of σ_{HAD} at low energy will continue in the next years. MC tools very important! Ultimate goal of σ_{HAD} : 1% up to J/ ψ (Ψ (4s)?)



Which is the situation on MC above 1 GeV?

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



Experimental errors on σ^{had} translate into theoretical uncertainty of a_{μ}^{had} ! → Needs precision measurements!

A rough estimate for g-2



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

$$\delta a_{\mu}^{\text{HLO}}$$
 →3=2.5 (√s<1GeV) \oplus 1.5 (√s<1GeV)
This means:
 $\delta \sigma_{\text{HAD}} \sim 0.4\% \sqrt{\text{s}} < 1 \text{GeV}$ (instead of 0.7% as now))
 $\delta \sigma_{\text{HAD}} \sim 2\% 1 < \sqrt{\text{s}} < 2 \text{GeV}$ (instead of 6% as now))

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

$\tau \rightarrow 2\pi (4\pi) \nu$ vs $e^+e^- \rightarrow 2\pi (4\pi)$ spectral functions



The report

- Provide a reference for the experimental/theorysts working on this field
- Provisionary title "Quest for precision in hadronic physics at low energy: MC tools vs experimental data"
- ~200 pages EPJC (50 pages for each main section+ 20 pages for VP, Introduction, Conclusion)
- Deadline: July 09
- Contact persons for the whole report: H.
 Czyz, G. Montagna, G. Venanzoni
- Conveners as contact persons for each section

Quest for precision in hadronic physics at low energies: Monte Carlo tools vs. experimental data*

First author¹ and Second author^{2a}

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Received: date / Revised version: date

Abstract. Insert your abstract here.

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1 Introduction	References
introduction [1] 2 Luminosity luminosity [2]	 C. Amsler et al. (Particle Data Group), Phys. Lett. B667, 1 (2008) G. Balossini, C.M. Carkoni Calame, G. Montagna, O. Nicrosini, F. Piccinini, Nucl. Phys. Proc. Suppl. 162, 59 (2006), hep-ph/0610022
3 Scan	
scan	
4 Radiative return radiative return 5 Vacuum polarization vacuum polarization	
6 Tau physics	
tau physics	

Work organisation (I)

5 sections:

- "R measurement with direct scan": A.Arbuzov, G. Fedotovich
- "R measurement with ISR": H. Czyz, S. Mueller
- "Luminosity": G. Montagna, F. Nguyen
- "Tau": Z. Was, S. Eidelman
- "VP": H. Kuehn, T. Teubner

Stefan has set up an uploading procedure for documents (www.lnf.infn.it/wg/sighad/private). Please use it!

Work organisation (II)

- Each section should describe the "state of art" with comparisons between different generators (where available), and address theoretical and experimental issues. Discuss also possible improvements (from Th/Exp).
- Conveners are responsible for:
 - Define the section outline/scheme
 - Involve the "experts", asking for contributions
 - Editorial work of the section (put together the contributions, uniformize it, cover possible gaps, style checks, etc...)
- H. Czyz and I will be responsible for the final editorial work (collect the sections, introduction, conclusion, etc...)

For those of you who will stay all the week there will be a KLOE-2 Physics Workshop on Thu-Fri

• This evening a dinner at the Restaurant "Pinocchio".

Have a nice meeting!!!!

PHIPSI09 at Beijing

"International Workshop on e+e- collisions from Phi to Psi" Institue of High Energy Physics, Beijing, China

13 - 16 October 2009

http://bes.ihep.ac.cn/conference/phipsi09/