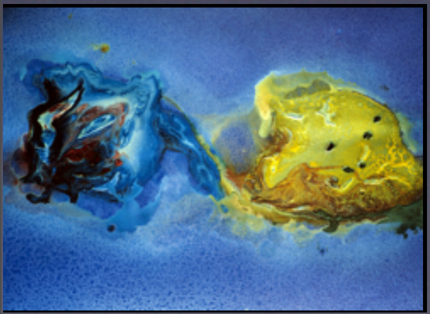
QWG

and

LHC HF WG: WG on heavy flavour physics at the LHC

LPCC
LHC Physics Centre at CERN



PHYSIK DEPARTMENT TUM
T30F

Nora Brambilla on behalf of the QWG

- the QWG as case study of a very successful WG

- the physics addressed by the QWG

- addressing collaboration and synergies between the QWG and the LHC heavy flavour WG

http://www.qwg.to.infn.it/

QWG-Conveners

- **Theory:**
  - *Geoff Bodwin*
    Nora Brambilla
    Antonio Vairo
- **Experiment:**
  - *Vaia Papadimitriou*
    Roberto Mussa

Topic-Conveners

- **Spectroscopy : Gunnar S. Bali, Nora Brambilla, Roman Mizuk, Roberto Mussa, Joan Soto, Ryan Mitchell;**
- **Decays : Estia Eichten, Claudia Patrignani, ChangZheng Yuan, Antonio Vairo;**
- **Production : Geoff Bodwin, Eric Braaten, Jianwei Qiu, Vato Kartvelishvili, Vaia Papadimitriou;**
- **Standard Model : Andreas Kronfeld, Antonio Pineda, Simon Eidelman;**
- **Quarkonium in media : Peter Petreczky, Anthony Frawley, Ramona Vogt, Enrico Scomparin;**
- **SUPER-B : Miguel Angel Sanchis-Lozano;**
- **Beyond SM : Alexei Petrov, Miguel Angel Sanchis-Lozano; Roy Briere;**

Liasons to experiments

Scomparin (Alice), Patrignani (Babar), Chang-Zheng Yuan (BESIII), Mizuk (Belle), Eidelman (KEDR), Mitchell (CLEO), Frawley (RHIC), Price (Atlas), Lourenco (CMS), Manca (LHCb), Woehri (LHC), Goetzen (Panda), Papadimitriou (CDF)

QWG was started at CERN in 2002 to address

huge challenges and opportunities in the physics of quarkonium

lack of communication and exchange between theorists and experimentalists

compartmentalization among different theoretical areas (lattice, perturbation theory, models, efts..)

application of newest methods and techniques

By using the most modern techniques in EFTs and lattice and by relating them to the data, quarkonium has regained his special status as privileged probe of SM (and beyond)

- QWG11: PNNL, 6-10 June, 2016
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- QWG10: CERN, Geneva, 10-14 November 2014
-
- QWG8: GSI, 3-7 October 2011
-
- QWG9: IHEP, Beijing, 22-26 April 2013
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- QWG8: GSI, 3-7 October 2011
-
- QWG7: Fermilab, 18-21 May 2010
-
- QWG6: Nara, Japan, 2-5 December 2008
-
- QWG5: DESY, 17-20 October 2007 (Photo Gallery)
-
- QWG4: Brookhaven, June 27 to 30, 2006 (Program/Slides and few photos)
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- *QWG Topical Seminar School on Heavy Quarkonia at Accelerators: New Theoretical Tools and Experimental Techniques*
  ITP Beijing, October 8 to 11, 2004
-
- QWG3: Beijing, October 12 to 15, 2004
-
- QWG2: Fermilab, September 20 to 22, 2003
-
- QWG1: CERN, November 8 to 10, 2002

The QWG has become the standard reference, the exchange forum, the collaboration site for quarkonium physics allowing great progress in the field

Way of work:

Direct collaboration among experimentalists and theorists

Collaboration among experimentalists of different experiments

Work organized in complementary and relates WGs

Meetings with large participation and extended plenary round tables on hot subjects

Meetings with large participation and extended plenary round tables on hot subjects

Identification of action items on hot subject and preparation of documents

Heavy quarkonium physics
Quarkonium Working Group Collaboration (N. Brambilla *et al.*). Dec 2004. 521 pp.
FERMILAB-FN-0779, CERN-2005-005
e-Print: **hep-ph/0412158** |

Cited by 728 records

Extremely important: it has set the language and the framework for a whole community, it has established bridges between different experiments and it has set scopes and vision in the field. It has enlightened the physics of quarkonium as based on several pillars: spectroscopy, decays, SM parameter, finite T and media, BSM, production

Heavy quarkonium: progress, puzzles, and opportunities

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Meyer†,10 R. E. Mitchell†,11 V. Papadimitriou†,8 P. Petreczky†,12 A. A. Petrov†,13 P. Robbe†,14 A. Vairo†,1 A. Andronic,15
Arnaldi,16 P. Artoisenet,17 G. Bali,18 A. Bertolin,19 D. Bettoni,20 J. Brodzicka,21 G. E. Bruno,22 A. Caldwell,23 J. Catmore,2
C.-H. Chang,25, 26 K.-T. Chao,27 E. Chudakov,28 P. Cortese,16 P. Crochet,29 A. Drutskoy,30 U. Ellwanger,31 P. Faccioli,32
Gabareen Mokhtar,33 X. Garcia i Tormo,34 C. Hanhart,35 F. A. Harris,36 D. M. Kaplan,37 S. R. Klein,38 H. Kowalski,10 J.-P.
Lansberg,39, 40 E. Levichev,2 V. Lombardo,41 C. Lourenc ̧o,42 F. Maltoni,43 A. Mocsy,44 R. Mussa,16 F. S. Navarra,45 M.
Negrini,20 M. Nielsen,45 S. L. Olsen,46 P. Pakhlov,47 G. Pakhlova,47 K. Peters,15 A. D. Polosa,48 W. Qian,49, 14 J.-W. Qiu
12, 50 G. Rong,51 M. A. Sanchis-Lozano,52 E. Scomparin,16 P. Senger,15 F. Simon,23, 53 S. Stracka,41, 54 Y. Sumino,55 M
Voloshin,56 C. Weiss,28 H. K. W¨ohri,32 and C.-Z. Yuan51

arXiv:1010.5827

Abstract A golden age for heavy quarkonium physics dawned a decade ago, initiated by the confluence of exciting ad- vances in quantum chromodynamics (QCD) and an explo- sion o related experimental activity. The early years of this period were chronicled in the Quarkonium Working Group (QWG) CERN Yellow Report (YR) in 2004, which pre- sented a comprehensive review of the status of the field at that time and provided specific recommendations for fur- ther progress. However, the broad spectrum of subsequent breakthroughs, surprises, and continuing puzzles could only be partially anticipated.....

Plus action items available on the QWG web site

patecipation in the snowmass initiative

Collaboration, complementarity, interactions, common targets

Quarkonium production, spectroscopy, exotics

on the physics

Heavy flavors cross sections and production, decays, spectroscopy

on the tools

montecarlos, symbolic manipulation programs, programs tailored on EFTs

on the combination of data from more experiments

combination of data from different experiments in a unique database accessible to everyone?

Collaboration, complementarity, interactions, common targets

on the development and application of new tools

Effective Field Theories, lattice

on pinning down uncertainties

mass of the heavy quarks, alphas, Particle distribution functions, cross section

on combing results and providing information to future experiments

Panda..., proposing new experiments in the field

Open Discussion about identifying concrete ways to collaborate