

CURRICULUM VITAE

Roberto Mussa

General Informations

Birth Date/Place April 21st, 1963 in Asti, Italy

Nationality Italian

Work Address Istituto Nazionale di Fisica Nucleare (INFN),
Via Pietro Giuria 1, 10125 Torino (Italy)

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Education

September 1992 PhD in Physics, University of Torino

July 1987 Degree in Physics, 110/110 cum laude, University of Torino

Academic Career

2011-2012 Sabbatical leave at UH Manoa

2010-present Primo Ricercatore INFN, Torino

2000-2010 Ricercatore INFN, Torino

1996-2000 Ricercatore INFN, Ferrara

1995-96 Guest Scientist appointment, Fermilab, Chicago

1993-95 Post-Doc Grant at University of Torino

1993 Guest Scientist appointment, Fermilab, Chicago

1992-93 INFN Post-Doc Scholarship, Torino

Institutional Appointments

2009-present Referee of Experiments GERDA and JEM-EUSO
in the INFN Astroparticle Physics Committee

2009-2011 Member of the INFN Particle Physics Committee (group 1),
as Observer of INFN Astroparticle Physics Committee

2008-2011 Member of the INFN Astroparticle Physics Committee (group 2),
as Coordinator of the Torino INFN section

- 2007-present Responsible Person for Torino BELLE Group
in the INFN Particle Physics Committee
- 2007-2011 Responsible Person for Torino AUGER Group
in the INFN Astroparticle Physics Committee
- 1998-2000 Member of the INFN Nuclear Physics Committee (group 3),
as Coordinator of the Ferrara INFN section
- 1998-2000 Referee of Experiments GRAAL,LEGS,GASP
in the INFN Nuclear Physics Committee

Research Activity

- 2007-present **Bottomonium Physics Studies in Experiment BELLE, at KEK, Tsukuba , Japan**
R.Mussa joined Belle to search for the missing states in the bottomonium spectrum; he proposed and coordinated the data taking at the $\Upsilon(1,2S)$ peak energies and since then he is convener of the $\Upsilon(1,2,3S)$ analysis group. Since 2013, R.Mussa has joined the Belle-II experiment and is italian PI for the construction of the TOP detector, and responsible for the time calibration system for this detector, which has been installed at KEK during 2015. R.Mussa is also strongly involved in the proposal of data taking periods below $Y(4S)$ energy with the Belle-II detector.
- 2001-present **Ultra High Energy Cosmic Ray Physics in AUGER Observatory, Malargue, Argentina**
R.Mussa joined the Atmospheric monitoring group of the Auger Collaboration; in 5 years, he proposed and commissioned a network of 4 LIDAR systems for the monitoring of atmospheric aerosols and clouds. Besides being responsible for maintenance and operation of the LIDAR network, R.Mussa is currently working on a new LIDAR prototype to upgrade the existing system. Since 2009, he has initiated the study of rare transient luminous events, called ELVES, that he discovered using the fluorescence detector cameras of the Auger Observatory. Since April 2014, R.Mussa is Co-Task Leader of Cosmo-GeoPhysics Working Group in Auger, covering all the interdisciplinary science topics that can be studied at the observatory.
- 2001-present **Quarkonium Working Group**
R.Mussa, together with N.Brambilla, initiated a joint theoretical-experimental working group on heavy quarkonium physics, the QWG. Since 2002, they organized 8 workshops, a school, and the writeup of CERN Yellow Report on Heavy Quarkonia. Recently, the QWG reviewed the status of this field after this decade, on a new article in publication on Europhysics Journal.
- 1997-2000 **Nucleon Spin Studies in Experiment Hermes at DESY, Germany**
R.Mussa joined the Hermes collaboration to take an active role in the development of the the transversely polarized target, and participated in the maintenance of the longitudinally polarized target magnet and cell.
- 1987-2002 **Charmonium Physics in Experiments E760 and E835 at Fermilab, USA**
R.Mussa has been involved in many analyses of angular distributions in charmonium

decays, to investigate the importance of spin effects on hadron dynamics. In 1993, for the upgrade of the tracking system from E760 to E835, R.Mussa proposed, designed and built the Scintillating Fiber Tracker for the experiment E835, coordinating all the stages of its construction and commissioning. In collaboration with Fiber Tracking Group at Fermilab, R.Mussa played an active role in the development of high efficiency fiber trackers.

Recent Talks at Conferences, Workshops

- 6/2016 "ELVES at the Pierre Auger Observatory", 14th AGILE Workshop, Roma, Italy
- 6/2016 "Early Physics at Belle-II: Studies on Quarkonia", QWG2016, Richland, USA
- 5/2015 "Hadron Spectroscopy", INFN What Next Workshop, La Biodola (Elba Island), Italy
- 2015/5 "First Physics at Belle-II: taking data below $\Upsilon(4S)$ ", B2TIP workshop, Krakow, Poland
- 2015/3 "Hadron Spectroscopy at e+e- colliders and B-factories ", QNP2015, Valparaiso, Chile
- 2014/12 "Reconstruction of multiple elves with high time resolution and longer trace length at the Pierre Auger Observatory", AGU Fall 2014 Meeting, San Francisco, USA
- 2014/8 "Heavy Quarkonium Spectroscopy ... and beyond", HQL2014, Mainz, Germany
- 2014/5 "Hadron spectroscopy: future prospects", What Next Workshop , La Biodola, Elba Island, Italy
- 2014/2 " $\Upsilon(3S)$ running at Belle-II startup", KEK-FF Workshop, Tsukuba, Japan
- 2014/1 "Hadron Physics at Belle-II", Bormio Winter Conference, Bormio, Italy
- 2013/12 "Stereo Reconstruction of Elves in the Pierre Auger Observatory" (talk), AGU Fall 2013 Meeting, San Francisco, USA
- 2013/11 "Bottomonium(-like) Spectroscopy", Hadron 2013, Nara, Japan
- 2013/8 "Results on New Particles from Belle" DPF Meeting, Santa Cruz, USA
- 2012/12 "Detection and triggering of ELVES at the Auger Observatory" (poster), AGU Fall 2012 Meeting, San Francisco, USA
- 2012/11 "H dibaryon and strange matter in Astroparticle Physics" and "Bottomonium", New Hadrons Workshop, Busan, Korea
- 2012/10 "XYZ exotics: experimental overview", X Confinement and the Hadron Spectrum, TUM Garching, Germany
- 2012/7 "Recent Results on new resonances at Belle", QCD 2012, Montpellier, France
- 2011/5 "Radiative decays of mesons at Babar and Belle", Photon 2011, Spa, Belgium
- 2011/5 "Observation of ELVES at the Pierre Auger Observatory", IS@AO, Cambridge, UK
- 2010/5 "First Results with $\Upsilon(1S,2S)$ Datasets at Belle", QWG2010, Fermilab, USA

- 2009/8 " $\Upsilon(nS, n \neq 4)$ Decays at B-factories", Physics in Collision, Kobe, Japan
- 2009/2 "Bottomonium Spectroscopy at B-factories", XXIII Rencontres de Physics de la Vallée, La Thuile, Italy
- 2008/9 "Atmospheric Monitoring for the Auger Observatory", CRIS2008, Salina, Italy
- 2008/9 "Atmospheric Monitoring Systems for AUGER", Lessons at the III Latin American School on Cosmic Rays and Astrophysics, Arequipa, Peru
- 2008/3 "Recent Results on Charmonium from Belle and Babar", Rencontres de Moriond: QCD, La Thuile, Italy
- 2008/1 "Searches for parabottomonia in current and future B-factories", BNM2008, Atami, Japan
- 2007/9 "Heavy quarkonia: an overview of recent results", Hadron 2007, Frascati, Italy

Recent Seminars

- 2013/1 "Bottomonium Physics at Belle", Valencia, Spain
- 2012/12 "Studies on TLEs in Auger", Univ. of Hawaii at Manoa, Honolulu, USA
- 2012/10 "Hyperon Production and Dynamics in $\Upsilon(1,2S)$ decays at Belle", TUM Garching, Germany
- 2011/11 "Bottomonium physics with $\Upsilon(1,2,5S)$ samples at Belle", SLAC, Palo Alto, USA
- 2010/12 " B^3 : Bound Bottom at B-Factories", Univ. of Hawaii at Manoa, Honolulu, USA
- 2009/7 "Atmospheric Monitoring for Auger Observatory", LIP Lisbon, Portugal

Organization of Schools, Conferences, Workshops

- 2016/9/4-9 *25th European Cosmic Ray Symposium*, Torino, Italy
(organizer)
- 2016/6/6-10 *11th International Workshop on Heavy Quarkonia*, PNNL, Richland, USA
(organizer, convener)
- 2015/5/20-22 *NPQCD15 Workshop*, Cortona, Italy
(convener)
- 2014/11/10-14 *10th International Workshop on Heavy Quarkonia*, CERN, Geneva
(organizer, convener)
- 2013/9/30-10/1 "HILITE 2013 Workshop on EM phenomena in the upper atmosphere", Torino, Italy
(organizer)
- 2013/4/22-26 *9th International Workshop on Heavy Quarkonia*, Beijing, China
(organizer, convener)

- 2012/5/14-17 *CHARM2012 Conference*, Univ. of Hawaii at Manoa, Honolulu, USA (organizer)
- 2011/10/4-7 *8th International Workshop on Heavy Quarkonia*, GSI Darmstadt, Germany
(organizer, convener)
- 2010/5/24-28 *Flavor Physics and CP Violation Conference (FP2010)*, Torino, Italy
(member of the Local Organizing Committee)
- 2010/5/18-21 *7th International Workshop on Heavy Quarkonia*, Fermilab, USA
(organizer, convener)
- 2008/12/2-5 *6th International Workshop on Heavy Quarkonia*, Nara Women Univ., Japan
(organizer, convener)
- 2007/10/17-20 *5th International Workshop on Heavy Quarkonia*, DESY Hamburg, Germany
(organizer, convener)
- 2006/6/27-30 *4th International Workshop on Heavy Quarkonia*, Brookhaven (New York, USA)
(organizer, convener)
- 2005/7/1-9 *ISAPP 2005 Doctorate School*, Belgirate (Italia)
(organizer)
- 2005/5/28-31 *HIF 2005, High Intensity Frontier Workshop*, Isola d'Elba, Italy
(convener)
- 2004/10/12-15 *3rd International Workshop on Heavy Quarkonia*, Beijing, China
(organizer, convener)
- 2004/10/8-11 *1st QWG Topical School on Heavy Quarkonia*, Beijing, China
(organizer, lecturer)
- 2003/9/20-22 *2nd International Workshop on Heavy Quarkonia*, Fermilab, USA
(organizer, convener)
- 2002/11/8-10 *1st International Workshop on Heavy Quarkonia*, CERN, Switzerland
(organizer, convener)
- 1997/11/2-6 *SciFi 97*, Univ. Notre Dame, Indiana, USA
(member of the International Advisory Committee)

Selected list of publications

- U. Tamponi *et al.* [Belle Collaboration], “First observation of the hadronic transition $\Upsilon(4S) \rightarrow \eta h_b(1P)$ and new measurement of the $h_b(1P)$ and $\eta_b(1S)$ parameters,” ArXiv:1506.08914, accepted for publication on Phys. Rev. Lett.
- I. Jaegle *et al.* [Belle Collaboration], “Search for the dark photon and the dark Higgs boson at Belle,” Phys. Rev. Lett. **114** (2015) 211801.

- B. H. Kim *et al.* [Belle Collaboration], “Search for an H -dibaryon with mass near $2m_\Lambda$ in $\Upsilon(1S)$ and $\Upsilon(2S)$ decays,”
Phys. Rev. Lett. **110** (2013) 222002.
- U. Tamponi *et al.* [Belle Collaboration], “Study of the Hadronic Transitions $\Upsilon(2S) \rightarrow (\eta, \pi^0)\Upsilon(1S)$ at Belle,”
Phys. Rev. D **87** (2013) 011104
- R. Mussa *et al.* [Pierre Auger Collaboration], “Observation of ELVES at the Pierre Auger Observatory,”
Eur. Phys. J. Plus **127** (2012) 94
- R. Mizuk *et al.* [Belle Collaboration], “Evidence for the $\eta_b(2S)$ and observation of $h_b(1P) \rightarrow \eta_b(1S)\gamma$ and $h_b(2P) \rightarrow \eta_b(1S)\gamma$,”
Phys. Rev. Lett. **109** (2012) 232002
- A. Bondar *et al.* [Belle Collaboration], “Observation of two charged bottomonium-like resonances in $Y(5S)$ decays,”
Phys. Rev. Lett. **108** (2012) 122001
- I. Adachi *et al.* [Belle Collaboration], “First observation of the P -wave spin-singlet bottomonium states $h_b(1P)$ and $h_b(2P)$,”
Phys. Rev. Lett. **108** (2012) 032001
- X. L. Wang *et al.* [Belle Collaboration], “Search for charmonium and charmonium-like states in $\Upsilon(2S)$ radiative decays,”
Phys. Rev. D **84** (2011) 071107
- N. Brambilla *et al.*, “Heavy quarkonium: progress, puzzles, and opportunities,”
Eur. Phys. J. C **71** (2011) 1534
- C. P. Shen *et al.* [Belle Collaboration], “Search for charmonium and charmonium-like states in $\Upsilon(1S)$ radiative decays,”
Phys. Rev. D **82** (2010) 051504
- J. Abraham *et al.* [Pierre Auger Collaboration], “Measurement of the energy spectrum of cosmic rays above 10^{18} eV using the Pierre Auger Observatory,”
Phys. Lett. B **685** (2010) 239
- J. Abraham *et al.* [Pierre Auger Collaboration], “Correlation of the highest energy cosmic rays with nearby extragalactic objects,”
Science **318** (2007) 939
- S. Y. BenZvi *et al.*, “The lidar system of the Pierre Auger observatory,”
Nucl. Instrum. Meth. A **574** (2007) 171
- R. Mussa *et al.*, “The LIDAR systems for atmospheric monitoring in Auger,”
Nucl. Instrum. Meth. A **518** (2004) 183.
- N. Brambilla *et al.* [Quarkonium Working Group], “Heavy quarkonium physics,”
CERN-2005-005 [arXiv:hep-ph/0412158]

- R. Mussa, “Open and hidden charm spectroscopy and decays: An overview,”
AIP Conf. Proc. **618** (2002) 329.
- M. Ambrogiani *et al.* [E835 Collaboration], “Study of the angular distributions of the reactions $\bar{p}p \rightarrow \chi_{c1}, \chi_{c2} \rightarrow J/\psi\gamma \rightarrow e^+e^-\gamma$ ”
Phys. Rev. D **65** (2002) 052002.
- R. Mussa, M. Onorato, N. Pastrone, D. Bettoni, R. Calabrese, B. Camanzi and E. Luppi,
“Development of a cylindrical scintillating fiber tracker for experiment E835 at FNAL,”
Nucl. Instrum. Meth. A **360** (1995) 13.
- M. Ambrogiani *et al.*, “Construction and performance of a cylindrical scintillating fiber detector for experiment 835 at FNAL,”
IEEE Trans. Nucl. Sci. **44** (1997) 460.
- M. Anselmino, R. Mussa and F. Caruso, “Polarization Of The χ_{c2} In $p\bar{p}$ Annihilation: Massless QCD Versus Diquarks,”
Phys. Rev. D **45** (1992) 4340.