Physics at LHC 2011 Proceedings of the International Conference held in Perugia, Italy, June 6-11, 2011

Cover artwork: S. Ciprini.

Cover image credits: IV November Square, with Major Fountain (*Fontana Maggiore*, completed in 1278 and designed by Nicola and Giovanni Pisano) the main monument in Perugia. This volume is based on SLAC eConf μ TEX package modified by S. Ciprini.

CLEUP sc Cooperativa Libraria Editrice Università di Padova www.cleup.it

Based on SLAC National Accelerator Laboratory eConf (Electronic Conference Proceedings Archive System). www.slac.stanford.edu/econf/C1106061

Padova, Italy, December 2012

ISBN 978-88-6787-006-6

Printed in Italy

PHYSICS AT LHC 2011 Proceedings of the International Conference held in Perugia, Italy, June 6-11, 2011



Editors Gian Mario Bilei, Stefano Ciprini, Livio Fanò

Organized by Physics Department, University of Perugia Istituto Nazionale di Fisica Nucleare (INFN), Section of Perugia European Organization for Nuclear Research (CERN) and University of Florida

Sponsored by Fondazione Cassa di Risparmio di Perugia, CERN Courier, Brunello Cucinelli Cashmere, CAEN, Hamamatsu, Italbras, Kurt J. Lesker Company, and Friatec.

SLAC ECONF - ELECTRONIC CONFERENCE PROCEEDINGS ARCHIVE CLEUP SC - COOPERATIVA LIBRARIA EDITRICE UNIVERSITÀ DI PADOVA

Foreword

The VI Physics at the LHC International Conference (PLHC2011) was held in Perugia (Italy), from 6^{th} to 11^{th} June, 2011 at the Congress Hotel Giò. The first Conference of this series was held in Prague in 2003 and the previous one in Hamburg in 2010.

This Conference was attended by 215 registered participants. 115 invited and contributing talks were presented, covering the main results, perspectives and related theory from all areas of LHC physics, including Higgs physics, Supersimmetry, Standard Model and beyond, Top physics, Beauty physics, Heavy-ion physics, Diffraction and Forward physics, as well as the status of all the LHC experiments. 69 posters were also submitted, out of which 5 were awarded with the best poster prize.

The social part of the conference included the official Opening in the University Aula Magna and a welcome party on June 6th, a trip to Assisi with a Reception and a Choir concert in the S. Francis Lower basilica on June 8th, the Conference dinner with music on June 10th. The meeting was sponsored mainly by I.N.F.N. and by the Fondazione Cassa di Risparmio di Perugia. Other institutional sponsors were the University of Perugia, the University of Florida and CERN. To all we express our warmest gratitude.

I would like to deeply thank the other Conference chairs and all the members of the IAC and of the Program committee for their collaboration in shaping a very interesting and complete program for this edition of the conference. Grateful thanks also to the members of the Local Committee, to the members of the personnel and to the students of our Physics Department for their help in making PLHC2011 a truly unforgettable event.

The complete proceedings of this Conference are available at SLAC web-site: www.slac.stanford.edu/econf/C1106061.

Giancarlo Mantovani Chairman of the Local Organizing Committee and Co-chair of the Conference



Figure 1: The Conference poster.



Figure 2: Organizing and sponsoring Institutions. Exhibitor and sponsoring Institutions and Companies.

CONFERENCE CHAIRS

G. Mantovani	Peru
G. Mitselmakher	Flori
L. P. Rossi	Gene

ıgia ida ova

SCIENTIFIC SECRETARY

G.M. Bilei

INFN Perugia

INTERNATIONAL ADVISORY BOARD

G. Altarelli	Roma
S. Asai	Tokyo
S. Bertolucci	CERN
P. Campana	INFN Frascati
M. Cavalli Sforza	IFAE Barcelona
H.S. Chen	IHEP Beijing
M. Danilov	ITEP Moscow
M. Diemoz	Roma
C. Dionisi	Roma
L. Foà	Pisa
D. Fournier	LAL Orsay
F. Gianotti	CERN
P. Giubellino	INFN Torino
G. Giudice	CERN
N. Glover	Durham
A. Golutvin	IC London/CERN/ITEP
D. Green	FNAL
G. Herten	Freiburg
R.D. Heuer	CERN
Y.K. Kim	Chicago/FNAL
M. Mangano	CERN
A. Masiero	Padova
C. Matteuzzi	Milano

J. Mnich	DESY
P. Nason	Milano
R. Petronzio	Roma
C. Quigg	FNAL
J. Schukraft	CERN
M. Spiro	CNRS Paris
G. Tonelli	Pisa/CERN
M. Tuts	Columbia

PROGRAM COMMITTEE

D. Denegri	Saclay (Chair)
T. LeCompte	Argonne (Chair)
F. Antinori	Padova
M. Carena	FNAL
C. Grojean	CERN
N. Kanaya	ICEPP/Tokyo
J. Incandela	UC Santa Barbara
G. Isidori	INFN Frascati
K. Jakobs	Freiburg
A. Nisati	INFN Roma
G. Rolandi	CERN
K. Safarik	CERN
P. Sphicas	CERN/Athens
O. Schneider	EPFL Lausanne
R. Tenchini	INFN Pisa
G. Wilkinson	Oxford

LOCAL ORGANIZING COMMITTEE

G. Mantovani	Perugia (Chair)
M. Biasini	Perugia
G. M. Bilei	INFN Perugia
S. Ciprini	Perugia
L. Fanò	Perugia

P. Lariccia	Perugia
M. Menichelli	INFN Perugia
A. Nappi	Perugia
A. Santocchia	Perugia
L. Servoli	INFN Perugia
M. Valdata	Perugia

CONFERENCE SECRETARIAT

K. Aspola	CERN
L. Lucaroni	INFN Perugia
G. Meniconi	Consulta Umbria
I. Panico	INFN Perugia

PROCEEDINGS EDITORS

INFN Perugia
Perugia
Perugia

TECHNICAL ASSISTANCE

E. Becchetti	INFN Perugia
G. Chiocci	Perugia



Figure 3: Conference photos (1).



Figure 4: Conference photos (2).



Figure 5: Conference photos (3).



Figure 6: Conference photos (4).



Figure 7: Conference photos (5).



Figure 8: Conference photos (6).

Table of Contents

Foreword	iii
Conference poster	v
Committees	vii
Conference photos	xi
Table of Contents	xvii
List of Participants	xxix

1. Opening, LHC Machine and Experiment

Status of ATLAS Ludovico Pontecorvo	3
Status of Totem Nicola Turini	11
Status of LHCf Oscar Adriani	19
Status of ALICE Johannes Wessels	25

Status of LHCb

Andreas Schopper

2. Soft QCD, Heavy Ion and Diffractive Physics

Soft QCD results from Alice Experiment Luciano Ramello	37
Onia at LHC Giulia Manca	41
Heavy IONs at LHC Andreas Morsch	47

Baryon number transport at LHC energies with the ALICE experiment 55

Michal Broz

Results from lead-lead collisions at $\sqrt{s_{NN}} = 2.76$ TeV with ATLAS at the LHC 59

 $Tomasz \ Bold$

3. Electroweak

EWK di-boson production in ATLAS Johannes Ebke	63
Status of Higgs and EW cross-sections for the LHC Fulvio Piccinini	67
Vector boson production in ATLAS Lashkar Kashif	73
Studies of electroweak boson production in the forward region with	LHCb

Stephen Farry

79

4. Heavy Ion and Soft QCD

Electromagnetic Dissociation Measurement at LHC with ALICE ZDC 83 Nora De Marco

Underlying event studies at CMS Paolo Bartalini

87

Transverse sphericity in minimum bias p-p collision at 0.9 and 7 Tev with ALICE 91

Antonio Ortiz Velasquez

5. Hard QCD and Diffractive

Multijets and the internal structure of jets measurements at ATLAS	95
Bilge Demirkoz	

Measurements of forward energy flow and forward jet production with CMS 101

Alexander Flossdorf

Exclusive dimuon	measurements with LHCb	109
Valentin Niess		

6. Electroweak and hard QCD

EWK/hard QCD results from Tevatron Junjie Zhu	113
EWK results from CMS Luca Lista	119
Hard QCD: theoretical aspects Giulia Zanderighi	125

7. B and top

B and D physics from Tevatron Paola Squillacioti	133
B decays, CKM, spectroscopy B and Charm at LHCb Marta Calvi	139
Top results from ATLAS Marina Coba	147
Top results from CMS Alicia Calderon Tazon	153
8. B, charm and onia	
Search for New Physics with rare decays of B and B_s mesons at LHC Johannes Albrecht	b 159
Signals of supersymmetry in flavour physics	163

Wolfgang Altmannshofer	
Mixing and CP violation in the Bs system at LHCb Greig Cowan	167
Quarkonium production in CMS Hermine K. Woehri	171

CP violation in hadronic B-decays at LHCb Lars Eklund

9. EWK and QCD

Jet production in assoc	iation with vector	bosons at ATLAS	179
Maria Fiascaris			

Role of gluons in soft pp collisions at LHC Gennady Lykasov	183
Jet production measurement with the ATLAS detector Felix Mueller	187
10. Тор	
Measurement of the Top quark pair production cross section with ATI Adam Roe	L AS 191
Top quark cross section measurements with CMS	195
Haryo Sumowidagdo	
Forward-backword asymmetries in the bottom/top sector of extra-dime models: LHC predictions from LEP and Tevatron anomalies Gregory Moreau	ensional 199
Single Top-Quark Production with the ATLAS Detector in ppCollis at 7 TeV Reinhard Schwienhorst	ions 203
Top quark property measurements at ATLAS Valerio Dao	207
Measurements of the Top quark mass at CMS Thomas Speer	211
11. B, charm and onia	
Measurements of B production with the CMS experiment Polina Otiougova	217
Anomalous t-Wb couplings :interplay of t -Wb decays and $B\overline{B}$ mixin MFV models Jure Drobnak	g in 223

CP-violation studies with charm decays at LHCb Vladimir Gligorov	227
Open Bottom and Charm Production at ATLAS Miriam Watson	231
Measurements of heavy-flavour production in p-p and Pb-Pb collisions the LHC with Alice Davide Caffarri	s at 235
12. Higgs and BSM	
Higgs results from Tevatron Massimo Casarsa	239
Recent Higgs results from ATLAS Marc Escalier	243
Searches in CMS Lars Sonnenschein	247
Recent results from New Physics Searches using the ATLAS detector LHC Tommaso Lari	r at 253
13. Higgs and Susy	

Searches for the SM Higgs boson with ATLAS Yingchun Zhu	259
Higgs Searches at CMS Ashok Kumar	263
Higgs phenomenology beyond the SM Heather Logan	269

14. BSM

Searches for new particles decaying into jet pairs in 2011ATLAS data Ryan Mark Buckingham	273
Search for hadronic resonances at CMS Sertac Ozturk	277
What if SUSY is not right? Non-susy signals at the LHC Antonio Delgado	281
Beyond Standard Model Searches at the Tevatron Gerard Sajot	287
15. Susy	
Search for SUSY in final state with jets and missing transverse moment with ATLAS Michael Rammensee	tum 291

Search for SUSY at CMS in all-hadronic final states	295
Piet Verwilligen	

Search for 1	Higgs Boson i	n SUSY D	ecays chains	299
Stefania (Gori			

- Searches for new heavy gauges bosons in 2011 ATLAS data 303 Dominick John Olivito
- Search for leptonic resonances at CMS 307 Carmen Diez Pardos
- The top forward-backward asymmetry and the Tevatron and the LHC 311 $Jessie\ Shelton$

Searches for tt resonances in 2011 ATLAS data at 7 TeV	315
Diane Cinca	

16. Posters

Search for single top quark production through FCNC at ATLAS experi- ment 321 Muhammad Alhroob
W/Z boson production in leptonic final states at the ATLAS experiment 323 Valerio Ippolito
PID with the ALICE TOF detector and a few physics results Francesca Bellini 325
Study of the Performance of the ATLAS muon spectrometer 331 Sara Borroni
ATLAS new heavy quark searches 335 Nicolas Bousson
First mass measurements at LHCb 337 Olivier Schneider
Physics with taus at CMS 339 Cesare Calabria 339
Calibration and performance of the precision chambers of the ATLAS muon spectrometer 341 Elena Solfaroli Camillocci
Muon reconstruction performance in the ATLAS experiment Daniele Capriotti 345
Search for Flavor Changing Neutral Currents in top quark decay in AT- LAS 349 Nuno Filipe Castro
Conceptual study of super-compact calorimeter design for the forward physics 351 Jan Cepila

Measurement of the cross section for Z/ γ * production in association jets in pp collisions at $\sqrt{(s)} = 7$ TeV with the ATLAS Detector <i>Estel Perez Codina</i>	with 353
SUSY-breaking as the origin of flavour violation Andreas Crivellin	355
Chirally enhanced corrections in the MSSM Andreas Crivellin	359
Quarkonium production at LHCb Maddalena Frosini	363
The upgrade of the CMS pixel detector for LHC Phase1 Ferdinando Giordano	365
Alignment of the ATLAS Inner Detector Tracking System Claudio Heller	367
Measurement of the top quark pair production cross section in the si lepton channel in ATLAS Anna Henrichs	ngle- 369
Vector meson production in pp collisions at $\sqrt{s} = 7$ TeV, measured the Alice detector <i>Elisa Incani</i>	with 371
D^+ and D^+_s production in pp collisions at $\sqrt{s}=7$ TeVin the ALICE eximent Gian Michele Innocenti	xper- 373
Searches for effects of TeV-scale Gravity in the 2010ATLAS data Michiru Kaneda	375
Preparing the ATLAS Jet Trigger for High Luminosity Gregor Kasieczka	377
Measurement of the W-helicity in top quark decays withATLAS Andrea Helen Knue	379

Search for supersymmetry in events with large missing transverse momen-

tum and two leptons in proton-proton collisions at 7 TeV with the ATLAS detector 383

Federica Legger

Performance of the Alice muon trigger system after the first year of data taking 387

Massimiliano Marchisone

Performance of the ATLAS Tau Trigger in High Luminosity Scenarios 391 Joerg Mechnich

Heavy stable particles in CMS Marco Meneghelli

Transverse momentum spectra of hadrons identified with the Alice Inner Tracking System 395

Leonardo Milano

Measurement of the $Z/\gamma*$ transverse momentum spectrum with ATLAS 397

Klemens Muller

- Searches for long-lived charged particles with the ATLAS experiment 401 Christian Ohm
- Search for B_0 decaying in two muons at LHCb 403 Mathieu Perrin-Terrin
- Inclusive lepton cross sections measured with the ATLAS detector 405 Fabrizio Petrucci

Measurement of the W + jets production cross section with the ATLAS detector 409

Imai Jen-La Plante

Measurement of the top quark pair production cross section in dilepton final states in pp collisions at 7 TeV with ATLAS 411 Tatevik Poghosyan

Measurement of the jet energy resolution in ATLAS 413 Serena Psoroulas

393

First observation of WZ events in leptonic channels with ATLAS Bernardo Resende	415
Jet energy scale uncertainty in ATLAS James Robinson	417
Soft and hard diffraction at CMS Ann-Karin Sanchez	419
Measurement of the ATLAS di-muon trigger efficiency in proton-pro collisions Arturo Sanchez Pineda	oton 421
Search for Large Extra Dimensions in Dimuon Events at CMS Stefan Antonius Schmitz	425
SUSY search at ATLAS in multilepton final states withjets and mist transverse energy Basil Schneider	sing 429
Search for the second generation leptoquarks at theATLAS experimen Matthias Schott	t 431
SUSY Higgs results from 2010 ATLAS data Thomas Schwindt	433
Refined reconstruction and calibration of missing transverse energy in LAS Rosa Simoniello	AT- 435
New ATLAS Event Generator Tunes to 2010 pp Collision Data at 7 centre-of-mass energy Nicholas Styles	TeV 437
Measurement of the b-tagging performance with ATLAS Nancy Tannoury	439
Measurement of the lepton charge asymmetry in inclusive pp to WX p duction at 7 TeV at CMS experiment Silvia Taroni	pro- 441

Radiative Decays at LHCb

Eliza Teodorescu

Anomalous baryon production in p+p and Pb+Pb collisions at the LHC 445

Vasile Topor Pop

Measurements of isolated prompt photons in pp collisions with the ATLAS detector 447

Ruggero Turra

Observation of the production cross section ratio of X(3872) and $\Psi(2S)$ in decays to $J/\psi\pi^+\pi^-$ in pp collisions at 7 TeV 449 Xianyou Wang

Search for supersymmetry in events with large missing transverse momentum, at least one b-jet candidate and at least one electron or muon in 7 TeV pp collisions with the ATLAS detector 451 Stafan Winkelmann

Stefan Winkelmann

Search for supersymmetry in events with large missing transverse momentum and at least one b-jet candidate in 7 TeV pp collisions with the ATLAS detector 453

 $Takashi \ Yamanaka$

 D_0 cross section measurement in pp collisions at 7 TeV, measured with the ALICE experiment 455

Xianbao Yuan

Double Parton Scattering Contribution to pp \rightarrow W^+W^+ 457 Miroslav Myska

List of Participants

ADRIANI OSCAR ALBRECHT JOHANNES ALHROOB MUHAMMAD ALTMANNSHOFER WOLFGANG ANTINORI FEDERICO ARDUINI GIANLUIGI ARMBRUSTER AARON J. ASPOLA KIRSTI BARBIERI RICCARDO BARFUSS ANNE-FLEUR BARTALINI PAOLO BATHEN BASTIAN BELLINI FRANCESCA BENUCCI LEONARDO BERTOLUCCI SERGIO BESSNER MARTIN BILEI GIAN MARIO BOLD TOMASZ BORGHINI NICOLAS BORRONI SARA BOUGHEZAL RADJA BOUSSON NICOLAS BROZ MICHAL BUCKINGHAM RYAN CAFFARRI DAVIDE CALABRIA CESARE CALDERON TAZON ALICIA CALVI MARTA CAMPANA PIERLUIGI CAPRIOTTI DANIELE CARMINATI FEDERICO CASARSA MASSIMO CASTALDI RINO CASTRO NUNO CEPILA JAN CINCA DIANE COBAL MARINA CONTINO ROBERTO COWAN GREIG CRIVELLIN ANDREAS DAO VALERIO DAVID PIETER DAWE NOEL DELGADO ANTONIO DE MARCO NORA DERO VINCENT

INFN AND UNIVERS. FIRENZE ITALY CERN SWITZERLAND UNIVERSITY OF BONN GERMANY FERMILAB USA INFN PADOVA iTALY CERN SWITZERLAND UNIVERS. OF MICHIGAN USA CERN SWITZERLAND INFN AND SNS PISA ITALY KANSAS ST. UNIVERSITY USA NATIONAL TAIWAN UNIVERSITY TAIWAN UNIV. OF MÜNSTER GERMANY INFN AND UNIVERS. OF BOLOGNA ITALY UNIVERS. OF ANTWERPEN BELGIUM CERN SWITZERLAND UNIVERS. OF HEIDELBERG GERMANY INFN PERUGIA ITALY U. CAL. IRVINE AND AGH KRAKOW USA UNIVERS. OF BIELEFELD GERMANY INFN AND UNIVERS. OF ROMA 1 ITALY ARGONNE NATIONAL LAB. USA CPP MARSEILLE FRANCE COMENIUS UNIVERSITY SLOVAKIA OXFORD UNIVERSITY UNITED KINGDOM INFN AND UNIVERS. OF PADOVA ITALY INFN AND UNIVERS. OF BARI ITALY INST. DE FISICA UNIV. DE CANTABRIA SPAIN INFN AND UNIV. MILANO BICOCCA ITALY CERN AND LN FRASCATI ITALY MPI MÜNCHEN GERMANY CERN SWITZERLAND INFN TRIESTE ITALY INFN PISA ITALY LIP LISBON PORTUGAL FNSPE CTU PRAGUE CZECH REPUBLIC UNIVERS. B. PASCAL CLERMONT F. FRANCE INFN AND UNIVERS. OF UDINE ITALY INFN ROMA1 ITALY EPFL LAUSANNE SWITZERLAND UNIVERS. OF BERN SWITZERLAND UNIVERS. OF GENEVA SWITZERLAND UNIVERSITY OF GENT BELGIUM SF UNIVERS. VANCOUVER CANADA UNIVERS. OF NOTRE DAME USA INFN TORINO ITALY UNIVERS. LIBRE DE BRUXELLES BELGIUM

DIEMOZ MARCELLA DE MIRKOZ BILGE DENEGRI DANIEL D'HONDT JORGEN DIEZ PARDOS CARMEN DOBUR DIDAR DOLGOPOLOV MIKHAIL DROBNAK JURE DÜNSER MARC EBKE JOHANNES EKLUND LARS ESCALIER MARC FANÒ LIVIO FARRY STEPHEN FATHOLAHZADEH BAHARAK FIASCARIS MARIA FLOSSDORF ALEXANDER FORTE STEFANO FROSINI MADDALENA GARBINI LUCIA GARCIA BELLIDO ARAN GIANOTTI FABIOLA GIORDANO FERDINANDO GIUBELLINO PAOLO GLIGOROV VLADIMIR GORI STEFANIA GOSHAW ALFRED GRANIER DE CASSAGNAC RAPHAEL GRAS PHILIPPE GUNNELLINI PAOLO HADJIDAKIS CYNTHIA HAUTMANN FRANCESCO HELLER CLAUDIO HENRICHS ANNA HERTEN GREGOR INCANI ELISA INNOCENTI GIAN MICHELE IPPOLITO VALERIO JADOON AAQIB KHAN JEN-LA PLANTE IMAI JENNENS DAVID KANEDA MICHIRU KASHIF LASHKAR KASIECZA GREGOR KEPKA OLDRICH KHARZEEV DMITRI KNUE ANDREA KNÜNZ VALENTIN KOUSOURIS KONSTANTINOS

INFN ROMA1 ITALY UNIVERS. AUT. BARCELONA SPAIN CEA SACLAY FRANCE VRIJE UNIVERSITEIT BRUSSEL BELGIUM CIEMAT MADRID SPAIN UNIVERS. OF FLORIDA USA SAMARA ST. UNIVERSITY RUSSIA JOZEF STEFAN INSTITUTE SLOVENIA INST. OF HIGH ENERGY PHYSICS AUSTRIA LMU MÜNCHEN GERMANY UNIVERS. OF GLASGOW UNITED KINGDOM UNIVERS. PARIS-SUD FRANCE INFN AND UNIVERS. OF PERUGIA ITALY UNIVERSITY COLLEGE DUBLIN IRELAND UNIV. OF TORONTO CANADA UNIVERS. OF CHICAGO USA DESY GERMANY INFN AND UNIVERS. OF MILANO ITALY INFN BOLOGNA ITALY INFN AND UNIVERS. OF PERUGIA ITALY UNIVERS. OF ROCHESTER USA CERN SWITZERLAND UNIVERS. OF CALIFORNIA RIVERSIDE USA CERN AND INFN TORINO ITALY CERN SWITZERLAND UNIVERS. OF CHICAGO USA DUKE UNIVERSITY USA LLR- ECOLE PLYTECHNIQUE FRANCE CEA SACLAY FRANCE INFN AND UNIVERS. OF PERUGIA ITALY INP AND UNIV. PARIS-SUD FRANCE UNIVERS. OF OXFORD UNITED KINGDOM LMU MÜNCHEN GERMANY UNIVERS. OF GTTINGEN GERMANY FREIBURG UNIVERSITY GERMANY INFN AND UNIVERS. OF CAGLIARI ITALY INFN AND UNIVERS. OF TORINO ITALY INFN ROMA1 ITALY HAZARA UNIVERS. MANSEHRA PAKISTAN UNIVERS. OF CHICAGO USA CERN AND UNIV. OF MELBOURNE AUSTRALIA CERN SWITZERLAND CERN SWITZERLAND UNIVERS. OF HEIDELBERG GERMANY IP ACAD. OF SCIENXES PRAGUE CZECH REP. STONY BROOK UNIVERSITY USA UNIVERS. OF GTTINGEN GERMANY INST. OF HIGH ENERGY PHYSICS AUSTRIA FERMILAB USA

KUMAR ASHOK LAENEN ERIC LANARO ARMANDO LARI TOMMASO LEFEBVRE MICHEL LEGGER FEDERICA LISTA LUCA LOGAN HEATHER LUCARONI ANDREA LUSZCZAK AGNIESZKA LUSZCZAK MARTA LYKASOV GENNADY MALECKI PAWEL MANCA GIULIA MANNELLI MARCELLO MANTOVANI GIANCARLO MARCHISONE MASSIMILIANO MASIERO ANTONIO MATTEUZZI CLARA MECHNICH JOERG MENEGHELLI MARCO MEROLI STEFANO MILANO LEONARDO MITSELMAKHER GUENAKH MNICH JOACHIM MONK JAMES MOREAU GREGORY MORSCH ANDREAS MÜLLER FELIX MÜLLER KLEMENS MYSKA MIROSLAV NAKADA TATSUYA NAPPI ANIELLO NASON PAOLO NIKOLICS KATALIN NIESS VALENTIN OHM CHRISTIAN OLIVITO DOMINICK ORTIZ VELASQUEZ ANTONIO OTIOUGOVA POLINA OWEN SIMON OZTURK SERTAC PARAMU VIVEKANANDAN PENNA PAOLO PERRIN TERRIN MATHIEU PEREZ GILAD PEREZ CODINA ESTEL PETERS KRISZTIAN PETERSEN TROELS

UNIVERS. OF DELHI INDIA NIKHEF THE NETHERLANDS UNIVERS. OF WISCONSIN USA INFN MILANO ITALY UNIV. OF VICTORIA CANADA LM UNIVERS. MÜNCHEN GERMANY INFN NAPOLI ITALY CARLETON UNIVERSITY CANADA CERN AND INFN PERUGIA ITALY CRACOW UNIVERS. OF TECHNOLOGY POLAND UNIVERS. OF RZESZOW POLAND JINR RUSSIA INP KRAKOW POLAND INFN AND UNIVERS. OF CAGLIARI ITALY CERN SWITZERLAND INFN AND UNIVERS. OF PERUGIA ITALY INFN TORINO ITALY INFN PADOVA ITALY INFN AND UNIV. MILANO BICOCCA ITALY CERN SWITZERLAND INFN AND UNIVERS. OF BOLOGNA ITALY INFN AND UNIVERS. OF PERUGIA ITALY INFN AND UNIV. OF TORINO ITALY UNIVERS. OF FLORIDA USA DESY GERMANY UNIVERS. COLLEGE LONDON UNITED KINGDOM LPT ORSAY FRANCE CERN SWIZTERLAND UNIVERS. OF HEIDELBERG GERMANY UNIVERS. OF BONN GERMANY INST. PHYS. ASCR CZECH REP. EPFL LAUSANNE SWITZERLAND INFN AND UNIVERS. OF PERUGIA ITALY INFN AND UNIV. MILANO BICOCCA ITALY CERN SWITZERLAND UNIV. B. PASCAL CLERMONT F. FRANCE UNIVERS. OF STOCKHOLM SWEDEN UNIVERS. OF PENNSYLVANIA USA ICN UNAM MEXICO CERN AND UNIVERS. OF ZÜRICH SWITZERLAND UNIVERS. OF SHEFFIELD UNITED KINGDOM UNIVERS. OF IOWA USA S. N. COLLEGE INDIA INFN AND UNIVERS. OF PERUGIA ITALY UNIV. D'AIX-MARSEILLE FRANCE WEIZMANN INSTITUTE ISRAEL CERN SWITZERLAND CERN SWITZERLAND NIELS BOHR INSTITUTE DANEMARK

PETRIELLO FRANCIS PETRUCCI FABRIZIO PICCININI FULVIO PIOTRZKOWSKI KRZYSZTOF PLAMONDON MATHIEU POGHOSYAN TATEVIK PONTECORVO LUDOVICO PSOROULAS SERENA RAMELLO LUCIANO RAMMENSEE MICHAEL REECE WILLIAM REEVES KENDALL REMINGTON RONALD RESENDE BERNARDO RIAHI HASSEN ROBINSON JAMES ROE ADAM ROMEO FRANCESCO ROSSI LEONARDO SAFARIK KAREL SAJOT GERARD SANCHEZ ANN KARIN SANCHEZ ARTURO SANTOCCHIA ATTILIO SCHMITZ STEFAN A. SCHNEIDER BASIL SCHNEIDER OLIVIER SCHOPPER ANDREAS SCHOTT MATTHIAS SCHWINDT THOMAS SCHWIENHORST REINHARD SHAFI QAISAR SHELTON JULIA SIMONIELLO ROSA SOARES MARA SOLFAROLI CAM. ELENA SONNENSCHEIN LARS SPEER THOMAS SPIEZIA ANIELLO SQUILLACIOTI PAOLA SRIVASTAVA YOGENDRA STYLES NICHOLAS SUMOWIDAGDO SUHARYO TANNOURY NANCY TARONI SILVIA TENCHINI ROBERTO TEODORESCU ELIZA TONELLI GUIDO E. TOPOR POP VASILE TSANG KA VANG

NORTHWESTERN UNIVERSITY USA INFN AND UNIVERS. OF ROMA TRE ITALY INFN PAVIA ITALY UC LOUVAIN BELGIUM UNIVERS. OF VICTORIA CANADA UNIVERS. OF BONN GERMANY INFN AND UNIV. OF ROMA1 ITALY UNIVERS. OF BONN GERMANY INFN AND UNIV. PIEMONTE ORIENT. ITALY UNIVERS. OF FREIBURG GERMANY CERN SWITZERLAND UNIVERS. OF TEXAS USA UNIVERS. OF FLORIDA USA CEA SACLAY FRANCE INFN AND UNIVERS. OF PERUGIA ITALY UNIVERSITY COLLEGE LONDON UNITED KINGDOM UNIVERS. OF GTTINGEN GERMANY INFN AND UNIVERS. OF PERUGIA ITALY INFN GENOVA ITALY CERN SWITZERLAND UNIVERS. OF GRENOBLE FRANCE ETH ZÜRICH SWITZERLAND INFN AND UNIVERS. OF NAPOLI ITALY INFN AND UNIVERS. OF PERUGIA ITALY RWTH AACHEN GERMANY UNIVERS. OF BERN SWITZERLAND EPF LAUSANNE SWITZERLAND CERN SWITZERLAND CERN SWITZERLAND UNIVERS. OF BONN GERMANY MICHIGAN ST. UNIVERSITY USA BARTOL RESEARCH INSTITUTE USA YALE UNIVERSITY USA INFN AND UNIVERS. OF MILANO ITALY CIEMAT MADRID SPAIN INFN AND UNIVERS. OF ROMA1 ITALY RWTH AACHEN GERMANY BROWN UNIVERSITY USA INFN AND UNIVERS. OF PERUGIA ITALY INFN AND UNIVERS. OF SIENA ITALY INFN AND UNIVERS. OF PERUGIA ITALY DESY GERMANY UNIVERS. OF CALIFORNIA RIVERSIDE USA UNIVERS. D'AIX-MARSEILLE FRANCE INFN AND UNIV. OF PERUGIA ITALY INFN PISA ITALY IFIN-HH ROMANIA PISA UNIVERS., INFN AND CERN ITALY MCGILL UNIVERS. MONTREAL CANADA BROWN UNIVERSITY USA

xxxii

TURINI NICOLA TURRA RUGGERO VALDATA MARISA VERWILLIGEN PIET VIRDEE TEJINDER WAGNER CARLOS E.M. WANG XIANYOU WATSON MIRIAM WEINER NEAL WESSELS JOHANNES WESTFALL GARY WINKELMANN STEFAN WOEHRI HERMINE K. YAMANAKA TAKASHI YOO HWIDONG YUAN XIANBAO ZANDERIGHI GIULIA ZHU HONGBO ZHU JINJIE ZHU YINGCHUN ZURITA JOSÉ F.

INFN AND UNIVERS. OF SIENA ITALY INFN AND UNIVERS. OF MILANO ITALY INFN AND UNIVERS. OF PERUGIA ITALY UNIV. OF GENT BELGIUM IMPERIAL COLLEGE UNITED KINGDOM UNIV. OF CHICAGO AND ANL USA CERN SWITZERLAND UNIVERS. OF BIRMINGHAM UNITED KINKDOM NEW YORK UNIVERSITY USA UNIVERS. OF MÜNSTER AND CERN GERMANY UNIVERS. OF MICHIGAN USA UNIVERS. OF FREIBURG GERMANY CERN SWITZERLAND UNIVERS. OF TOKYO JAPAN PURDUE UNIVERSITY USA INFN AND UNIVERS. OF PADOVA ITALY OXFORD UNIVERSITY UNITED KINGDOM DESY GERMANY UNIVERS. OF MICHIGAN USA UNIVERS. OF WISCONSIN USA UNIVERS. OF ZÜRICH SWITZERLAND

xxxiv