



Pablo Martinez Ruiz del Arbol <pablo.martinez.ruizdelarbol@gmail.com>

[CINCO] [LP2019] Pablo Martinez Ruiz Del Arbol (Universidad de Cantabria) accepted invitation to give a talk at LP2019

1 message

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Sun, May 19, 2019 at 12:10 PM

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Dear Committee,

Pablo Martinez Ruiz Del Arbol (Universidad de Cantabria) [mailto:Pablo.Martinez@cern.ch] just accepted to give a talk "Precision Timing with the CMS MIP Timing Detector"

https://cms-mgt-conferences.web.cern.ch/cms-mgt-conferences/conferences/pres_display.aspx?cid=2470&pid=19968

at "LP2019: 29th International Symposium on Lepton Photon Interactions at High Energies, 5-10 Aug 2019, University of Toronto, Toronto (Canada)"

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EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
COMPACT MUON SOLENOID COLLABORATION

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Geneva, 07.01.2010

Votre référence / Your reference :

Notre référence / Our reference : CMS-Z.G

Certificate of Presence

We hereby certify that Pablo Martínez Ruiz del Árbol, member of the CMS Collaboration, has given the following oral presentations at conferences, workshops, and seminars on the dates and places indicated below:

"Precision Timing with the CMS MIP Timing Detector" at "LP2019: 29th International Symposium on Lepton Photon Interactions at High Energies, 5-10 Aug 2019, University of Toronto, Toronto (Canada)".

"Dark matter at LHC" at "Split2018: 2018 LHC days in Split, 17-22 Sep 2018, University of Split - FESB and Faculty of Science, Split (Croatia)".

"Searches for BSM physics in the 2 leptons y MET final state" at "IX CPAN days: IX CPAN days, Centro Nacional de Partículas, Astropartículas y Nuclear, 23-25 Oct 2017, CPAN, Santander (Spain)".

"Review of Supersymmetry Searches at 13 TeV with the CMS experiment" at "DM2016: Dark Matter 2016: From the smallest to the largest scales, 27 Jun-1 Jul 2016, Santander (Spain)".

"CMS SUSY searches at 13 TeV" at "LPCC Seminar: CERN LPCC EP-LHC Seminar Series, 9 Feb 2016, Geneva (Switzerland)".

"Search for Beyond the Standard Model Physics in multi-leptonic and photonic final states with the CMS detector" at "ICHEP 2014: 37th International Conference on High Energy Physics, 2-9 Jul 2014, Valencia (Spain)".

"Searches for SUSY in events with two or more leptons at CMS" at "ICHEP 2012: International Conference on High Energy Physics, 4-12 Jul 2012, Melbourne, VIC (Australia)".

"Susy searches in the Z+Jets+MET final state in 7 TeV pp collisions with the jet-z balance method" at "Bienal RSEF: XXXIII Reunión Bienal de la Real Sociedad Española de Física, 19-23 Sep 2011, Universidad de Cantabria, Santander (Spain)".

"Commissioning and Performance of the CMS Detector" at "Blois2010: 22nd Rencontres de Blois on "Particle Physics and Cosmology; First Results from the LHC", 15-20 Jul 2010, Blois (France)".

"The CMS Muon System Alignment: First results from commissioning runs " at "BIENALFISICA09: XXXII Bienal de Física, 7-11 Sep 2009, Ciudad Real (Spain)".

"Muon Alignment in ATLAS and CMS" at "Detector Understanding with First LHC Data, 29 Jun-3 Jul 2009, DESY, Hamburg (Germany)".

"The CMS Muon System Alignment" at "CHEP09: International Conference On Computing In High Energy Physics And Nuclear Physics, 21-27 Mar 2009, Prague (Czech Republic)".


CMS Secretariat



Precision timing with the CMS MIP timing detector

Pablo Martinez Ruiz del Arbol* on behalf of the CMS Collaboration

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The Compact Muon Solenoid detector at the CERN Large Hadron Collider is undergoing an extensive Phase II upgrade program to prepare for the challenging conditions of the High-Luminosity LHC. In particular, a new timing layer with hermetic coverage up to a pseudo-rapidity of $|\eta|=3$ will measure minimum ionizing particles with a time resolution of 30 ps. This MIP Timing Detector will consist of a central barrel region based on LYSO:Ce crystals read out with SiPMs and two end-caps instrumented with radiation-tolerant Low Gain Avalanche Detectors. The precision time information from the MTD will reduce the effects of the high levels of pile-up expected at the HL-LHC and will bring new and unique capabilities to the CMS detector. The time information assigned to each track will enable the use of 4D reconstruction algorithms and will further discriminate interaction vertices within the same bunch crossing to recover the track purity of vertices in current LHC conditions. For instance, in the analysis of di-Higgs boson production, a timing resolution of 30-40 ps is expected to improve the effective luminosity by about 25% through gains in b-tagging and isolation efficiency. We present motivations for precision timing at the HL-LHC and overview the MTD design, while also highlighting specific physics studies benefiting from the improved timing information.

XXIX International Symposium on Lepton Photon Interactions at High Energies - LeptonPhoton2019
August 5-10, 2019
Toronto, Canada

*Speaker.

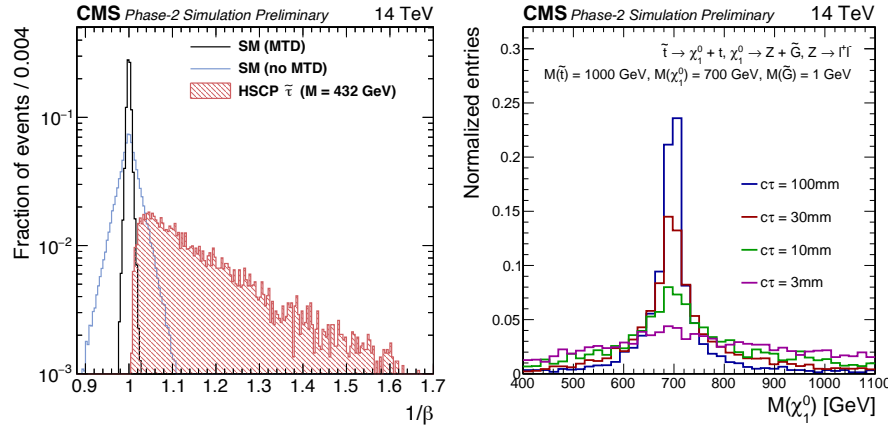


Figure 6: Distribution of the inverse of the particle velocity for the HSCP signal, the background, and the background estimated with the MTD (left), and neutralino mass estimated using the timing information for a SUSY GMSB model with different lifetimes (right).

tion. This detector will be composed of two parts: the Barrel Timing Layer based on LYSO crystals and the Endcap Timing Layer based on silicon sensors (LGADs). The inclusion of timing information is expected to have a strong impact in the mitigation of the harsh pile-up conditions at the HL-LHC. By associating a time stamp to the tracks, the number of spurious tracks not compatible in time with the primary vertex will be reduced improving the physics object performance for jet reconstruction, b-tagging algorithms, lepton isolation, transverse missing momentum resolution, etc. These improvements will translate into a sensitivity increase for important analyses such as the double Higgs search, and will also bring unique physics potential for complicated topologies such as those involving the production of long-lived particles.

References

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- [2] Chatrchyan, S. and others. *The CMS experiment at the CERN LHC*. JINST, 3 S08004, 2008, 10.1088/1748-0221/3/08/S08004.
- [3] D. Anderson et al. *On timing properties of LYSO-based calorimeters*. Nucl. Instrum. Meth. A 794 (2015) 7, doi:10.1016/j.nima.2015.04.013.
- [4] G. Pellegrini et al. *Technology developments and first measurements of Low Gain Avalanche Detectors (LGAD) for high energy physics applications*. Nucl. Instrum. Meth. A 765 (2014) 12, doi:10.1016/j.nima.2014.06.008.

XXIX International Symposium on Lepton Photon Interactions at High Energies

LeptonPhoton2019 - (other lp conferences)

**August 5-10, 2019
Toronto, Canada**

Entries on ADS

The 29th International Symposium on Lepton Photon Interactions at High Energies will take place in Toronto, Canada between August 5-10, 2019. The Conference follows the tradition of a long series of high energy physics conferences, the International Symposia on Lepton and Photon Interactions at High Energies. The program features plenary sessions covering topics of major interest to the particle physics community. New this year will be two (or three) tracks of parallel sessions for one day, that will provide an opportunity for additional presenters to give a more in-depth presentation of individual physics results. We will also organise poster sessions where additional researchers may present their work.

The conference is hosted by the University of Toronto, and will take place at the Westin Harbour Castle Hotel on the lakefront in downtown Toronto.


Sessions

 Collider SM

 Collider BSM

 Intensity Frontier

 Astroparticle physics

 Traditional talks

 Future Projects

 Parallel Sessions

 Posters

Collider SM

Status and Plans for CERN Accelerator Complex

 PoS(LeptonPhoton2019)002 **pdf** *P. Collier*

CKM and CP Constraints from B-Decays

 PoS(LeptonPhoton2019)006 **pdf** *S. Nishida*

New Physics Searches with Top Quarks

 PoS(LeptonPhoton2019)012 **pdf** *S. Westhoff*

Collider BSM

Rare decays of B-hadrons

 PoS(LeptonPhoton2019)014 **pdf** *C. Marin Benito and on behalf of the LHCb collaboration*

Constraints on New Physics from B Mesons

 PoS(LeptonPhoton2019)015 **pdf** *M. Blanke*

Intensity Frontier

Atmospheric Neutrinos and Proton Decay

 PoS(LeptonPhoton2019)028 **pdf** *R. Wendell*

Astroparticle physics

Cosmological Measurements of Dark Energy and Dark Matter

PoS(LeptonPhoton2019)029 [pdf](#) S. BenZvi

Multi-messenger searches in astrophysics

PoS(LeptonPhoton2019)030 [pdf](#) K. Egberts

Traditional talks

Outreach Activities in High Energy Physics

PoS(LeptonPhoton2019)036 [pdf](#) K. Assagman

Future Projects

Advances in Particle Detectors

PoS(LeptonPhoton2019)040 [pdf](#) J. Haba

European Particle Physics Strategy Update

PoS(LeptonPhoton2019)044 [pdf](#) B. Vachon

Parallel Sessions

Semileptonic and leptonic D decays at BESIII

PoS(LeptonPhoton2019)046 [pdf](#) K. Liu and On behalf of the BESIII collaboration

Muon collider: the Low EMittance Muon Accelerator (LEMMA) approach

PoS(LeptonPhoton2019)047 [pdf](#) N. Bartosik, M. Antonelli, O.R. Blanco-Garcia, M. Boscolo, M. Iafrati, B. Ponzio, M. Ricci, M. Rotondo, S. Hoh, D. Lucchesi, A. Paccagnella, J. Pazzini, S. Rossin, M. Zanetti, G. Ballerini, C. Brizzolari, V. Mascagna, M. Prest, M. Soldani, A. Bertolin, C. Curatolo, F. Gonella, L. Sestini, S. Ventura, C. Biino, B. Kiani, N. Pastrone, M. Pelliccioni, N. Amapane, A. Cappati, G. Cotto, O. Sans Planell, F. Anulli, M. Bauce, F. Collamati, F. Iacoangeli, L. Bandiera, G. Cavoto, E. Vallazza, M. Casarsa and A. Trioss

Application of Quantum Machine Learning to High Energy Physics Analysis at LHC using IBM Quantum Computer Simulators and IBM Quantum Computer Hardware

PoS(LeptonPhoton2019)049 [pdf](#) J. Chan, W. Guan, S. Sun, A.Z. Wang, S.L. Wu, C. Zhou, M. Livny, F. Carminati and A. Di Meglio

A Generative-Adversarial Network Approach for the Simulation of QCD Dijet Events at the LHC

PoS(LeptonPhoton2019)050 [pdf](#) R. Di Sipio, M. Faucci Giannelli, S. Ketabchi Haghighat and S. Palazzo

ATLAS Trigger and Data Acquisition Upgrades for the High Luminosity LHC

PoS(LeptonPhoton2019)055 [pdf](#) A. Camplani and on behalf of the ATLAS collaboration

New results from the DANSS experiment

PoS(LeptonPhoton2019)056 [pdf](#) Y. Shitov and on behalf of the DANSS collaboration

Searches for charged lepton flavor violating muon decay, MEG/MEG II experiment

PoS(LeptonPhoton2019)057 [pdf](#) T. Iwamoto and on behalf of the MEG-II collaboration

B lifetime and $B^0 - \bar{B}^0$ mixing results from early Belle II data

PoS(LeptonPhoton2019)058 [pdf](#) R. Rasheed and On behalf of the BELLE II collaboration

Results and future plans of the NEXT double beta decay experiment

PoS(LeptonPhoton2019)060 [pdf](#) A. Laing and on behalf of the NEXT Collaboration

Search for Dark Sector Physics at the NA64 experiment in the context of the Physics Beyond Colliders Projects

PoS(LeptonPhoton2019)061 [pdf](#) D. Banerjee, on behalf of the NA64 collaboration and on behalf of the Physics Beyond Colliders Conventional Beams Working Group

The Super Charm-Tau Factory in Novosibirsk

PoS(LeptonPhoton2019)062 [pdf](#) A. Barniakov and on behalf of the Super Charm-Tau Factory collaboration

Dark Sector Physics with Belle II

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First look at time-dependent CP violation using early Belle II data

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Recent Neutrino Cross Section Measurements from MicroBooNE

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The Phase-II upgrade of the ATLAS Muon Spectrometer

PoS(LeptonPhoton2019)070 [pdf](#) J. Zhu and On behalf of the ATLAS Muon Collaboration

Small-Strip Thin Gap Chambers for the Muon Spectrometer Upgrade of the ATLAS Experiment

PoS(LeptonPhoton2019)071 [pdf](#) B. Lefebvre and On behalf of the ATLAS Muon Collaboration

Search for lepton-flavour violating and lepton-number violating decays of the D^0 meson and observation of $D^0 \rightarrow K^- \pi^+ e^+ e^-$

PoS(LeptonPhoton2019)073 [pdf](#) F. Wilson and on behalf of the BABAR collaboration

Freeze-in production of dark matter through spin-1 and spin-2 portals

PoS(LeptonPhoton2019)076 [pdf](#) M. Dutra

Beyond the Standard Model searches at HERA

PoS(LeptonPhoton2019)077 [pdf](#) O. Turkot and on behalf of the H1 and ZEUS Collaboration

Latest Results on the Radiation Tolerance of Diamond Detectors

PoS(LeptonPhoton2019)079 [pdf](#) L. Baeni, A. Alexopoulos, M. Artuso, F. Bachmair, M.R. Bartosik, H.C. Beck, V. Bellini, V. Belyaev, B. Bentele, A. Bes, J.M. Brom, M. Bruzzi, G. Chiodini, D. Chren, V. Cindro, G. Claus, J. Collot, J. Cumalat, A. Dabrowski, R. D'Alessandro, D. Dauvergne, W. De Boer, C. Dorfer, M. Dunser, G. Eigen, V. Eremin, G.T. Forcolin, J. Forneris, L. Gallin-Martel, M.L. Gallin-Martel, K.K. Gan, M. Gastal, M. Goffe, J. Goldstein, A. Golubev, A. Gorišek, E. Grigoriev, J. Grosse-Knetter, A. Grummer, M. Guthoff, B. Hiti, D. Hits, M.R. Hoeferkamp, T. Hofmann, J. Hosselet, F. Hügging, C. Hutton, J. Janssen, H. Kagan, K. Kanxheri, R. Kass, M. Kis, G. Kramberger, S. Kuleshov, A. Lacoste, S. Lagomarsino, A. Lo Giudice, I. Lopez Paz, E. Lukosi, C. Maazouzi, I. Mandić, C. Mathieu, M. Menichelli, M. Mikuz, A. Morozzi, J. Moss, R. Mountain, A. Oh, P. Olivero, D. Passeri, H. Pernegger, R. Perrino, F. Picollo, M. Pomorski, R. Potenza, A. Quadf, F.E. Rarbi, A. Re, M.P. Reichmann, S. Roe, D.A. Sanz Becerra, M. Scaringella, C. Schmidt, S. Schnetzer, E.J. Schioppa, S. Sciortino, A. Scorzoni, S. Seidel, L. Servoli, D.S. Smith, B. Sopko, V. Sopko, S. Spagnolo, S. Spanier, K. Stenson, R. Stone, B. Stugu, C.M. Sutura, M. Traeger, W. Trischuk, M. Truccato, C. Tuve, J. Velthuis, N. Venturi, S. Wagner, R. Wallny, J.C. Wang, N. Wermes, M. Yamouni, J. Zalieckas, M. Zavrtnik and on behalf of the RD42 Collaboration

Beam test results of 3D pixel detectors constructed with poly-crystalline CVD diamond

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