

CURRICULUM VITAE

Fotios Ptochos

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Education

- *Ph. D., Physics, May 1998*: Harvard University, Cambridge, Massachusetts, USA
Thesis: “*Measurement of the $t\bar{t}$ production cross section with heavy flavor tagging in $W+ \geq 3$ jet events in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ -TeV*”
Thesis Advisor: Professor Melissa Franklin
- *Master of Arts and Sciences, October 1990*: Harvard University, Cambridge, Massachusetts, USA
- *B. Sc., Physics, April 1987*: Aristoteles University, Thessaloniki, Greece
Thesis: “*Neutrino oscillations*”
Thesis Advisor: Professor Argyres Nicolaides

Academic and Research Positions Held

- *Associate Professor (tenured)*, University of Cyprus, 2009 – present.
- *Assistant Professor*, University of Cyprus, 2004 – 2009.
- *International Fellow*, Fermi National Laboratory, 2007 – 2008.
- *Guest Scientist*, Fermi National Laboratory, 2016 – 2017, 2003 – 2004 & 2001 – 2002.
- *Research Scientist*, I.N.F.N. Frascati, Italy, 2002 – 2003 & 1998 – 2001.
- *Graduate Student Research Assistant*, Harvard University, 1988 – 1998.
- *Research Assistant*, CERN (Particle Physics Division/ICARUS experiment), 1987 – 1988.
- *Undergraduate Research Assistant*, Aristoteles University, Greece, 1983 – 1985.

Research Activities

- *CMS Collaboration*, University of Cyprus, July 2005 – Present:
 - Search for heavy charged Higgs boson decaying to top bottom quarks and its identification in the all hadronic final state, [in progress].
 - Development of L1 tau-lepton trigger algorithms for the CMS detector for the high luminosity phase II LHC upgrades, [CMS TDR and in progress].
 - Measurement of Standard Model Higgs boson production in association with a pair of $t\bar{t}$ quarks, [in progress].
 - Search for light charged Higgs boson in top quark decays [JHEP].
 - Measurement of the $b\bar{b}$ production cross section [JHEP].
 - Measurement of Bose-Einstein Correlations in proton-proton collisions [PRL].
 - Search for low mass NMSSM neutral Higgs Bosons [in progress].
 - Prospects for discovering higher dimensional mini black hole events by tagging high p_T top quark jets.
 - Development of tagging algorithms for boosted top quark jets [in progress].
 - Involvement in the development of a Level-1 tau trigger for the High-Luminosity phase of LHC running.
 - Involvement in the muon trigger upgrades of the CMS detector.
 - Involvement in the forward hadron calorimeter upgrade of the CMS detector.
 - Involvement in the monitoring of the quality of data collected with the Electromagnetic Calorimeter of CMS.
- *CDF Collaboration*, University of Cyprus, June 2004 – Present:
 - Study of the characteristics of multi-muon events at CDF [PLB and EPJC].
 - Study of anomalous production of multi-muon events at CDF [EPJC].
 - Phenomenological interpretation of the multi-muon events observed at CDF [arXiv:0810.5730].
 - Measurement of correlated $b\bar{b}$ production cross section [PRD].
 - Measurement of the B^+ production cross section [PRD].
 - Measurement of the J/ψ polarization [PRL] and $\Upsilon(1S)$ polarization and production cross section.
 - Review of all Tevatron measurements related to b -quark production cross section [PRD].
 - Phenomenological study of the discrepancies between the heavy flavor properties of jets observed at the Tevatron and the prediction of conventional QCD simulations [PRD].
 - Study of the dimuon invariant mass spectrum between 6.3 – 9.0 GeV/c² for narrow resonances [PRD-Run I]. Similar study using Run II events corresponding to an integrated luminosity of 630 pb⁻¹ [EPJC].
 - Study of the rates and kinematical properties of lepton pairs from sequential heavy flavor semileptonic decays contained in central jets [PRD].
 - Responsible for the maintenance and energy calibration of the Central (CHA) and End Wall (WHA) hadron calorimeter of the CDF detector.

- *Detector R&D*, University of Cyprus
 - Measurement of the response of crystals to very low energy ions and comparison to the GEANT4 simulations [in preparation].
 - Characterization of Silicon Photomultipliers and test of the properties and response of various types of crystals to Cherenkov and Scintillation photons [presented at IEEE 2011]
 - Use of the dual readout calorimetry concept in a testbeam calorimeter prototype with Glasses [Fermilab-Proposal-1015].
 - Use of the dual readout calorimetry concept in a total absorption hadron calorimeter prototype [Fermilab-Proposal-1004].
- *CDF Collaboration*, Fermi National Accelerator Laboratory, 2001 – 2004:
 - Measurement of the time integrated mixing probability of b -flavored hadrons using events with $\mu - \mu$ and $e - \mu$ pairs [PRD].
 - Study of the heavy flavor content of jets in events with two or more jets where one jet contains a lepton while the other one is tagged with a displaced vertex tagging [PRD].
 - Coordinator of a group responsible for the construction, installation, commissioning, online monitoring, calibration and maintenance of the timing system used in the hadronic sections of the CDF calorimeter.
 - Project leader for the upgrades of the laser and source calibration system for the CDF CHA and WHA hadron calorimeter.
 - Coordinator of the CDF CHA and WHA hadron calorimeter energy calibration.
- *CDF Collaboration*, I.N.F.N. Frascati, 1998 – 2001:
 - Study of heavy flavor jet production in association with W bosons using various heavy flavor tagging algorithms that revealed the famous CDF *events with superjets* [PRD].
 - Study of the probability for the observed superjet events to be consistent with Standard Model predictions [PRD].
 - Evaluation of the background due to QCD multijets and W/Z +jet processes to events with large missing transverse energy and multijets. This final state signature was used in a search for squarks and gluinos [PRD].
- *CDF Collaboration*, Harvard University, 1989 – 1998:
 - Ph. D. thesis on the measurement of the $t\bar{t}$ production cross section in the $W + \geq 3$ jet events using three different heavy flavor identification/tagging techniques. The measurement provided the most accurate value of the $t\bar{t}$ production cross section in $p\bar{p}$ collisions at $\sqrt{s} = 1.8\text{-TeV}$ [PRD].
 - Development of the jet-probability tagging algorithm for measuring the $t\bar{t}$ cross section.
 - Development of a new technique for evaluating mistags.
 - Application of the Monte Carlo based $t\bar{t}$ background estimates to the Soft Lepton Tagger.
 - Tuning with jet data of the heavy flavor production cross sections predicted by the Herwig Monte Carlo.

- Contributor in a search for Higgs production and other exotic signatures in $W(\rightarrow \ell + \nu) +$ jet events [PRL].
- Study of $W + N$ jet production cross section as a function of the jet multiplicity and development of a technique for accounting for the observed jet multiplicity and the contributing partons at generator level. This was a novel theoretical approach towards the jet-parton matching algorithms developed in the recent years.
- Evaluation of the $Z(\rightarrow \tau^- \tau^+) +$ jets production cross section as a function of jet multiplicity for estimating the background in a search for 3-rd generation leptiquarks [PRL].
- Reduction of the photons contributing background to plug electrons by using track segments in the silicon detector. The technique was used to increase the η -coverage of the CDF tracker with the development and implementation of the PHOENIX tracker system for CDF-II upgrade. It was also used in the measurement of the W asymmetry.
- Responsible for the construction, test, calibration and alignment of the Central Muon Extension (CMX), a sub-system of the CDF muon system. Co-coordinator of this sub-system commissioning during the Run Ia collider run.
- Studies of the free ion yield of various tetramethyl liquids in a search for suitable room temperature liquids to use in future calorimeters [two NIM articles].
- Study of the electron thermalization length and the connection to the molecular structure and free ion yield in various tetramethyl liquids [PRB].
- *ICARUS Collaboration*, CERN, 1987 – 1988:
 - Development of a technique for monitoring the purity of liquid argon by measuring the lifetime of electrons extracted from photocathodes using a Nd-Yag UV laser [NIM].
 - Prospects of using electron emission from sharp points in liquid argon as a purification system [Nuovo Cimento].
 - Participation in the construction, instrumentation and testbeam test of the first *ICARUS* prototype at CERN PS.

Technical Skills Relevant to Scientific Research

- *Operating Systems (administration)*: Unix/Linux, Mac OS X, Windows, and VMS.
- *Programming Languages*: C/C++, FORTRAN, Python, Perl, JAVA, and shell scripting.
- *Instrumentation and Controls*: VME, FASTBUS, CAMAC, and LabVIEW.

Membership In Professional Organizations

- *American Physical Society*, member.
- *European Physical Society*, member.
- *Cyprus Physical Society*, member.

Grants

- *University Cyprus Internal Research Grant*, funded project *Tau hadronic triggers at the HL-LHC era* for the period of 2016 - 2018, in the amount of 48,000 Euro (in collaboration with postdoctoral fellow A. Attikis).
- *Cyprus Research Promotion Foundation*, funded project *CMS Research Program at CERN* for the period of 2015 - 2030, in the amount of 200,000 Euro/year (in collaboration with prof. P. Razis).
- *European Research Commission-FP7-PEOPLE-2013-IEF (Intra-European Fellowships)*, November 2013. Funding for a two year period in the amount of 145,252 Euro. The funded project covers the activities of a post doctoral Fellow on *The development of a Level-1 Tau Trigger for CMS at the high luminosity run of LHC*. The proposal was submitted in collaboration with Dr. A. Attikis of the Physics Department of University of Cyprus.
- *Cyprus Research Promotion Foundation (Action Technology)*, December 2011. Funding for a three year period in the amount of 137,000 Euro. The funded project is on *Search for neutral SM and MSSM Higgs bosons in the decay channel $H/A/h \rightarrow \tau\tau$* . The proposal was submitted in collaboration with prof. P. Razis and Dr. J. Mousa of the Physics Department of University of Cyprus.
- *Cyprus Research Promotion Foundation*, funded project *CMS Research Program at CERN* September 2011 - 2015, in the amount of 140,000 Euro/year (in collaboration with prof. P. Razis).
- *Fermi National Accelerator Laboratory*, Summer 2010. Funding was provided for a two month period in the amount of 5,000 for two Physics undergraduate students from University of Cyprus to work on hadron calorimeter R & D at Fermi National Laboratory.
- *Cyprus Research Promotion Foundation (Action Technology)*, September 2009. Funding for a three year period in the amount of 119,824 Euro for a post doctoral researcher. The funded project is on *Search for light neutral NMSSM Higgs bosons at CMS*. The successful proposal was submitted in collaboration with Dr. J. Mousa of the Physics Department of University of Cyprus.
- *Cyprus Research Promotion Foundation* September 2009. Funding for a two year period in the amount of 247,500 Euro under the collaboration protocol on *High Energy Physics* between CERN and Cyprus (in collaboration with prof. P. Razis).
- *European Regional Development Fund - INTEREG-IIIa and the Governments of Greece and Cyprus*, November 2006 – November 2008. Funding was provided in the amount of 225,000 Euro for a project titled *The Regional Europe at the center of the modern scientific research. Collaboration between Greece and Cyprus in High Energy Physics and Cosmology*. The project was a joint collaboration with Professor N. Toumbas of the Physics Department of University of Cyprus and the Physics Department of the University of Crete (Greece).

Awards

- *Fermi National Accelerator Laboratory, International Fellowship for senior researchers*, assigned to CDF experiment, June 2007 – June 2008.
- *I.N.F.N. Fellowship for young non-Italian post-doctoral researchers*, February 1988. I declined this fellowship to continue graduate studies at Harvard University.
- *Greek National Foundation*, July 1983, a merit award for my performance in the University National Entrance Exams (I ranked seventh in order of merit among 300 successful candidates for the Physics Department).

Talks and Seminars

- “*CDF Calorimetry*,” talk at the *Calorimetry for High Energy Frontier (CHEF2013)*, Paris, France, April 2013.
- “*Experimental Studies of Scintillation and Cherenkov light Yield of Scintillation Crystals with SiPM Readout*,” presentation and poster at *2011 IEEE Nuclear and Science Symposium and Medical Imaging Conference*, Valencia, Spain, October 2011.
- “*Multi-muon events at CDF*,” invited talk at *Rencontres de Moriond - QCD and High Energy Interactions*, LaTulle, Italy, March 2009.
- “*Multi-muon events at CDF*,” invited speaker at *Physics Department Seminar*, University of Padova, Italy, January 2009.
- Invited participant at *Aspen Winter Conference on Particle Physics*, Aspen, Colorado, February 2005. Served as coordinator for the QCD session of the conference.
- “*Anomalous Heavy Flavor Production at the Tevatron*,” invited speaker at *High Energy Physics Seminar*, Stanford Linear Accelerator Center (SLAC), June 2003.
- “*Tuning the QCD Monte Carlo processes in the $t\bar{t}$ cross section measurement*,” invited speaker at *CTEQ/Matrix Element-Monte Carlo tuning workshop*, Fermi National Accelerator Laboratory, April 2003.
- “*Superjet events at CDF*,” invited speaker at *Aspen Winter Conference on Particle Physics*, Aspen, Colorado, February 2002.
- “*New results on the $t\bar{t}$ production cross section from CDF*,” representing the CDF collaboration at the *International Europhysics Conference on High Energy Physics*, Tampere, Finland, July 1999.
- “*New results on the $t\bar{t}$ production cross section from CDF*,” invited speaker at *High Energy physics seminar*, Harvard University, December 1998.
- “*Measurement of the $t\bar{t}$ production cross section at CDF*,” invited speaker at *High Energy physics seminar*, I.N.F.N. Frascati, October 1998.

Scientific Service Work

- Member of a Committee appointed by the Cyprus Ministry of Education in charge of evaluating and reforming the physics curriculum for the entire Secondary Education and determining the corresponding indicators for the learning and proficiency objectives, March 2015 - *present*.
- Member of the editorial team that prepares education material in Physics for all class of high school.
- Member of the editorial group in charge for producing education material (student instruction books and corresponding laboratory activities) for the entire Cyprus Secondary Education, June 2015 - *present*.
- Co-organizer of the 2013 CERN School of Computing (CSC 2013), Nicosia, Cyprus, August 19 – August 30 2013.
- Co-organizer of the 2012 international workshop on *Low-x* physics, Paphos, Cyprus, June 27 – July 1 2012.
- Chairperson and Member of various CDF internal Review Committees.
- Member of Scientific and Selection Committee for the *Summer School on High Energy Physics and Cosmology*, Paphos, Cyprus, Summer 2008.
- Session chair, QCD session, *Winter Conference on Particle Physics*, Aspen, USA, Spring 2005.

Administrative Work

- Chairpeson of the Physics Department, University of Cyprus, March 2018 – *present*.
- Chairpeson of the Physics Department, University of Cyprus, March 2014 – March 2016.
- Vice Chairpeson of the Physics Department, University of Cyprus, March 2012 – March 2014.
- Coordinator of the Physics Department Graduate Program, University of Cyprus, March 2010 – March 2014.
- Member of the Cyprus-CERN National Committee appointed by the Minister of Education of the Republic of Cyprus (2010-2012). The purpose of the committee was to evaluate the benefits of Cyprus becoming a CERN member state and coordinate the application procedure to the CERN evaluating committee. The Republic of Cyprus was accepted as a CERN Associate member in October 2012.
- Chairperson of the Special Evaluation Committee for the promotion of faculty in the Physics Department, 2011.
- Chair of the Committee for reviewing the Ph. D. Candidacy Qualifying Examination, Spring 2013.
- Chairperson of the special examination committee for the the Ph. D. Thesis Defense of three Ph. D. graduate students, May 2011, May 2012 and June 2012.

- External examiner of a Ph. D. Thesis Defense, Physics Department, University of Thessaloniki, Greece, June 2012.
- Member of numerous Master and Undergraduate Thesis examination committees.
- Member of the Physics Department Graduate Admissions Committee, May 2005 – Present.
- Chair of the Committee for reviewing the Ph. D. Candidacy Qualifying Examination, Fall 2005 – Spring 2006.
- Committee Member of the Ph. D. Candidacy Qualifying Examinations, Fall 2005 – Fall 2006 and Fall 2011.
- Member of various Standards and Evaluation Committees for tenders on Laboratory Infrastructure, Spring 2005 – Fall 2006.
- Member of a Search Committee for the position of a Laboratory Technician/Assistant for the Particle Physics and Electromagnetism Labs, Fall 2004.

Public outreach

- Coordinator of the *International Masterclasses: Hands on Particle Physics in Cyprus*. This widespread international outreach activity offers the opportunity to high school students to live and experience for a day the world and mysteries of particle physics through a series of lectures organized at the University and experiment with data collected at LHC using event display.
- Invited talks on Particle Physics and Cosmology at high schools around Cyprus and community events, Spring 2005 – Present.
- Talks and hands on demonstration of cosmic rays detection to High School Students, World Year of Physics Celebrations, events organized by the Physics Department, University of Cyprus 2005.

Supervision of Post Doctoral Researchers and Students

- *Postdocs*
 - Dr. Attikis Alexandros, June 2013 – present.
 - Dr. Mousa Jehad, December 2008 – 2013.
 - Dr. Galanti Mario, September 2009 – August 2012.
- *Ph. D. Students:*
 - W. Ather, University of Cyprus, September 2011 – present.
 - M. Kolosova, University of Cyprus, September 2016 – present.
 - S. Konstantinou, University of Cyprus, September 2016 – present.
 - K. Christoforou, University of Cyprus, September 2018 – present.
 - I. Vasilas, University of Cyprus, September 2011 – 2014.

- A. Ioannou, University of Cyprus, September 2012 – 2014.
- Dr. F. Happacher, “*Study of leptonic decays of heavy flavor hadrons produced in $p\bar{p}$ interactions at $\sqrt{s} = 1.8\text{-TeV}$,*” L’Aquila University, Italy [Ph. D., February 2001, co-supervisor]. Dr. Happacher is currently a staff Research Scientist at I.N.F.N. Frascati.
- Dr. I. Fiori, “*Observation of anomalous semileptonic decays of heavy flavor quarks at $p\bar{p}$ interactions at $\sqrt{s} = 1.8\text{-TeV}$,*” Bologna University, Italy [Ph. D., February 2000, co-supervisor]. Dr. Fiori is currently a Research Scientist at I.N.F.N. Pisa.
- M. Sc. Students:
 - C. Siakas, University of Cyprus [January 2019 – present].
 - M. Toumazou, University of Cyprus [September 2017 – present].
 - M. Kolosova, University of Cyprus [September 2015 - 2016]. Following the first year of the Master’s Degree studies Ms. Kolosova entered in the Ph.D. program of our Department.
 - M. Haraki, “*Reconstruction of the top quark mass in the fully hadronic final state as a way to control the background in a search for a charged Higgs boson,*” University of Cyprus [September 2015 - December 2017].
 - E. Ioannou, “*Study of a low mass NMSSM Higgs boson using same sign dimuon events collected with the CMS detector at LHC,*” University of Cyprus, March 2011 – May 2012. Mr. Ioannou is currently a Ph. D. student at the Physics Department of University of Cyprus.
 - I. Vasilas, “*Dual read-out calorimeter,*” University of Cyprus, June 2009 – May 2011. Mr. Vasilas is currently a Ph. D. student at the Physics Department of University of Cyprus.
 - R. Ferreos, “*Constraints on Supersymmetry from Cosmology,*” University of Cyprus [M. Sc., May 2008, co-supervisor]. Mr. Ferreos is a high school teacher.
 - Z. Zenonos, “*Exploring Higher Dimensional Black Hole events at LHC with the CMS detector,*” University of Cyprus [M. Sc., May 2007]. Dr. Zenonos continued his Ph. D. studies at the University of Pisa under a full fellowship and is currently a post doctoral research associate at Max Planck Institute, Munich, Germany.
 - K. Pelekanos, “*Exploring the possibility of detecting rare events in models with large extra spatial dimensions,*” University of Cyprus [M. Sc., May 2007]. Mr. Pelekanos is a high school teacher.
 - A. Anastassiou, “ *b -quark production at the Tevatron $p\bar{p}$ collider and study of the $B^+ \rightarrow J/\psi K^+$ decay channel,*” University of Cyprus [M. Sc., May 2007]. Mr. Anastassiou is a high school teacher.
 - L. Breccia, “*Heavy flavor tags in Z +jet events produced in $p\bar{p}$ interactions at the Tevatron,*” Bologna University [M. Sc., February 1999].
- Undergraduate Students Thesis:
 - K. Vakkou, “*Investigation of the understanding of graphs in kinematics,*” University of Cyprus [June 2018 - December 2018].
 - K. Christoforou, “*Search for Charged Higgs boson decaying to top and bottom quark at pp collisions at LHC with the CMS detector,*” University of Cyprus [June 2017 - May 2018].

- M. Toumazou, “*Search for Charged Higgs boson with mass greater than the top quark mass*,” University of Cyprus [June 2016 - May 2017].
- S. Konstantinou, “*Measurement of the production cross section of Higgs boson in association with a pair of $t\bar{t}$ quarks and its subsequent decay to a pair of $\tau^+\tau^-$ leptons*,” University of Cyprus [June 2015 - May 2016].
- M. Haraki, “*L1 tau-trigger for High Luminosity LHC phase II run*,” University of Cyprus [June 2014 - May 2015].
- M. Kolosova, “*Primary vertex finding at CMS for the High Luminosity LHC phase II run*,” University of Cyprus [June 2014 - May 2015].
- S. Kyriacou, “*Search for multi-muon events at CMS*,” University of Cyprus [B. Sc., May 2012]. Mr Kyriacou is pursuing a Ph. D. degree in experimental high energy physics at Rutgers University (USA).
- I. Vasilas, “*Exploring hidden valley scenarios at the Tevatron and LHC*,” University of Cyprus [B. Sc., May 2009].
- A. Alekou, “*Measurement of the $\Upsilon(1S)$ polarization at the Tevatron collider with the CDF detector*,” University of Cyprus [B. Sc., May 2008]. Dr. Alekou continued her Ph. D. studies in accelerator physics at Imperial University (UK) is currently a CERN post doctoral research associate.
- M. Fragkou, “*Measuring the $b\bar{b}$ production cross section at the Tevatron*,” University of Cyprus [B. Sc., May 2007]. Ms. Fragkou continued her M. Sc. degree studies on *Environmental Physics and Alternative energy sources* at the Engineering School of University of Crete, Greece, and is currently pursuing a Ph. D. degree on *Environmental Physics Alternative energy sources* at the Physics Department of University of Crete, (Greece).

Publications

Most of my publications are part of the publication list of the CDF and CMS collaborations. In such large collaborations with a large number of participating particle physicists it is difficult to identify the role of each individual researcher. Evidence for the role of each researcher and the impact of his/her work in shaping the published work can be found by the internal documents and the presentations at various internal to the collaboration working groups. I chose to present the list of my publications split in two major categories. Publications in which I am the primary or one of the primary authors (*Primary publications*). Among them, there are also publications with fewer than five authors which is rare for the field of my research. The second category refers to a the full list of more than 1,300 published articles in which my contribution is based either on the development of analysis tools used in the published work, or on my personal service work within the collaborations or on editorial comments that improved the quality and clarity of the published work. The list can be retrieved using the INSPIRE/HEP database: [HTTP://INSPIREHEP.NET/SEARCH?LN=EN&P=FIND+AU+PTOHOS+OR+AU+PTOCHOS](http://inspirehep.net/search?ln=en&p=find+au+ptohos+or+au+ptochos)

Books for Education

1. G. Archontis *et al.* “*Physics: Mechanics and Optics*,” Cyprus Insitute of Education, Cyprus Ministry of Education, June 2016. Instruction book and book of activities for Students of the 1st year of Cyprus High School following the discipline of natural sciences.
2. G. Archontis *et al.* “*Physics: Mechanics and Optics*,” Cyprus Insitute of Education, Cyprus Ministry of Education, June 2016. Instruction book and book of activities for Students of the 1st year of Cyprus High School following all disciplines other than natural sciences.
3. G. Archontis *et al.* “*Physics: Mechanics and Electricity*,” Cyprus Insitute of Education, Cyprus Ministry of Education, June 2016. Instruction book for Students of the 2nd year of Cyprus High School following the discipline of natural sciences.
4. G. Archontis *et al.* “*Physics: Mechanics*,” Cyprus Insitute of Education, Cyprus Ministry of Education, July 2018. Instruction book for Students of the 3rd year of Cyprus High School following the discipline of natural sciences.

Primary Publications

1. S. Chatrchyan *et al.* [CMS Collaboration] “*Search for charged Higgs boson in pp collisions at $\sqrt{s} = 8$ - TeV ,*” JHEP **11**, 018 (2015) [arXiv:1508.07774 [hep-ex]]
2. J. Butler, D. Contardo, M. Klute *et al.* [CMS Collaboration] “*Technical Proposal for the Phase-II Upgrade of the CMS Detector*,” Technical Report CERN-LHCC-2015-10-P-008, CERN, Geneva, (Jun 2015)
3. S. Chatrchyan *et al.* [CMS Collaboration] “*Search for a light charged Higgs boson in top quark decays in pp collisions at $\sqrt{s} = 7$ - TeV ,*” JHEP **1207**, 143 (2012) [arXiv:1205.5736 [hep-ex]]
4. S. Chatrchyan *et al.* [CMS Collaboration] “*Measurement of the cross section for production of b b -bar X , decaying to muons in pp collisions at $\sqrt{s} = 7$ - TeV ,*” JHEP **1206**, 110 (2012) [arXiv:1203.3458 [hep-ex]]
5. T. Aaltonen *et al.* [CDF Collaboration]. “*An additional study of multi-muon events produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV ,*” Phys. Lett. B **710**, 278 (2012) [arXiv:1111.5242 [hep-ex]]
6. D. Cauz, *et al.* “*T-1015 Dual Readout Calorimetry with Glasses*,” FERMILAB-PROPOSAL-1015
7. T. Aaltonen *et al.* [CDF Collaboration] “*Improved determination of the sample composition of dimuon events produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV ,*” Eur. Phys. J. C **71**, 1720 (2011) [arXiv:1105.5787 [hep-ex]]
8. A. Aaltonen *et al.* [CDF Collaboration], “*Study of multi-muon events produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ - TeV ,*” Eur. Phys. J. C **68**, 109 (2010) [arXiv:0810.5357 [hep-ex]]

9. A. Aaltonen *et al.* [CDF Collaboration], “Comments and reply on: Study of multi-muon events produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96\text{-TeV}$,” *Eur. Phys. J. C* **68**, 119 (2010)
10. V. Khachatryan *et al.* [CMS Collaboration] “Measurement of Bose-Einstein Correlations in pp Collisions at $\sqrt{s} = 0.9$ and 7 TeV ” *JHEP* **1105**, 029 (2011) [arXiv:1101.3518 [hep-ex]]
11. “Total Absorption Dual Readout Calorimetry,” M. Crisler *et al.* FERMILAB-PROPOSAL-1004
12. V. Khachatryan *et al.* [CMS Collaboration], “First Measurement of Bose-Einstein Correlations in pp collisions at $\sqrt{s} = 0.9$ and 2.36-TeV at the LHC,” *Phys. Rev. Lett.* **105**, 262001 (2010) [arXiv:1005.3294 [hep-ex]]
13. T. Aaltonen *et al.* [CDF Collaboration], “Search for narrow resonances lighter than Υ mesons,” *Eur. Phys. J. C* **62**, 319 (2009) [arXiv:0903.2060 [hep-ex]].
14. P. Giromini, F. Happacher, M.J. Kim, K. Pitts, M. Kruse, F. Ptohos, S. Torre, “Phenomenological interpretation of the multi-muon events reported by the CDF collaboration,” [arXiv:0810.5730 [hep-ph]]
15. S. Chatrchyan *et al.* [CMS Collaboration] “The CMS experiment at the CERN LHC,” *JINST* **3**, S08004 (2008).
16. T. Aaltonen *et al.* [CDF Collaboration], “Measurement of correlated $b\bar{b}$ production in $p\bar{p}$ collisions at $\sqrt{s} = 1960\text{ GeV}$,” *Phys. Rev. D* **77**, 072004 (2008) [arXiv:0710.1895 [hep-ex]].
17. T. Aaltonen *et al.* [CDF Collaboration], “Measurement of Inclusive Jet Cross Sections in $Z/\gamma^*(\rightarrow ee) + \text{jets}$ Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96\text{ TeV}$,” *Phys. Rev. Lett.* **100**, 102001 (2008) [arXiv:0711.3717 [hep-ex]].
18. A. Abulencia *et al.* [CDF Collaboration], “Polarization of J/ψ and $\psi(2S)$ mesons produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96\text{-TeV}$,” *Phys. Rev. Lett.* **99**, 132001 (2007) [arXiv:0704.0638 [hep-ex]].
19. A. Abulencia *et al.*, [CDF Collaboration], “Measurement of the B^+ production cross section in $p\bar{p}$ collisions at $\sqrt{s} = 1960\text{ GeV}$,” *Phys. Rev. D* **75**, 012010 (2007) [arXiv:hep-ex/0612015].
20. F. Happacher, P. Giromini and F. Ptohos, “Status of the observed and predicted $b\bar{b}$ production at the Fermilab Tevatron,” *Phys. Rev. D* **73**, 014026 (2006) [arXiv:hep-ph/0509348].
21. G. Apollinari *et al.*, “Phenomenological study of the atypical heavy flavor production observed at the Fermilab Tevatron,” *Phys. Rev. D* **73**, 014025 (2006) [arXiv:hep-ex/0511053].
22. G. Apollinari *et al.*, “Search for narrow resonances below the Υ mesons,” *Phys. Rev. D* **72**, 092003 (2005) [arXiv:hep-ex/0507044].
23. G. Apollinari, I. Fiori, P. Giromini, F. Happacher, S. Miscetti, A. Parri and F. Ptohos, “Study of sequential semileptonic decays of b hadrons produced at the Tevatron,” *Phys. Rev. D* **72**, 072002 (2005) [arXiv:hep-ex/0507043].
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