

MARÍA CEPEDA

CERN

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CIEMAT

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HIGHLIGHTS

Member of the CMS Collaboration since 2007

CMS Higgs convener, 2019-2021

Higgs measurements at the LHC, HL-LHC and Future colliders.

Exotic Higgs decays. Lepton flavor violation.

L1Trigger strategies and algorithm development for LHC and HL-LHC.

EMPLOYMENT

(2/2024–today) **Científico Titular** (Tenured Scientist)

Centro de Investigaciones Energéticas, MedioAmbientales y Tecnológicas (CIEMAT), Madrid, Spain

(2/2019–12/2023) "Ramón y Cajal" Researcher

Centro de Investigaciones Energéticas, MedioAmbientales y Tecnológicas (CIEMAT), Madrid, Spain

(10/2015–10/2018) Marie Curie CONFUND CERN Research Fellow

(7/2011–9/2015) Post-Doctoral Research Associate

University of Wisconsin-Madison, US

(2/2007–7/2011) Ph.D. Student Grant

Centro de Investigaciones Energéticas, MedioAmbientales y Tecnológicas (CIEMAT), Madrid, Spain

EDUCATION

Ph.D. in High Energy Physics, Universidad Complutense de Madrid (UCM) and Centro de Investigaciones, Energéticas, Medioambientales y Tecnológicas (CIEMAT), Madrid, May 2011

PhD Thesis: "Measurement of the W boson production cross-section in proton-proton collisions at $\sqrt{s} = 7$ TeV, in the CMS experiment at the LHC"

Supervisors: Isabel Josa Mutuberría and Begoña de la Cruz Martínez

M.Sc. in Fundamental Physics, Universidad Complutense de Madrid, 2007

Master Thesis: "Muon Momentum Scale Measurement using J/Ψ decays in the CMS experiment"

Licenciatura in Physics, Universidad Complutense de Madrid, 2006

COORDINATION AND MANAGEMENT

- (2023) Coordination of L1 Performance studies for HL-LHC (Phase-2 L1T DPG Convener)
- (2019-2021) Coordination of Higgs studies at CMS
- (2019) Member of the Higgs at Future Colliders working group for ECFA
- (2017–2018) CMS convener for the Working Group 2 (Higgs Physics) of the 2018 Yellow Report on the "Physics of the HL-LHC, and Perspectives at the HE-LHC"
- (2016–2018) Coordination of Higgs searches for the HL-LHC at CMS
- (2015–2016) Coordination of the Higgs exotic searches analysis subgroup of CMS
- (2013–2014) Coordination of trigger studies and preparation of the 2015 strategy for the Higgs analysis group
- (2012–2013) Coordination of trigger studies for the Standard Model analysis group

CONFERENCES AND WORKSHOPS: ORGANIZATION

- Local Organizing Committee of SUSY24, June 24, Madrid
- Seminar organization for the Department of Basic Research at CIEMAT (2019-2022)
- International Advisory Committee for the Higgs Hunting workshop (2018-2022)
- Convener of the Higgs parallel session in ICHEP 2022 (Bologna)
- Convener of the Higgs parallel session in 'SM at LHC' 2022 (CERN)
- International Advisory Committee for the Higgs conference (formerly Higgs Couplings) (2018-2021)
- Convener of the Higgs sessions of the "Workshop on the physics of HL-LHC, and perspectives at HE-LHC". Series of workshops (CERN November 2017, Fermilab April 2018, CERN June 2018, CERN October 2018, Final jamboree March 2019)
- Convener of the Upgrade/Future parallel session in LHCP 2018 (Bologna)
- Convener of the Higgs parallel session in SUSY 2017 (Mumbai)
- CERN Cross Talk Organization, 2016-2018

STUDENT SUPERVISION

Ph.D.: Lourdes Urda Gómez, October 2023, Universidad Complutense de Madrid (UCM)

Title: Constraints on anomalous couplings of the Higgs boson in WW decays with the CMS experiment at the LHC

Co-supervised with Dr. Dermot Moran (CIEMAT)

Ph.D.: Elvira Martín Viscasillas, in progress, Universidad Autónoma de Madrid (UAM)

Topic: Higgs boson pair production and constraints on the Higgs boson self-coupling

Co-supervised with Dra. Silvia Goy (CIEMAT)

M.Sc.: Manuel González Hernández, June 2023, UCM

Title: "Búsquedas de producción simultánea de dos bosones de Higgs desintegrándose en dos quarks b y dos leptones tau ($HH \rightarrow bb\tau\tau$) con datos del experimento CMS del LHC"

Co-supervised with Dra. Silvia Goy (CIEMAT)

M.Sc.: Izan Kevin Fernández Tostado González, June 2023, UCM

Title: "Estudio del acoplamiento entre el bosón de Higgs y el leptón tau en futuros colisionadores $e+e^-$ "

(2011–2015) Supervision and tutoring of UW PhD students (Professors W. Smith and S. Dasu)

CONFERENCES AND WORKSHOPS: ABRIDGED LIST OF CONTRIBUTIONS

"The Higgs Boson: Present and Future", 57th Rencontres de Moriond: QCD and High Energy Interactions. Rencontres de Moriond, March 2023. (Invited Contribution).

"Trigger in CMS". Trigger and Readout at the LHC experiments for Run3 and Beyond. IFIC (Valencia, Spain), March 2023

"El LHC y el bosón de Higgs: Historia y resultados experimentales 10 años después de su descubrimiento", Public lecture at Madrid Universities: UAM April 2022, UCM September 2022

"Higgs at HL-LHC", Higgs Discovery at 10: Symposium for the 10 years from the Higgs boson observation, Birmingham, 2022

"Higgs at the LHC", XVIII International Meeting on Fundamental Physics, Benasque (Spain), September 2021

"Experimental Constraints on the Exotic Higgs Width", Workshop on Feebly-Interacting Particles (FIPS 2020), Online, September 2020

"Capabilities of Future machines for Precision Higgs Physics", Open Symposium of the Update of the European Strategy for Particle Physics, Granada (Spain), May 2019

"Standard Model Higgs at the LHC", 25th Anniversary of the Rencontres du Vietnam, Qui Nhon, August 2018

"Prospects of Higgs searches at the HL-LHC", Workshop on the physics of HL-LHC, and perspectives at HE-LHC CERN, November 2017

"Exotic Decays of the Higgs Boson", presented on behalf of CMS Collaboration at the 38th (ICHEP) Conference, Chicago, August 2016

"Flavor-violating Higgs coupling measurements at the LHC", Higgs Tasting Workshop 2016, Benasque, May 2016

"Study of Higgs boson production in fermionic decay channels at the LHC", presented on behalf of the CMS and ATLAS collaborations at Blois2015, June 2015

"Exotic Higgs Searches", presented on behalf of the CMS and ATLAS collaborations at CIPANP 2015, Vail, Colorado, May 2015

"Recent results in Higgs Physics, focusing on Higgs&Flavor", invited talk at ZPW2015 (Zurich Phenomenology Workshop), Zurich, January 2015

"Trigger strategies for exotic Higgs searches", LPC Physics Forum, Fermilab, November 2014

"Vector boson + jets measurements at CMS", presented on behalf of the CMS Collaboration at the 19th International Symposium on Particles, Strings and Cosmology (PASCOS2013), Taipei (Taiwan), December 2013

"W and Z physics at the LHC", presented on behalf of the CMS, ATLAS and LHCb Collaboration at Physics at the LHC (PLHC), Vancouver (Canada), June 2012

"W and Z boson production at CMS, in pp collisions at $\sqrt{s} = 7$ TeV", presented on behalf of CMS Collaboration at the 35th (ICHEP) Conference, Paris, July 2010

"W and Z Production at the LHC", presented on behalf of CMS and ATLAS Collaborations at the XVII Int. Workshop on Deep-Inelastic Scattering and Related Topics (DIS), Madrid, April 2009

TEACHING

Organization of the Taller de Altas Energias (Graduate Physics School), September 2024

Phy6Cool: Summer School on Experimental Particle Physics and Cosmology, organized and imparted by CIEMAT. Member of the LOC and teacher of the "Physics at Colliders" unit (lecture+exercise preparation) (2021, 2022, 2023)

"Experimental: Looking to future Higgs measurements at the LHC", CERN Academic Training, CERN, June 2022

49th SLAC Summer Institute, 'The Higgs State Fair', class on 'Extending Higgs Measurement Capabilities', August 2020

Master Thesis Jury in the UCM Master on Fundamental Physics (from 2020)

UCM Master on Fundamental Physics, course on "Experimental Particle Physics and Cosmology" - imparted 1.5 hours on Higgs physics (the subject is organized as a series of seminars) (from 2019)

Class on "Experimental Particle Physics", 3 hours, within the course "Introducción a la física partículas para profesores de ciencia y tecnología" (within the Spanish structure of the CERN outreach and training program for high school teachers and students), 2019 and 2020

Xth SERC School - Course on DAQ, Trigger and Electronics (6 hours), 2016

AWARDS

2018 CMS Achievement Award for outstanding contribution to the Upgrade project in CMS.

2019 CMS Young researchers prize

OUTREACH

Radio interview in the Science program "A Hombros de Gigantes", Radio Nacional de España (RNE), July 2022

"Feliz cumpleaños, bosón de Higgs", MUNCYT, Alcobendas (Madrid), June 2022

"Cuánto Cuenta Lo Cuántico", Museo de Ciencia de Valladolid, Valladolid, March 2022

"Cazando Partículas", Talk at the CIEMAT Grandes Retos Cycle of the Madrid "Science Week", 2020

Workshop leader of the Cloud Chamber experience in the Expanding your horizons (EYH) conference in Geneva, 16th November 2013. Participation in the 'Questions without answers at the LHC' session in 2011 and the Cloud Chamber session in 2015 and 2017.

Participation in "International Masterclasses" (from CERN and from CIEMAT)

Official CMS guide since 2012 (underground visits, in Spanish and English)

Participation in the High School outreach program of CIEMAT: lectures oriented to high school students focusing on LHC and HEP topics (several talks per year since 2019)

OTHER ACTIVITIES

Contribution to data taking (L1Trigger, Calorimetric Trigger, HLT Doc, Shiftleader, Run Field Manager)

Participation in CMS analysis review committees (ARC)

Participation in peer review (JHEP, PLB, EPJC, Nature) and funding agency review processes

PUBLICATIONS

As a CMS author I cosign all articles published by CMS. They can be found online in the following links:

[INSPIRES](#) (author id: 1064384)

[ORCID](#) (ID: 0000-0002-6076-4083)

María Cepeda, January 31, 2024