



Richard Efrain Ruiz, PhD Hab.**Associate Professor & Senior Staff Scientist**

Department of Particle Physics (NZ42),
Division of Theoretical Physics (NO4),
Institute of Nuclear Physics
Polish Academy of Science (IFJ PAN)
ul. Radzikowskiego 152, 31-342 Kraków, Poland

Web: th.ifj.edu.pl/rruiz/

Email: rruiz@ifj.edu.pl

Citizenship: USA (NL - pending)

Family: Married (EU Citizen), 1 kid

Right to work in the EU: Yes

ORCID : [0000-0002-3316-2175](https://orcid.org/0000-0002-3316-2175)

InSpire HEP Publication Summary:

Profile: inspirehep.net/authors/1054727

As of 30 Dec. 2024, published (citeable): 42 (70).

Total citations: 6,065 (8,995), $h_{\text{HEP-index}}$: 30 (38).

Scopus Profile ID: 55585930400

Web of Science ID: AAI-7939-2020

Google Scholar ID: ZrDaE8sAAAAJ

Total citations (Scopus): 3,592, $h_{\text{HEP-index}}$: 24

Total citations (WoS): 3,070, $h_{\text{HEP-index}}$: 23

Total citations (Google): 7,320, $h_{\text{HEP-index}}$: 40

Summary:

- 44 manuscripts (4 single-author works) under or through peer-review in nuclear and particle physics
- 26 contributions to proceedings, white papers, workshop reports, etc.
- 15 distinct software releases
- 2 colloquia, 84 seminars, and 90 conference talks
- 15 internal and external funding awards (over €1M+ awarded) – 4 active grants + 1 under review
- 15 students+postdocs supervised/mentored (incl. current students and PhD committees/juries)
- member of the MadGraph5_aMC@NLO, nCTEQ, and ATLAS collaborations; former member of CMS

Career trajectory

Career break (paternity leave ☺)

Fall 2022 – Winter 2023

Associate Professor & Senior Staff Scientist

Apr. 2024–**present**

Assistant Professor & Junior Staff Scientist

Feb. 2024–Apr. 2024

Marie Skłodowska-Curie Action and PASIFIC Fellow

Jan. 2022–Feb. 2024

Junior Staff Scientist

Jan. 2021–Dec. 2021

Institute of Nuclear Physics – Polish Academy of Sciences, Kraków, Poland

Fonds Spéciaux de Recherche (FSR) University Fellow

Oct. 2018–Dec. 2020

Université Catholique de Louvain, Louvain-la-Neuve, Belgium

Postdoctoral Research Associate

Oct. 2015–Sept. 2018

Department of Physics, Durham University, Durham, United Kingdom

Education

Habilitation, Institute of Nuclear Physics – Polish Academy of Science

15 Apr. 2024

Citation: “*For influential theoretical contributions to understanding and using vector boson scattering...*”

All documents are available from [Poland’s Bulletin of Public Information](#)

Doctor of Philosophy, Physics, University of Pittsburgh

8 Aug. 2015 (Defense: 24 Apr. 2015)

Thesis: *Hadron Collider Tests of Neutrino Mass-Generating Mechanisms* [[arXiv:1509.06375](https://arxiv.org/abs/1509.06375)]

Master’s of Science, Physics, University of Wisconsin-Madison

24 Dec. 2011

Bachelor of Arts, with Honors, Physics, University of Chicago,

12 June 2010

Thesis: *Selection Efficiencies for $Z \rightarrow e^+e^-$ & $Z'_{SM} \rightarrow e^+e^-$ in 7 TeV pp Collisions at the CMS Detector*

Bachelor of Science, Mathematics, University of Chicago

12 June 2010



Honors, merit awards, and prizes

- PhysicsWorld (IOP Publishing) [Top 10 Breakthroughs of the Year in physics for 2024](#) Dec. 2024
- Polish Academy of Sciences' PASIFIC Fellowship 2022–2024
(Note: One of 35 national-level awards across all disciplines.)
- Fonds Spéciaux de Recherche Fellowship – U. Catholique de Louvain 2018–2020
(Note: One of 10 university-level awards across all disciplines.)
- ATLAS Theorist of the Month – Deutsches Elektronen-Synchrotron (DESY) Apr. 2018
- Andrew Mellon Pre-doctoral Fellowship – University of Pittsburgh 2014–2015
(Note: Highest academic award for PhD students in School of Arts and Sciences.)
- K. Leroy Irvis Graduate Fellowship – University of Pittsburgh 2012–2015
- Adv. Opportunity Graduate Fellowship – University of Wisconsin – Madison 2010–2012
- Odyssey Scholarship – University of Chicago 2009–2010

Research grants and funding awards as PI

Total awarded as PI: €1M+ (approximate due to currency exchange rates)

1. Short-Term Scientific Mission Grant, COMETA COST Action (CA22130) [€1k] Mar. 2024
2. SNAIL: SCATTERING NEUTRINOS ON ATOMS IN THE LHC
Polish National Science Center (NCN) – OPUS 25 [1.6M zł (€375k)] Mar. 2024–**present**
3. POPSICLE: POLARIZATION OF PRECISION SCATTERING IN COLLIDERS WITH LARGE ENERGIES
Polish National Science Center (NCN) – SONATA BIS 11 (Awarded; Resigned) [1.38M zł (€324k)] Feb. 2022
4. POPSICLE: POLARIZATION OF PRECISION SCATTERING IN COLLIDERS WITH LARGE ENERGIES
Polish Academy of Sciences (PAN) – PASIFIC Fund [732k zł (€171k)] Jan. 2022–Feb. 2024
5. Short-Term Scientific Mission Grant, VBSCan COST Action (CA16108) [€2k] Apr. 2019
6. NUJETS: THE NEUTRINO JET ERA OF TESTING SEESAWS,
Université Catholique de Louvain – Move-In Fund [€80k] Oct. 2018–Sept. 2020
7. Dietrich School Fellowship for Graduate Summer Research, University of Pittsburgh [\$6k] Summer 2015
8. Dietrich School Fellowship for Graduate Summer Research, University of Pittsburgh [\$4k] Summer 2014
9. Dietrich School Fellowship for Graduate Summer Research, University of Pittsburgh [\$4k] Summer 2013
10. INVESTIGATION AND DETERMINATION OF NEW METHODS FOR STUDYING
MISSING TRANSVERSE ENERGY SIGNALS AT THE LARGE HADRON COLLIDER
US National Science Foundation – EAPSI Fellowship ([OISE-1210244](#)) [\$6k] Summer 2012
11. Summer International Travel Grant for Research, University of Chicago [\$7k] Summer 2009

Research grants and funding awards as co-PI

1. COMETA 2nd General Meeting, w/ Rene Poncelet (IFJ)
COMETA Cost ACTION [€30k] **present/Spring 2025**
2. Travel & Professional Development Award, w/ Alberto Accardi (JLab & Christopher Newport)
APS and Simons Foundation [\$8.4k] Aug. 2024–**present**
3. FLAMENCO Project w/ Didar Dobur (Ghent) & Miha Nemevšek (Ljubljana)
Research Foundation Flanders (FWO) [€399k] Jan. 2022–**present**
4. NUTHEORIES WORKSHOP, w/ Tao Han (Pittsburgh) and Cedric Weiland (Pittsburgh)
US Department of Energy – Neutrino Theory Network Initiative [\$25k] June 2018



Language skills

Human: English – Native; Dutch – Advanced (B2.1); Polish – Beginner; Spanish – Beginner.

Computer: C++, ROOT, fortran, python, bash, html, CSS, L^AT_EX, adaptive (ML) Monte Carlo techniques for HPC

Research networks & collaboration membership

- Member, outreach coordinator – COMETA COST action network (No. CA22130) Sept. 2023–present
- Expert, external member – FLAMENCO (FWO grant No. G027922N) Fall. 2022–present
- Member – nCTEQ (nuclear parton distribution functions) Collaboration Oct. 2021–present
- Short-Term (Theory) Associate (STA) – ATLAS Experimental Collaboration Oct. 2020–present
- Member – MadGraph5_aMC@NLO Simulation Software Collaboration Oct. 2018–present
- Member – VBScan COST action network (No. CA16108) 2019–2021
- Member – CMS Experimental Collaboration 2007–2010
- VISC/User – CERN Theory Group 2017–present
- User – JLab Theory Group 2024–present

Membership in professional and scientific societies

- Member, American Association of Physical Teachers (AAPT) Spring 2024–present
- Member, American Physical Society (APS) Fall 2009–present
- Member, APS Forum on Graduate Student Affairs Fall 2010–Oct. 2015
 - Member-at-Large, FGSA Executive Board (Elected) Mar. 2014–Oct. 2015
 - Travel Award Review Committee Mar. 2014–Oct. 2015

Postdoc supervision

1. Stephane Delorme (IFJ) 2023-2024

PhD supervision

1. Trina Basu (IFJ) 2024 - present

Undergraduate research supervision

1. Alicja Sztandera (Wrocław University of Science and Technology) in [arXiv:2405.19399] 2023–present
2. Fotios Maroungkas (Ionian University) in [arXiv:2405.19399] 2023–present
3. Hubert Paszkiewicz (University of Warsaw) 2024– present
4. Leon Mach (University of Warsaw) 2024– present

Graduate research mentoring (short-term / informal)

1. J. Turner (Durham) in Phys. Rev. **D94** 053002 (2016) [arXiv:1602.06957]
2. D. Scott (Durham) in Phys. Rev. **D94** 095016 (2016) [arXiv:1607.03504]
3. P. Waite (Durham) in Phys. Rev. **D96** 055042 (2017), [arXiv:1706.02298]
4. S. Williamson (Paris, LPTHE) in Phys. Rev. **D100** 074010 (2019) [arXiv:1901.09937]
5. S. von Buddenbrock (Witwatersrand) in Phys Lett **B811**, 135964 (2020) [arXiv:2009.00032]
6. J. Neundorf (DESY) in PRD **103**, 055005 (2021) [arXiv:2011.02547], PRD **103**, 115014 (2021) [arXiv:2012.09882]
7. S. Jeon (Seoul National) in Phys. Rev. **D107**, 075020 (2023) [arXiv:2210.13496]

PhD committees and juries (external member / non-supervisor)

1. Liam Wezenbeek (U Ghent + ULB) private/public defenses: Sept. / Nov. 2023
2. Basile Vermassen (U Ghent) private/public defenses: Nov. / Dec. 2023



University teaching

- **Autonomous University of Madrid**, Madrid, ES Spring 2025
Guest Lecturer: Introduction to collider physics and deep-inelastic scattering [4-6 hours]
<https://projects.ift.uam-csic.es/doctorado/#cursos>
- **Ghent University**, Ghent, BE Fall 2023
Guest Lecturer: C003119: Subatomic Physics II (MS level; Text: Thomson) [2.5 hours]
- **Durham University**, Durham, UK 2017–2018
Tutor (Teaching Assistant in USA): MSc Particle Theory [30 hours]
(Note: One of four tutors for entire year-long Masters of Science degree program.)
- **Durham University**, Durham, UK 2016–2018
Co-Lecturer: MATH51260: Elementary Particle Theory II [6 hours/term]
- **Durham University**, Durham, UK 2016–2017
Tutor: Phys 1122: General Physics (Physics majors) [30 hours]
- **University of Pittsburgh**, Pittsburgh, USA Fall 2013
Teaching Assistant: Phys 1370: Intro. to Quantum Mechanics I [120 hours]
(Note: Undergraduate; Text: D. J. Griffiths)
- **University of Pittsburgh**, Pittsburgh, USA 2013
Teaching Assistant: Phys 1100: General Physics (algebra based) [120 hours]
- **University of Wisconsin – Madison**, Madison, USA Fall 2011
Grader: Phys 322: Electromagnetic Fields [120 hours]
(Note: Undergraduate; Text: D. J. Griffiths)
- **University of Wisconsin – Madison**, Madison, USA Fall 2011
Grader: Phys 103: General Physics (algebra based) [120 hours]

Teaching at topical schools for MS and PhD students

- **Université Toulouse III – Paul Sabatier**, Toulouse, France Sept. 2024
Lecturer: COMETA workshop on vector boson polarization [1 hour]
· *Introduction to helicity polarization and polarized computations with MadGraph5*
- **National Centre For Nuclear Research (NCBJ)**, Warsaw, Poland Sept. 2024
Lecturer: Warsaw Summer School on Particle Physics [4.5 hours+tutorials]
· *Introduction to collider physics*
· *Introduction to deep-inelastic scattering*
· *Muon colliders and electroweak PDFs*
- **Belgium Dutch German (BND) graduate school in particle physics** Sept. 2024
Lecturer: 2024 edition, Blankenberge, Belgium [3 hours]
· *Introduction to neutrino physics*
· *Neutrino mass models and their tests*
· *Introduction to neutrino deep-inelastic scattering*
- **Korea Institute for Advance Study**, Seoul, South Korea Feb. 2020
Lecturer, Tutor: MadAnalysis 5 workshop on LHC recasting [5 hours]
· *Introduction to Monte Carlo simulations*
· *Jet physics and event reconstruction*
· *Neutrino physics at the LHC*
- **Institute of Mathematical Sciences**, Chennai, India Nov. 2019
Lecturer, Tutor: MadGraph School 2019 [4 hours]
· *BSM Neutrinos Physics I & II*
- **University of Ljubljana**, Ljubljana, Slovenia 10–12 Feb. 2019
Tutor: VBSCan@Ljubljana: Training Event [2 hours]
· *Monte Carlo Generators*



- **U. of Science and Technology of China (USTC)**, Hefei, China, 19–23 Nov. 2018
Tutor: FeynRules/MadGraph School on Collider Phenomenology 2018 [10 hours]
· *Monte Carlo Generators*
- **Oxford University**, Oxford, UK 19–31 Aug. 2018
Tutor: British Uni. Summer School in Theoretical Elementary Particle Physics (BUSSTEPP) 2018 [40 hours]
· various topics in quantum field theory and particle physics
- **University College London**, London, UK 20 Aug. –1 Sept. 2017
Tutor: British Uni. Summer School in Theoretical Elementary Particle Physics (BUSSTEPP) 2017 [40 hours]
· various topics in quantum field theory and particle physics
- **Institute for Physics and Mathematics of the Universe (IPMU)**,
Kashiwanoha, Japan 11–14 Nov. 2016
Lecturer, tutor: as part of foreign researcher exchange [4.5 + 3 hours]
· *Introduction to Monte Carlo simulations*
· *Jet physics and event reconstruction*
· *Neutrino physics at the LHC*
- **University of Manchester**, Manchester, UK 22 Aug. –2 Sept. 2016
Tutor: British Uni. Summer School in Theoretical Elementary Particle Physics (BUSSTEPP) 2016 [40 hours]
· various topics in quantum field theory and particle physics
- **Center for Future High Energy Physics,**
Institute for High Energy Physics (IHEP), Beijing, China 10 July 2014
Lecturer, tutor: part of foreign researcher exchange [4 hours]
· *Collider Tests of Seesaw Mechanisms*

Peer-Reviewed Publications

Note: Authorship in high-energy physics is usually in alphabetical order.

(★) = 50+ citations; (★★) = 100+ citations; (★★★) = 250+ citations; (★★★★) = 500+ citations.

1. *Lepton Number Violation and Chiral W' Couplings at the LHC*, (★)
T. Han, I. Lewis, R. Ruiz, Z. -g. Si, *Phys. Rev.* **D87**, 035011(2013) [arXiv:1211.6447 [hep-ph]]
2. *Higgs from the Top*,
T. Han, R. Ruiz, *Phys. Rev.* **D89**, 074045 (2014) [arXiv:1312.3324 [hep-ph]]
3. *Heavy Majorana Neutrinos from $W\gamma$ Fusion at Hadron Colliders*, (★★)
D. Alva, T. Han, R. Ruiz *JHEP* **02** (2015), 072 [arXiv:1411.7305 [hep-ph]]
4. *QCD Corrections to Pair Production of Type III Seesaw Leptons at Hadron Colliders*, (★)
R. Ruiz, *JHEP* **12** (2015), 165 [arXiv:1509.05416 [hep-ph]]
5. *Fully-Automated Precision Predictions for Heavy Neutrino Production Mechanisms at Hadron Colliders*, (★★)
C. Degrande, O. Mattelaer, R. Ruiz, J. Turner, *Phys. Rev.* **D94** 053002 (2016) [arXiv:1602.06957 [hep-ph]]
6. *Neutrino Jets from High-Mass W_R Gauge Bosons in TeV-Scale Left-Right Symmetric Models*, (★★)
M. Mitra, R. Ruiz, D.J. Scott, M. Spannowsky, *Phys. Rev.* **D94** 095016 (2016) [arXiv:1607.03504 [hep-ph]]
7. *Automated Neutrino Jet and Top Jet Predictions at Next-to-Leading-Order with Parton Shower Matching in Effective Left-Right Symmetric Models*,
O. Mattelaer, M. Mitra, R. Ruiz, [arXiv:1610.08985 [hep-ph]]
8. *A Comprehensive Framework for Studying W' and Z' Bosons at Hadron Colliders with Automated Jet Veto Resummation*,
B. Fuks, R. Ruiz, *JHEP* **05** (2017), 032, [arXiv:1701.05263 [hep-ph]]
9. *Lepton Number Violation at Colliders from Kinematically Inaccessible Gauge Bosons*,
R. Ruiz, *EPJC* (2017) **77**, 375, [arXiv:1703.04669 [hep-ph]]
10. *Heavy Neutrinos from Gluon Fusion*,
R. Ruiz, M. Spannowsky, P. Waite, *Phys. Rev.* **D96** 055042 (2017), [arXiv:1706.02298 [hep-ph]]

11. *Lepton Number Violation: Seesaw Models and Their Collider Tests*, [Review] (★★★)
Y. Cai, T. Han, T. Li, R. Ruiz, *Front. Phys.* **6**:40 (2018) [arXiv:1711.02180 [hep-ph]]
12. *Monojet Signatures from Heavy Colored Particles: Future Collider Sensitivities and Theoretical Uncertainties*,
A. Chakraborty, S. Kuttimalai, S. H. Lim, M. M. Nojiri, R. Ruiz,
EPJC (2018) **78**, 679 [arXiv:1805.05346 [hep-ph]]
13. *Safe Jet Vetoes*,
S. Pascoli, R. Ruiz, C. Weiland, *Phys Lett* **B786**, 106 (2018) [arXiv:1805.09335 [hep-ph]]
14. *Heavy Neutrinos with Dynamic Jet Vetoes: Multilepton Searches at $\sqrt{s} = 14, 27, \text{ and } 100 \text{ TeV}$* , (★★)
S. Pascoli, R. Ruiz, C. Weiland, *JHEP* **06** (2019), 049 [arXiv:1812.08750 [hep-ph]]
15. *Sleptons without Hadrons*,
B. Fuks, K. Nordström, R. Ruiz and S. L. Williamson,
Phys. Rev. **D100** 074010 (2019) [arXiv:1901.09937 [hep-ph]]
16. *FCC-hh: The Hadron Collider: Future Circular Collider Conceptual Design Report Volume 3*, (★★★★)
A. Abada *et al.* [FCC Collaboration], *Eur. Phys. J. ST* **228**, no. 4, 755 (2019)
17. *FCC-ee: The Lepton Collider: Future Circular Collider Conceptual Design Report Volume 2*, (★★★★)
A. Abada *et al.*, *Eur. Phys. J. ST* **228**, no. 2, 261 (2019)
18. *FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Volume 1*, (★★★★)
A. Abada *et al.*, *Eur. Phys. J. C* **79**, no. 6, 474 (2019)
19. *HE-LHC: The High-Energy Large Hadron Collider: Future Circular Collider Conceptual Design Report Volume 4*, (★★★)
A. Abada *et al.*, *Eur. Phys. J. ST* **228**, no. 5, 1109 (2019)
20. *Automated Predictions for Polarized Parton Scattering*, (★)
D. Buarque Franzosi, O. Mattelaer, R. Ruiz and S. Shil, *JHEP* **04** (2020), 082 [arXiv:1912.01725 [hep-ph]]
21. *Doubly Charged Higgs Boson Production at Hadron Colliders*, (★)
B. Fuks, M. Nemešek, and R. Ruiz, *Phys. Rev.* **D101** 075022 (2020) [arXiv:1912.08975 [hep-ph]]
22. *Vector boson fusion at multi-TeV muon colliders*, (★★)
A. Costantini, F. De Lillo, F. Maltoni, L. Mantani, O. Mattelaer, R. Ruiz and X. Zhao,
JHEP **09** (2020), 080 [arXiv:2005.10289 [hep-ph]]
23. *A quantitative study on helicity inversion in Majorana neutrino decays at the LHC*,
R. Ruiz, *Phys. Rev.* **D103**, 015022 (2021) [arXiv:2008.01092 [hep-ph]]
24. *Anatomy of inclusive $t\bar{t}W$ production at hadron colliders*, (★)
Stefan von Buddenbrock, Richard Ruiz, Bruce Mellado,
Phys Lett **B811**, 135964 (2020) [arXiv:2009.00032 [hep-ph]]
25. *Majorana Neutrinos in Same-Sign $W^\pm W^\pm$ Scattering at the LHC: Breaking the TeV Barrier*,
B. Fuks, J. Neundorff, K. Peters, R. Ruiz and M. Saimpert,
Phys. Rev. **D103**, 055005 (2021) [arXiv:2011.02547 [hep-ph]]
26. *Probing the Weinberg Operator at Colliders*,
B. Fuks, J. Neundorff, K. Peters, R. Ruiz and M. Saimpert,
Phys. Rev. **D103**, 115014 (2021) [arXiv:2012.09882 [hep-ph]]
27. *Leptonic anomalous magnetic moments in ν SMEFT*,
V. Cirigliano, W. Dekens, J. de Vries, K. Fuyuto, E. Mereghetti, R. Ruiz
JHEP **08** (2021), 103 [arXiv:2105.11462 [hep-ph]]
28. *Vector Boson Scattering Processes: Status and Prospects*, [Review]
D. Buarque Franzosi, M. Gallinaro, R. Ruiz, *et al.*
J. Reviews in Physics (2022) 100071 [arXiv:2106.01393 [hep-ph]]
29. *The Effective Vector Boson Approximation in High-Energy Muon Collisions*, (★)
R. Ruiz, A. Costantini, F. Maltoni and O. Mattelaer, *JHEP* **06** (2022), 114 [arXiv:2111.02442 [hep-ph]]



30. *The Forward Physics Facility at the High-Luminosity LHC*, (★★★)
J. Feng, *et al.*, *J. Phys. G* **50** (2023) 3, 030501 [arXiv:2203.05090 [hep-ex]]
31. *Searches for Long-Lived Particles at the Future FCC-ee*, (★)
J. Alimena, C. Verhaaren, M. Bauer, P. Azzi, R. Ruiz, *et al.*, *Front. Phys.* (2022) 28 [arXiv:2203.05502 [hep-ex]]
32. *The Present and Future Status of Heavy Neutral Leptons*, (★★)
A. M. Abdullahi, *et al.*, *J. Phys. G* **50** (2023) 2, 020501 [arXiv:2203.08039 [hep-ph]]
33. *Impact of heavy quark and quarkonium data on nuclear gluon PDFs*,
P. Duwentäster, *et al.* *Phys. Rev.* **D105**, 114043 (2022) [arXiv:2204.09982 [hep-ph]]
34. *Compatibility of Neutrino DIS Data and Its Impact on Nuclear Parton Distribution Functions*,
K. F. Muzakka, *et al.* *Phys. Rev.* **D106**, 074004 (2022) [arXiv:2204.13157 [hep-ph]]
35. *Doubly Charged Higgs Boson Production at Hadron Colliders II: A Zee-Babu Case Study*,
R. Ruiz, *JHEP* **10** (2022), 200 [arXiv:2206.14833 [hep-ph]]
36. *Muon Collider Forum Report*, (★)
K. M. Black, *et al.*, 2022 Snowmass Summer Study (Convener Report)
JINST **19** (2024) no.02, T02015 [arXiv:2209.01318 [hep-ex]]
37. *Testing the Scalar Triplet Solution to CDF's Fat W Problem at the LHC*,
J. Butterworth, J. Heeck, S. H. Jeon, O. Mattelaer, R. Ruiz,
Phys. Rev. **D107**, 075020 (2023) [arXiv:2210.13496]
38. *Target Mass Corrections in Lepton-Nucleus DIS: Theory & Applications to Nuclear PDFs*, [Review]
R. Ruiz, K. F. Muzakka, F. Olness, *et al.*, *J. PNP* 104096 (2024) [arXiv:2301.07715]
39. *Towards a Muon Collider*, (★★)
C. Accettura, *et al.*, *Eur. Phys. J. C* **83** (2023), no. 9, 864 [arXiv:2303.08533 [physics.acc-ph]]
40. *Search for Majorana neutrinos in same-sign WW scattering events from pp collisions at $\sqrt{s} = 13$ TeV*,
G. Aad, *et al.* [ATLAS Collaboration], *Eur. Phys. J. C* **83**, no.9, 824 (2023) [arXiv:2305.14931]
41. *Evidence for Modified Quark-Gluon Distributions in Nuclei by Correlated Nucleon Pairs*,
A. W. Denniston, *et al.*, *Phys. Rev. Lett.* **133**, 152502 [arXiv:2312.16293 [hep-ph]]
42. *Polarized ZZ pairs in gluon fusion and vector boson fusion at the LHC*,
M. Javurkova, R. Ruiz, R. Coelho Lopes de Sá, J. Sandesara *Phys. Lett.* **B855**, 138787 (2024) [arXiv:2401.17365]
43. *Search for heavy Majorana neutrinos in $e^\pm e^\pm$ and $e^\pm \mu^\pm$ final states via WW scattering in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector*,
G. Aad, *et al.* [ATLAS Collaboration], *Phys. Lett.* **B856**, 138865 (2024) [arXiv:2403.15016]
44. *Hard processes in multi-TeV ion collisions*,
B. Fuks, F. Maroukhas, R. Ruiz, and A. Sztandera [arXiv:2405.19399] [Accepted by PRD]
45. *Collinear W Bosons at $E_W = 800$ GeV*,
I. Bigaran, R. Ruiz [arXiv:2411.yyyyy] [to appear]

Conference proceedings, white papers, and other publications

1. *Higgs Working Group Report of the Snowmass 2013 Community Planning Study*,
S. Dawson, *et al.*, [arXiv:1310.8361 [hep-ex]]
2. *Snowmass 2013 Top Quark Working Group Report*,
K. Agashe *et al.* [Top Quark Working Group Collaboration], [arXiv:1311.2028]
3. *Hadron Collider Tests of Neutrino Mass-Generating Mechanisms*,
R. E. Ruiz, Ph.D. thesis, University of Pittsburgh (2015), ISBN: 9781339241869, [arXiv:1509.06375]
4. *CEPC-SPPC Preliminary Conceptual Design Report. 1. Physics and Detector*,
CEPC-SPPC Study Group, IHEP-CEPC-DR-2015-01, IHEP-TH-2015-01 [InSpires RECID:1395734]
5. *Physics at a 100 TeV pp collider: Beyond the Standard Model Phenomena*,
T. Golling *et al.*, CERN Yellow Report, no. 3, 441 (2017), [arXiv:1606.00947]



6. *Physics at a 100 TeV pp collider: Standard Model processes*, M.L. Mangano *et al.*, CERN Yellow Report, no. 3, 1 (2017) [arXiv:1607.01831]
7. *Future Opportunities in Accelerator-based Neutrino Physics*, A. Dell'Acqua *et al.*, arXiv:1812.06739 [hep-ex]
8. *Opportunities in Flavour Physics at the HL-LHC and HE-LHC*, A. Cerri *et al.*, arXiv:1812.07638
9. *Beyond the Standard Model Physics at the HL-LHC and HE-LHC*, X. Cid Vidal *et al.*, arXiv:1812.07831
10. *Les Houches 2019 Physics at TeV Colliders: New Physics Working Group Report*, G. Brooijmans *et al.*, arXiv:2002.12220
11. *VBSCan Mid-Term Scientific Meeting*, J. Baglio *et al.*, arXiv:2004.00726
12. *Beyond the Standard Model in Vector Boson Scattering Signatures*, [Editor] M. Gallinaro (ed), K. Long (ed), J. Reuter (ed), R. Ruiz (ed) *et al.*, arXiv:2005.09889
13. *Proceedings of the second MadAnalysis 5 workshop on LHC recasting in Korea*, J. Y. Araz, *et al.* Mod. Phys. Lett. A **36**, no.01, 2102001 (2021) arXiv:2101.02245
14. *Impact of W and Z Production Data and Compatibility of Neutrino DIS Data in Nuclear PDFs* K. F. Muzakka, *et al.* arXiv:2107.13235
15. *BSM ν physics: complementarity across energies*, [Editor] T. Han, *et al.*, Contribution to 2022 Snowmass Summer Study arXiv:2203.06131
16. *Neutrinoless Double-Beta Decay: A Roadmap for Matching Theory to Experiment*, V. Cirigliano, *et al.*, Contribution to 2022 Snowmass Summer Study arXiv:2203.12169
17. *Muon Collider Physics Summary*, C. Aime, *et al.*, Contribution to 2022 Snowmass Summer Study arXiv:2203.07256
18. *The physics case of a 3 TeV muon collider stage*, Muon Collider Collaboration, Contribution to 2022 Snowmass Summer Study arXiv:2203.07261
19. *On Baryon and Lepton Number Violation*, P. Fileviez Perez, *et al.*, 2022 Snowmass Summer Study (Convener Report) arXiv:2208.00010
20. *Report of the Topical Group on Electroweak Precision Physics and Constraining New Physics*, A. Belloni, *et al.*, 2022 Snowmass Summer Study (Convener Report) arXiv:2209.08078
21. *Report of the Topical Group on Physics Beyond the Standard Model at Energy Frontier for Snowmass 2021*, T. Bose, *et al.*, 2022 Snowmass Summer Study (Convener Report) arXiv:2209.13128
22. *Theory Frontier (TF) 07 Snowmass Report: Theory of Collider Phenomena*, F. Maltoni, *et al.*, 2022 Snowmass Summer Study (Convener Report) arXiv:2210.02591
23. *Global analyses of nuclear PDFs with heavy-quark and neutrino data*, M. Klasen, *et al.*, arXiv:2210.10284
24. *Towards a New nCTEQ global nPDF release*, P. Risse, *et al.*, arXiv:2307.07814
25. *Interim report for the International Muon Collider Collaboration (IMCC)*, C. Accettura *et al.* [International Muon Collider], arXiv:2407.12450 [physics.acc-ph]
26. *MuCol Milestone Report No. 5: Preliminary Parameters*, C. Accettura *et al.* [MuCoL Collaboration] arXiv:2411.02966 [physics.acc-ph]



Open-sourced software packages

1. FEYNRULES Model: *HeavyN: The Standard Model + Heavy Neutrinos at NLO in QCD*, R. Ruiz, <http://feynrules.irmp.ucl.ac.be/wiki/HeavyN>
2. FEYNRULES Model: *Effective Left-Right Symmetry Model at NLO in QCD*, R. Ruiz, <http://feynrules.irmp.ucl.ac.be/wiki/EffLRSM>
3. FEYNRULES Model: *W' and Z' at NLO in QCD*, B. Fuks, R. Ruiz, <http://feynrules.irmp.ucl.ac.be/wiki/WZPrimeAtNLO>
4. FEYNRULES Model: *Type II Seesaw at NLO in QCD*, B. Fuks, M. Nemevšek, R. Ruiz, <http://feynrules.irmp.ucl.ac.be/wiki/TypeIISeesaw>
5. FEYNRULES Model: *SMWeinberg: SM + Weinberg operator at NLO in QCD*, R. Ruiz, <https://feynrules.irmp.ucl.ac.be/wiki/SMWeinberg>
6. FEYNRULES Model: *ZeeBabu: Standard Model + Zee-Babu at NLO in QCD*, R. Ruiz, <http://feynrules.irmp.ucl.ac.be/wiki/ZeeBabu>
GitLab repository: http://gitlab.cern.ch/riruiz/public-projects/-/tree/master/ZeeBabu_LHC_Update
7. FEYNRULES Model: *VPolar: The Standard Model at NLO in QCD with helicity-polarized W and Z bosons*, R. Ruiz, <http://feynrules.irmp.ucl.ac.be/wiki/VPolarization>
GitLab repository: https://gitlab.cern.ch/riruiz/public-projects/-/tree/master/VPolar_ggZZ
8. HeavyNSandbox, a tool for calculating the (Drell-Yan) cross section of heavy neutrinos at the LHC [arXiv:1509.06375]
GitLab repository: <https://gitlab.cern.ch/riruiz/public-projects/-/tree/master/HeavyNSandbox>
9. NuPhysSandbox, tools/lecture demos for calculation standard quantities in neutrino physics
GitLab repository: <https://gitlab.cern.ch/riruiz/public-projects/-/tree/master/NuPhysSandbox>
10. NuWidth++, a tool for calculating the total width of light heavy neutrinos
GitLab repository: <https://gitlab.cern.ch/riruiz/public-projects/-/tree/master/NuWidth++>
11. Support material and scripts for Ions@NLO
GitLab repository: <https://gitlab.cern.ch/riruiz/public-projects/-/tree/master/IonsNLO>
12. ArXiv-Twitter/X API:
GitLab repository: <https://gitlab.cern.ch/riruiz/public-projects/-/tree/master/TwitterAPI>
13. MADGRAPH5_AMC@NLO principal or co-developer for the following releases:
 - Automated predictions for polarized matrix elements [arXiv:1912.01725]
 - Support for muon collider simulations [arXiv:2005.10289]
 - “Effective W/Z/ γ Approximation” in lepton collisions [arXiv:2111.02442]
 - “Effective W Approximation at next-to-leading power” [to appear]Repository located at <https://github.com/mg5amcnlo>

Invited colloquia at universities and laboratories

1. *Vector Boson Scattering: Status and Prospects for the Large Hadron Collider and Beyond*, Institute of Nuclear Physics Polish Academy of Science, Kraków, Poland, 13 Oct. 2022
2. *Vector Boson Scattering: Status and Prospects for the Large Hadron Collider and Beyond*, Rudjer Boskovic Institute, Zagreb, Croatia, 23 Oct. 2023

Invited seminars at universities and laboratories

1. *Lepton Number Violation and Chiral W' Couplings at the LHC*, University of Wisconsin – Madison, Madison, USA, 6 Dec. 2011
2. *Lepton Number Violation and Chiral W' Couplings at the LHC*, University of Pittsburgh, Pittsburgh, USA, 29 Feb. 2012
3. *Higgs from the Top*, Korea Institute for Advanced Study (KIAS), Seoul, South Korea, 20 June 2013



4. *Lepton Number Violation and Chiral W' Couplings at the LHC*, KEK, Tsukuba, Japan, 25 June 2013
5. *Lepton Number Violation and Chiral W' Couplings at the LHC*, Tohoku University, Sendai, Japan, 27 June 2013
6. *Lepton Number Violation and Chiral W' Couplings at the LHC*, Toyama University, Toyama, Japan, 1 July 2013
7. *Higgs from the Top*, Toyama University, Toyama, Japan, 1 July 2013
8. *LHC Tests of Lepton Number Violation*, 12th LHC Physics Monthly Meeting, KIAS, Seoul, South Korea, 25 July 2014
9. *State-of-the-Art Tests of Lepton Number Violation and Seesaw Mechanisms*, Durham University, Durham, England, 4 Sept. 2014
10. *State-of-the-Art Tests of Lepton Number Violation and Seesaw Mechanisms*, University of Edinburgh, Edinburgh, Scotland, 9 Sept. 2014
11. *State-of-the-Art Tests of Lepton Number Violation and Seesaw Mechanisms*, University College London, London, England, 11 Sept. 2014
12. *State-of-the-Art Tests of Lepton Number Violation and Seesaw Mechanisms*, University of Manchester, Manchester, England, 17 Sept. 2014
13. *State-of-the-Art Tests of Lepton Number Violation and Seesaw Mechanisms*, Cambridge University, Cambridge, England, 19 Sept. 2014
14. *State-of-the-Art Tests of Lepton Number Violation and Seesaw Mechanisms*, University of Maryland, College Park, USA, 5 Dec. 2014
15. *QCD Corrections to Heavy Type III Seesaw Leptons at Hadron Colliders*, Universidade Federal do ABC, Santo André, Brazil, 31 Aug. 2015
16. *QCD Corrections to Heavy Type III Seesaw Leptons at Hadron Colliders*, University of Pittsburgh, Pittsburgh, USA, 16 Sept. 2015
17. *QCD Corrections to Heavy Type III Seesaw Leptons at Hadron Colliders*, University of Oxford, Oxford, England, 11 Feb. 2016
18. *Neutrino Mass Models at Current and Future Colliders*, Ghent University, Ghent, Belgium, 1 June 2016
19. *Neutrino Mass Models at Current and Future Colliders*, Université libre de Bruxelles, Brussels, Belgium 3 June 2016
20. *Neutrino Jets from High-Mass W_R Bosons*, Center for Future High Energy Physics, IHEP, Beijing, China, 25 July 2016
21. *Neutrino Jets from High-Mass W_R Bosons*, University of Genova, Genova, Italy, 20 Sept. 2016
22. *Neutrino Jets from High-Mass W_R Bosons*, KEK, Tsukuba, Japan, 8 Nov. 2016
23. *Neutrino Jets from High-Mass W_R Bosons*, DESY, Hamburg, Germany, 21 Dec. 2016
24. *Neutrino Jets from High-Mass W_R Bosons*, King's College London, London, England, 8 Mar. 2017
25. *QCD Resummation for BSM*, Universität Bern, Bern, Switzerland, 31 Mar. 2017
26. *Neutrino Phenomenology for New Collider Era*, Michigan State University, Lansing, USA, 27 Apr. 2017



27. *Neutrino Phenomenology for New Collider Era*,
Northwestern University, Evanston, USA, 1 May 2017
28. *Neutrino Phenomenology for New Collider Era*,
Fermilab, Batavia, USA, 2 May 2017
29. *QCD Resummation for BSM*,
Center for Future High Energy Physics, IHEP, Beijing, China, 21 July 2017
30. *QCD Resummation for BSM*,
Institute for Theoretical Physics,
Chinese Academy of Sciences, Beijing, China, 27 July 2017
31. *Left-Right Symmetry: At the Edges of Phase Space and Beyond*,
Seoul National University, Seoul, South Korea, 7 Sept. 2017
32. *QCD Resummation for BSM*,
Korea University, Seoul, South Korea, 11 Sept. 2017
33. *QCD Resummation for BSM*,
Korea Institute for Advanced Study (KIAS), Seoul, South Korea, 14 Sept. 2017
34. *QCD Resummation for BSM*,
NIKHEF, Amsterdam, Netherlands, 22 Oct. 2017
35. *Left-Right Symmetry: At the Edges of Phase Space and Beyond*,
University of Massachusetts – Amherst, Amherst, USA, 6 Oct. 2017
36. *QCD Resummation for BSM*,
SUNY Buffalo, Buffalo, USA, 9 Oct. 2017
37. *Left-Right Symmetry: At the Edges of Phase Space and Beyond*,
Universität Basel, Basel, Switzerland, 2 Nov. 2017
38. *Left-Right Symmetry: At the Edges of Phase Space and Beyond*,
Institut für Physik, Universität Mainz, Mainz, Germany, 11 Nov. 2017
39. *Seesaw Mimicry at Colliders*,
Neils Bohr Institute, Copenhagen, Denmark, 5 Dec. 2017
40. *QCD Resummation for BSM*,
University of Edinburgh, Edinburgh, Scotland, 6 Dec. 2017
41. *QCD Resummation for BSM*,
University of Oslo, Oslo, Norway, 17 Jan. 2018
42. *Jet Vetoes for BSM*,
University of Pittsburgh, Pittsburgh, USA, 1 Feb. 2018
43. *QCD Resummation for BSM*,
Lawrence Berkeley National Laboratory, Berkeley, USA, 14 Feb. 2018
44. *Left-Right Symmetry: At the Edges of Phase Space and Beyond*,
Case Western Reserve University, Cleveland, USA, 20 Feb. 2018
45. *QCD Resummation for BSM*,
Manchester University, Manchester, England, 9 Mar. 2018
46. *Left-Right Symmetric Models at the LHC*,
DESY, Hamburg, Germany, 10 Apr. 2018
47. *Heavy Neutrinos and Jet Vetoes*,
University of Birmingham, Birmingham, England, 13 June 2018
48. *Heavy Neutrinos and Jet Vetoes*,
Ghent University, Ghent, Belgium, 28 June 2018
49. *Heavy Neutrinos and Jet Vetoes*,
Université de Montpellier, Montpellier, France, 13 July 2018



50. *QCD Resummation for BSM*,
LPTHE Jussieu (Paris IV), Paris, France, 12 Oct. 2018
51. *Heavy Neutrinos with Dynamic Jet Vetoes:
A New Outlook for Multi-Lepton Searches at Current and Future Hadron Colliders*,
Stefan Jožef Institute, Ljubljana, Slovenia, 11 Apr. 2019
52. *Dynamic Jet Vetoes: A New Prospect for Future Multi-Lepton Searches at the LHC*,
SLAC, Menlo Park, USA, 1 May 2019
53. *Dynamic Jet Vetoes: A New Prospect for Future Multi-Lepton Searches at the LHC*,
Monash University, Clayton, Australia, 20 May 2019
54. *Heavy Neutrinos: From Beam Dumps to Colliders*,
University of Melbourne, Parkville, Australia, 23 May 2019
55. *New Prospects for New Physics at the LHC*,
University of the Witwatersrand, Johannesburg, South Africa, 24 July 2019
56. *A New Prospect for Discovering Heavy Neutrinos at the LHC*,
Instituto de Física Teórica, Madrid, Spain, 30 Sept. 2019
57. *A New Prospect for Heavy Neutrino Searches at the LHC*,
Radboud University Nijmegen, Nijmegen, Netherlands, 5 Nov. 2019
58. *Event-Based Jet Vetoes: A New Prospect for Multi-Lepton Searches at the LHC*,
Laboratoire d'Annecy-le-Vieux de Physique Théorique (LAPTh),
Annecy, France, 23 Jan. 2020
59. *Nu Physics with Jets at the LHC*,
Pitt-PACC, University of Pittsburgh, Pittsburgh, USA, 29 Jan. 2020
60. *Nu Physics with Jets at the LHC*,
Kennesaw State University, Kennesaw, USA, 31 Jan. 2020
61. *ν Physics at the LHC and Beyond*,
University of Warsaw, 10 June 2020
62. *The Neutrinoless $\beta\beta$ Process at the LHC*,
University of California – Irvine, Irvine, USA, 3 Feb. 2021
63. *ν Ideas for the Large Hadron Collider and Beyond*,
Case Western Reserve University, 3 Aug. 2021
64. *Life at a Multi-TeV Muon Collider*,
Southern Methodist University, Dallas, USA, 5 Nov. 2021
65. *Life at a Multi-TeV Muon Collider*,
Pitt-PACC, University of Pittsburgh, Pittsburgh, USA, 10 Nov. 2021
66. *Life at a Multi-TeV Muon Collider*,
LPTHE Jussieu (Paris IV), Paris, France, 8 Dec. 2021
67. *Nu Ideas for the Large Hadron Collider and Beyond*,
Jožef Stefan Institute, Ljubljana, Slovenia, 17 Feb. 2022
68. *Nu Ideas for the Large Hadron Collider and Beyond*,
University of Massachusetts Amherst, Amherst, USA, 3 Feb. 2022
69. *Heavy Neutrinos at the LHC: Prospects circa Snowmass 2022*,
Humboldt University of Berlin, Berlin, Germany, 8 July 2022
70. *Life at a Multi-TeV Muon Collider*,
Heidelberg University, Heidelberg, Germany, 21 July 2022
71. *Seesaw Scalars at the LHC*,
LPTHE Jussieu (Paris IV), Paris, France, 23 Sept. 2022



72. *Searching for the Origin of Neutrino Masses at the Large Hadron Collider*,
United States Naval Academy, Annapolis, USA, 30 Jan. 2023
73. *Life at a Multi-TeV Muon Collider*,
University of Manchester, Manchester, England, 21 Apr. 2023
74. *Life at a Multi-TeV Muon Collider*,
National Centre for Nuclear Research, Warsaw, Poland, 25 Apr. 2023
75. *Target Mass Corrections for DIS on Nuclear Targets*,
AGH University of Science and Technology, Kraków, Poland, 5 May 2023
76. *Life at a Multi-TeV Muon Collider*,
International School for Advanced Studies (SISSA), Trieste, Italy, 10 May 2023
77. *Life at a Multi-TeV Muon Collider*,
Institute of Nuclear Physics Polish Academy of Science (IFJ PAN), Kraków, Poland 18 May 2023
78. *Life at a Multi-TeV Muon Collider*,
California Institute of Technology, Pasadena, USA, 9 Jan. 2024
79. *Particle physics probes of nuclear structure*,
Souther Methodist University, Dallas, Texas, 1 Feb. 2024
80. *Vector Boson Scattering: Status and Prospects for the Large Hadron Collider and Beyond*,
Vrije Universiteit Brussel (VUB), Brussels, Belgium 7 Mar. 2024
81. *Vector Boson Scattering: Status and Prospects for the Large Hadron Collider and Beyond*,
Instituto de Fisica Teórica, Madrid, Spain, 25 Apr. 2024
82. *Probing Nuclear Structure with Particle Physics*,
Christopher Newport University, Newport News, USA, 21 Oct. 2024
83. *Target Mass Corrections for DIS on Nuclear Targets*,
Jefferson Lab, Newport News, USA, 23 Oct. 2024
84. *Vector Boson Scattering: Status and Prospects for the Large Hadron Collider and Beyond*,
Brandeis University, Waltham, USA, 13 Nov. 2024

Invited presentations at international conferences & workshops

1. *Improving the Electron Energy Resolution at CMS* [BAPS.2010.APR.B9.1],
On behalf of CMS Collaboration, APS April Meeting, Washington DC, USA, Feb. 2010
2. *Lepton Number Violation and Chiral W' Couplings at the LHC*,
Phenomenology 2012 Symposium, University of Pittsburgh, Pittsburgh, USA, May 2012
3. *Higgs from the Top*,
Snowmass Energy Frontier Workshop, Brookhaven Nat'l Lab., Upton, USA, Apr. 2013
4. *Collider Signatures of Neutrino Models*,
Particle Physics at the Intensity Frontier, Argonne Nat'l Lab., Lemont, USA, Apr. 2013
5. *Higgs from the Top*,
Phenomenology 2013 Symposium, University of Pittsburgh, Pittsburgh, USA, May 2013
6. *New Tests of Neutrino Mass-Generating Mechanisms at the LHC*,
Phenomenology 2014 Symposium, University of Pittsburgh, Pittsburgh, USA, May 2014
7. *$W\gamma$ Fusion at Super-TeV Hadron Colliders*,
DIS 2015 Workshop, Southern Methodist University, Dallas, USA, Apr. 2015
8. *Heavy Type III Seesaw Leptons at NLO in QCD*,
Phenomenology 2015 Symposium, University of Pittsburgh, Pittsburgh, USA, May 2015
9. *Tests of Seesaw Leptons at Current and Future Colliders*,
 ν @Fermilab, Fermi National Accelerator Laboratory, 21–25 July 2015



10. *QCD Corrections to Heavy Type III Seesaw Leptons at Hadron Colliders*, CAM 2015, Oaxaca, Mexico, 9–12 Sept. 2015
11. *Neutrino Mass Models at Colliders [Plenary]*, NuPhys 2015, London, England, 16–18 Dec. 2015
12. *Modeling Heavy Neutrino Production Mechanisms at Hadron Colliders (and with Fully Automated QCD Corrections!)*, Phenomenology 2016 Symposium, University of Pittsburgh, Pittsburgh, USA, 9–11 May 2016
13. *Neutrino Mass Models at Current and Future Colliders*, KITPC Workshop: New Physics at the LHC Run 2, Beijing, China, 26–28 July 2016
14. *Heavy Neutrinos from VBF*, IPPP Workshop: Future of VBF Measurements, Durham, England, 21–23 Sept. 2016
15. *Monte Carlo Techniques for BSM at NLO and Beyond [Plenary]*, GDR Terascale@Paris, Paris, France, 23–25 Nov. 2016
16. *Status for Theoretical Calculations for Collider Searches*, Neutrinos: Quest for a New Physics Scale, CERN, Geneva, Switzerland 27–31 Mar. 2017
17. *Colorful Production of Heavy Neutrinos at Hadron Colliders*, Phenomenology 2017 Symposium, University of Pittsburgh, Pittsburgh, USA, 8–10 May 2017
18. *Left–Right Symmetry: At the Edges of Phase Space and Beyond [Plenary]*, Invisibles17 Workshop, Universität Zürich, Zürich, Switzerland, 12–16 June 2017
19. *Left–Right Symmetry: At the Edges of Phase Space and Beyond*, 12th TeV Workshop, Zengzhou University, Zhengzhou, China, 22–24 June 2017
20. *Left–Right Symmetry: At the Edges of Phase Space and Beyond*, Brookhaven Forum 2017, Brookhaven National Laboratory, Upton, USA, 11–13 Oct. 2017
21. *Neutrino Physics and Future Experiments*, Out of the Higgs Era and into the Dark, KIAS-IPMU-IPPP Workshop, Durham University, Durham, England, 20–24 Nov. 2017
22. *Collider Tests of Neutrino Mass Models*, Workshop on the physics of HL-LHC, CERN, Geneva, Switzerland, 30 Oct.–1 Nov. 2017
23. *Monte Carlo Tools for BSM at NLO and Beyond*, [Review] Phenomenology 2018 Symposium, University of Pittsburgh, Pittsburgh, USA, 7–9 May 2018
24. *What’s Next for Particle Physics? [Panel]* EuroScience Open Forum 2018, Toulouse, France, 9–14 July 2018
25. *Heavy Neutrinos and (Safe) Jet Vetoes*, First International High Energy Physics School and Workshop in Western China, Institute of Modern Physics, Lanzhou, China, 1–10 Aug. 2018
26. *Heavy Neutrinos at Colliders: Prospects for Experiment and Theory*, [Review] 24th Summer Institute on Pheno. of Elementary Particle Phys. and Cosmology, Tianjin, China, 12–17 Aug. 2018
27. *Heavy Neutrinos at Colliders: Prospects for Experiment and Theory*, [Review] IRN Terascale@Durham, Durham, England, 4–7 Sept. 2018
28. *Heavy Neutrinos and (Safe) Jet Vetoes*, IRN Terascale@Durham, Durham, England, 4–7 Sept. 2018
29. *Heavy Neutrinos and (Safe) Jet Vetoes*, DESY Theory Workshop, Hamburg, Germany, 25–28 Sept. 2018
30. *Dynamical Jet Vetoes in VBF*, New Techniques in Particle Reconstruction for VBF, Institute of Nuclear Physics Polish Academy of Science, Kraków, Poland, 22–24 Oct. 2018

31. *Heavy Neutrinos at Beam Dumps and Colliders*,
European Neutrino Town Meeting, CERN, Geneva, Switzerland, 22–24 Oct. 2018
32. *Nu Mass Models at Colliders: Worries and Hopes*,
NuTheories: Beyond 3×3 Paradigm Workshop, University of Pittsburgh, Pittsburgh, USA, 4–10 Nov. 2018
33. *Neutrino Mass Models at Current and Future Colliders*,
2018 International CepC Workshop, IHEP, Beijing, China, 12–15 Nov. 2018
34. *Neutrino Mass Models: The e^-e^+ Option*,
11th FCC-ee Workshop, CERN, Geneva, Switzerland, 8–11 Jan. 2019
35. *Revisiting Central Jet Vetoes for BSM*,
VBSCan@Ljubljana, University of Ljubljana, Ljubljana, Slovenia, 10–12 Feb. 2019
36. *Dynamic Jet Vetoes for Multi-lepton VBS(F) Searches*,
MPI, Color Reconnection, and Hadronization Effects in Central Jet Vetoes,
Universität Wien, Vienna, Austria, 25–29 Mar. 2019
37. *Heavy Neutrinos with Dynamic Jet Vetoes*,
Portorož 2019, Portorož, Slovenia, 16–19 Apr. 2019
38. *Dynamic Jet Vetoes for Multi-Lepton Searches at LHC Run III*,
Phenomenology 2019 Symposium, University of Pittsburgh, Pittsburgh, USA, 6–8 May 2019
39. *Event-dependent Jet Vetoes*,
Parton Showers, Event Generators and Resummation Workshop 2019,
Universität Wien, Vienna, Austria, 11–14 June 2019
40. *Tagless Top Quark Vetoes*,
European Physics Society Conference on HEP 2019, Ghent, Belgium, 10–17 July 2019
41. *Beyond Simplified Seesaw Models*, [Plenary]
3 Neutrinos and Beyond, 15th Rencontres du Vietnam, Quy Nhon, Vietnam, 5–10 Aug. 2019
42. *Event-dependent Jet Vetoes*, [Plenary]
Multi-Boson Interactions 2019, Aristotle University of Thessaloniki, Thessaloniki, Greece, 26–28 Aug. 2019
43. *A New Spin on Giant K-Factors at the LHC*,
IRN Terascale@Bruxelles, Université Libre de Bruxelles, Brussels, Belgium, 16–18 Oct. 2019
44. *Collider Searches for Heavy Neutrinos: Lessons from the European Strategy Update*,
Baryon and Lepton Number Violation 2019, Instituto de Física Teórica, Madrid, Spain, 21–24 Oct. 2019
45. *Doubly Charged Higgs from VBF at NLO with MG5aMC@NLO*,
BSM Models in Vector Boson Scattering Processes, LIP, Lisbon, Portugal, 4–6 Dec. 2019
46. *Comments on Lepton Number Violation at High- Q^2* ,
Ghent Mini-workshop on Majorana Neutrinos, Ghent University (online), 13 Mar. 2020
47. *Doubly Charged Higgs Boson Production at Hadron Colliders*,
Phenomenology 2020 Symposium, University of Pittsburgh (online), 4–6 May 2020
48. *New Ideas on Sterile Neutrino Searches at the LHC*,
Large Hadron Collider Physics (LHCP) 2020 (online), 25–30 May 2020
49. *LNV and LFV at Colliders: a Theory Perspective in the Post-ESU Era*,
Baryon and Lepton Number Violation Circa 2020, Case Western Reserve University (online), 6–8 July 2020
50. *Searching for N at Colliders: How High Can We Go?*,
Mini-workshop on Neutrino Theory, Snowmass 2021 (online), 21–23 Sept. 2020
51. *Neutrino Mass Models at Colliders in the Snowmass 2021 era*,
Rare Processes Frontier Town Hall Meeting, Snowmass 2021 (online), 2 Oct. 2020
52. *ν Tools for the LHC and Beyond*,
Tools 2020, IP2I, Lyon, France, 2–6 Nov. 2020



53. *Helicity Inversion and Suppression with Long-Lived Majorana Neutrinos*,
8th Workshop of the LHC Long-Lived Particle Community (online), 16–20 Nov. 2020
54. *Simulating Long-Lived (and Prompt!) Heavy Neutrinos from W s, Z s, and H s*,
LHC LLP Working Group: first topical meeting on HNLs (online), 9 Dec. 2020
55. *New Physics at LH-LHC with VBS Signatures*,
Winter 2021 topical meeting on VBS: VBS at Snowmass (online), 25–29 Jan. 2021
56. *NuTools for Colliders*,
International Workshop on Future Linear Colliders, LCWS2021 (online), 15–18 Mar. 2021
57. *Doubly Charged Higgs Boson Production at Hadron Colliders*,
Higgs as a Probe of New Physics, Special Edition 2021 (online), 25–27 Mar. 2021
58. *Event-Based Jet Vetoes: A New Prospect for Multi-Lepton Searches at the LHC*,
XXVIII Int'l Workshop on DIS and Related Subjects (online), 12–16 Apr. 2021
59. *Advancing Physics Simulations at a Multi-TeV Muon Collider*,
American Physical Society April Meeting (online), 17–20 Apr. 2021
60. *The Neutrinoless $\beta\beta$ Process at the LHC*,
Phenomenology 2021 Symposium, University of Pittsburgh (online), 24–26 May 2021
61. *Updates on simulating Long-Lived (and Prompt!) Heavy Neutrinos from W s, Z s, and H s*,
9th Workshop of the LHC Long-Lived Particle Community (online), 25–28 May 2021
62. *Polarized Multiboson Production at the LHC and Beyond*,
9th Edition of the Large Hadron Collider Physics Conference (online), 7–12 June 2021
63. *The Neutrinoless $\beta\beta$ Process at the LHC and Beyond*,
LIO conference on “Future Colliders and the Origin of Mass” (online), 21–25 June 2021
64. *Vector Boson Scattering at Muon Colliders*,
PARTICLEFACE 2021, Institute Ruder Bošković, Zagreb, Croatia, 14–16 July 2021
65. *A Theory Perspective on Sterile Neutrinos at Colliders*,
Lomonosov 2021, Moscow State University (online), 19–25 Aug. 2021
66. *VBS and VBScan at Snowmass 2021*,
Multi-Boson Interactions 2021, Milano–Bicocca University, Milan, Italy, 23–27 Aug. 2021
67. *Working Group 5 Introduction*,
NuFact 2021, hybrid/online and Cagliari, Italy, 5–11 Sept. 2021
68. *Revisiting the Effective W Approximation at Muon Colliders*,
Portorož 2021, Portorož, Slovenia, 21–24 Sept. 2021
69. *The Effective Vector Boson Approximation in High-Energy Muon Colliders*,
MadGraph/FeynRules Meeting, Universität Bonn, Bonn, Germany, 15–17 Nov. 2021
70. *Neutrino Masses at the FCC-hh*,
FCC-France Workshop, LAPTh, Annecy, France, 30 Nov.–2 Dec. 2021
71. *Majorana vs Dirac Heavy Neutral Leptons*,
FCC Physics Workshop (online), 7–11 Feb. 2022
72. *Electroweak Bosons as Partons of the Muon*,
Phenomenology 2022 Symposium, University of Pittsburgh, Pittsburgh, USA, 9–11 May 2022
73. *Theory landscape of Heavy Neutral Leptons*,
LHCP 2022 (online), 16–20 May 2022
74. *Seesaw Scalars at the LHC*,
Extended Workshop NuTs, Instituto de Física Teórica, Madrid, Spain, 16 May–17 June 2022
75. *Nuclear PDFs with Neutrino DIS Data – a Compatibility Analysis from nCTEQ*,
NuFact 2022, Snowbird, USA, 31 July–6 Aug. 2022



76. *Vector Boson Scattering at the LHC, circa Run III*, LHCP 2023, Belgrade, Serbia, 22–26 May 2023
77. *Towards LIV/NC with automated MC generator: Helicity-polarized parton scattering in MadGraph5_aMC@NLO*, Probing Spacetime Properties at HEP Experiments, Belgrade, Serbia, 29 May 2023
78. *Nuclear PDFs with Neutrino DIS data – a compatibility analysis from nCTEQ*, NuFact 2023, Seoul, South Korea, 21–26 Aug. 2023
79. *Light mesons from light heavy neutrinos at the LHC*, NuFact 2023, Seoul, South Korea, 21–26 Aug. 2023
80. *New probes of Lepton Number Violation and Lepton Flavor Violation at the LHC*, MTTD 2023, Ustroń, Poland, 17–22 Sept. 2023.
81. *COMETA Communication and Dissemination Plan*, 1st COMETA General Meeting, Izmir, Turkey, 27 Feb.–1 Mar. 2024
82. *Target mass corrections in lepton-nucleus deeply inelastic scattering*, DIS 2024, Grenoble, France, 8–12 Apr. 2024
83. *Precision Neutrino DIS at CERN's Forward Physics Facility (and Beyond)*, CATCH22+2, Dublin, Ireland, 1–5 May 2024
84. *Light mesons from light heavy neutrinos at the LHC*, BLED 2024: International Workshop on Lepton Number Violation, Bled, Slovenia, 16–23 June 2024
85. *Polarization as a Feynman Rule*, COMETA workshop on vector-boson polarisations, Toulouse, France, 23-24 Sept. 2024
86. *Prospects for Discovering LNV at the FCC, [Plenary]* BLV 2024, Karlsruhe, Germany, 8-11 Oct. 2024
87. *Prospects for Discovering LNV at the FCC*, ACFI workshop on "LNV @ TeV scale or below", Amherst, USA, 14-16 Nov. 2024
88. *Prospects for Discovering LNV at the LHC and beyond*, International Conference on Neutrinos and Dark Matter (NuDM- 2024), Cairo, Egypt, 11–14 Dec. 2024
89. *ν Mass Models at the FCC-hh*, FCC BSM Searches Workshop (online), 12 Dec. 2024
90. *Polarization as a Feynman Rule*, MadGraph_aMC@NLO meeting 2025, CERN, Switzerland, 3-5 Feb. 2025

Service work & commissions of trust

Departmental Activities

- **Election Committee (ad hoc) for Division Head / Dean** – IFJ PAN 2024–2025
- **Division Seminar Organization** – IFJ PAN 2021 – **present**
- **Seminar Organization** – U. Catholique de Louvain 2018–2020

Grant funding referee

- **European Commission (EC)**, European Union 2024-**present**
- **European Cooperation in Science & Technology (COST)**, European Union 2024-**present**
- **Swiss National Science Foundation (SNSF)**, Switzerland 2023-**present**
- **Research Foundation – Flanders (FWO)**, Belgium 2016, 2017
- **American Physical Society (APS)** – Forum on Graduate Student Affairs 2014–2015

Journal Referee: 60+ manuscripts refereed as of Fall 2024; (★) = 15+ manuscripts):

- **Physics Review Letters (PRL)**, American Physical Society (★) July 2015–**present**



-
- Physics Review D (PRD), American Physical Society (★) Mar. 2015–**present**
 - Physics Letters B (PLB), Elsevier Mar. 2019–**present**
 - Chinese Physics C, Institute of Physics (IoP) Publishing Apr. 2020–**present**
 - Europhysics Letters, Institute of Physics (IoP) Publishing May 2014–**present**
 - European Physics Journal C (EPJC), Springer Mar. 2019–**present**
 - Indian Journal of Physics (INJP), Springer Sept. 2022–**present**
 - International Journal of Theoretical Physics (IJTP), Springer Sept. 2022–**present**
 - Journal of High Energy Physics (JHEP), Springer Oct. 2017–**present**
 - Journal of Physics G, Institute of Physics (IoP) Publishing Feb. 2024–**present**
 - Modern Physics Letters A (MPLA), World Scientific Oct. 2021–**present**
 - Nuclear Physics A (NPA), Elsevier Nov. 2024–**present**
 - Nuclear Physics B (NPB), Elsevier Nov. 2019–**present**

Other refereeing functions

- **Panel Referee**, University of Pittsburgh Dietrich School of Arts & Sciences
Graduate Research Expo Spring 2013, Spring 2014, Spring 2015

Organizer for scientific meetings:

- PI and co-chair for *Polish Particle And Nuclear Theory Summit (2PiNTS)*, 2023–**present**
Institute of Nuclear Physics – Polish Academy of Science, Poland
<https://indico.ifj.edu.pl/e/krakowtheorysummit> (2023 edition)
<https://indico.ifj.edu.pl/e/2pints2024> (2024 edition)
- Organizing committee and outreach coordinator for *1st COMETA General Meeting*, Feb. 2024
Izmir, Turkey <https://indico.cern.ch/event/1334055/>
- Organizing committee for *2nd COMETA General Meeting*, April 2025
Krakow, Poland <https://indico.cern.ch/event/1482727/>
- Working Group 5 Convener for *NuFact International Workshop* (various locations) 2018–2022
<https://indico.cern.ch/event/773605/> (2019 edition)
<https://indico.cern.ch/event/855372/> (2021 edition)
<https://indico.fnal.gov/event/53004/> (2022 edition)
- Co-chair, organizing committee for *NuTheories Workshop: Beyond the 3×3 Paradigm*, Nov. 2018
Neutrino Theory Network Initiative, University of Pittsburgh, USA
<https://indico.cern.ch/e/beyond3x3>
- US co-chair for *Canadian-American-Mexican Graduate Student Physics Conference*, Sept. 2015
Oaxaca, Mexico <https://engage.aps.org/fgsa/meetings/upcoming/cam-conference>
- Support for local committee, *Phenomenology Symposium*, 2012–2015
University of Pittsburgh, USA

Science Communication and Outreach

Science Communication coordinator: COMETA COST Action (No. CA22130) Sept. 2023–**present**

Quantum Diaries Columnist July 2011–July 2017
Articles (45 total) can be found at quantumdiaries.org/author/richard-ruiz/

Social Media (Twitter/X):

[@BraveLittleMuon](https://twitter.com/BraveLittleMuon) May 2011– **present**

[@multibosons](https://twitter.com/multibosons) (Co-moderator for scientific network – COMETA) Sept. 2023– **present**



@ifjNZ42 (Co-moderator for departmental account)
@IPPP_Durham (Co-moderator for group account)

Sept. 2023– **present**
June 2017–Sept.2018

Wonders of Physics Demonstration Show, U. Wisconsin – Madison, Madison, WI, USA
Modeling Invisible Exhibit, by IPPP at Royal Society Summer Exhibition, London, UK,

Dec. 2011
July 2017

Media and interviews

1. [Top 10 Breakthroughs of the Year in physics for 2024](#) PhysicsWorld (IOP Publishing), 12 Dec. 2024
2. [Tracking Down the Origin of Neutrino Mass](#), Physics (APS highlight), 6 July 2023
3. [What is a photon?](#), Symmetry Magazine, 29 June 2021
4. [Six fabulous facts about the Standard Model](#), Symmetry Magazine, 16 Mar. 2021
5. [The large boson-boson collider](#), Symmetry Magazine, 30 Apr. 2020
6. [How to make a Higgs boson](#), Symmetry Magazine, 10 Apr. 2018
7. [What's really happening during an LHC collision?](#), Symmetry Magazine, 30 June 2017
8. [LHC swings back into action](#), Symmetry Magazine, 23 May 2017
9. [The mystery of particle generations](#), Symmetry Magazine, 05 Aug. 2015
10. [#FollowFriday IV: Physicists to follow on Twitter](#), Symmetry Magazine, 07 Feb. 2014
11. [5 Unanswered Questions that Will Keep Physicists Awake at Night](#), Scientific American, 25 Oct. 2013
12. [Unanswered questions](#), Symmetry Magazine, 22 Oct. 2013
13. [Higgs particle could be found by Christmas](#), BBC News, 1 Sept. 2011