Dr Rene Poncelet

Curriculum Vitae

Name: Dr. rer. nat. Rene Poncelet
Affiliation: Institute of Nuclear Physics Polish Academy of Sciences, Kraków, Poland
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Academic degrees

Doktor der Naturwissenschaften (Dr. rer. nat.) 24 Sep 2018
RWTH Aachen University, Aachen, Germany
Thesis: Precision Top-Quark Physics with Leptonic Final States
Referees: Prof. Dr. Michal Czakon and Prof. Dr. Robert Harlander

Master of Science (M.Sc.) 30 Sep 2015
Georg-August University, Göttingen, Germany
Thesis: Monte Carlo event generation with the $(MC)^3$ sampling algorithm
Referee: Prof. Dr. Steffen Schumann

Bachelor of Science (B.Sc.) 27 Sep 2013
Georg-August University, Göttingen, Germany
Thesis: Systematic studies on the production of bottom-quarks in parton shower simulations
Referee: Prof. Dr. Steffen Schumann

Employment by academic and scientific institutions

Staff scientist (Adiunkt) Since Oct 2023
Institute of Nuclear Physics Polish Academy of Sciences, Kraków, Poland
Division of Theoretical Physics – Particle Physics

Leverhulme Early Career Fellow Oct 2021 – Sep 2023
Cavendish Laboratory, Cambridge, UK
Theoretical High Energy Physics

Research Associate (PostDoc) Oct 2018 – Sep 2021
Cavendish Laboratory, Cambridge, UK
Theoretical High Energy Physics

Research Assistant (Doctoral student) Oct 2015 – Sep 2018
RWTH Aachen University, Aachen, Germany
Institute for Theoretical Particle Physics and Cosmology
Member of DFG Graduate School (GK)
"Teilchen- und Astroteilchenphysik im Lichte von LHC"

Research grants and funding awards

Research projects where identified as PI

Leverhulme Early Career Fellowship 2021–2023
The 'NNLO revolution': pushing the boundary of perturbative QCD.
Awarded by the Leverhulme Trust and the Isaac Newton Trust. (168 kGBP)

Research projects where identified as co-PI

DiRAC RAC - computing resources 2023–2024
Precision LHC Phenomenology
Total volume: 16 MCPU hours.

DiRAC RAC - computing resources 2024–2027
Precision LHC Phenomenology
Total volume: 53 MCPU hours.

Not granted research projects

NCN Sonata Bis 13 Call 2023
High Precision Predictions to Probe the Electroweak-Symmetry-Breaking Mechanism
Total amount: 563,500 EUR

Other awards

Cavendish Laboratory staff reward 2019
(Note: Award of extra pay-grade jump due to extraordinary performance.)

College Research Associate 2021
Emmanuel College, Cambridge

COST ITC conference grant 2024
Participation at ICHEP 2024 conference, 1600 Euro

Simons Foundation Grant 2024
Funding to participate in the Aspen Summer Programme 2024
Tightening the Gap Between Scattering Amplitudes and Events at the LHC at Higher Orders, 4500 USD

Teaching

Teaching at IFJ PAN

- 2024: Quantum Field Theory, lecture for PhD students (4x90 mins + exercises).

Teaching at Cambridge University

- 2024: Co-supervision of Louis Christou as Part III student at the Cavendish Laboratory.
- 2023: Supervision of Louis Christou in the summer-student programme of the Cavendish Laboratory.
- 2021-2023: Undergraduate supervision for Physics 1B A (wave-mechanics, quantum mechanics, statistical methods, solid-state physics) at Emmanuel College.
- 2019-2022: Graduate Lecture "HEP computing tools" at the Cavendish Laboratory (2x90 mins + tutorial per year).
- 2019-2022: PhD project co-supervision of Andrei Popescu.
- 2019: Part III project co-supervision of Weijun Li.

Teaching at RWTH Aachen University

- Summer term 2016: exercise classes for "Relativistic quantum mechanics" (graduate course)
- Winter term 2016/17: Tutor for "Theoretische Physik 0" (undergraduate course, mathematical methods for theoretical physics)
- Summer term 2017: Tutor for "Theoretische Physik I: Mechanik" (undergraduate course, classical mechanics)
- Winter term 2017/18: Tutor for "Statistische Mechanik" (undergraduate course, statistical physics)

Teaching at the University of Göttingen

- Winter term 2012/13: tutor for "Analytische Mechanik" (undergraduate course, classical mechanics)
- Summer term 2013: tutor for "Physik II" (undergraduate course, electrodynamics)
- Winter term 2013/14: tutor for "Mathematische Methoden der Physik II" (undergraduate course, mathematical methods for physics)
- Summer term 2014: tutor for "Quantenmechanik I" (undergraduate course, quantum mechanics)
- Winter term 2014/2015: tutor for "Rechenmethoden der Physik" (undergraduate course, mathematical methods for physics)
- Summer term 2015: tutor for "Analytische Mechanik" (undergraduate course, classical mechanics)

Other

- Sep 2023: Maria Laach Herbstschule, Maria Laach, Germany, theory coordinator

Publications

Below are various metrics of scientific output and citations as provided by the InSpire HEP database. The database considers pre-prints published on ArXiv and other online repositories citable works. Works marked "published" have undergone a rigorous peer-reviewing process.

Date: 27 November 2024

InSpire HEP Profile: `https://inspirehep.net/authors/1812055`

Published works (JCR-indexed journals)	24
Citable works	35
Total citations (excluding self-citations) for JCR works	996 (819)
Total citations (excluding self-citations) for citable works	1077 (862)
h-index (JCR works)	17 (16)
h-index (citable works)	18 (16)

Journal Articles

1. **Quark mass effects in Higgs production**,
   M. Czakon, F. Eschment, M, Niggetiedt, **R. Poncelet**, T. Schellenberger,
   JHEP 10 (2024) 210
2. **Top-Bottom Interference Contribution to Fully-Inclusive Higgs Production**,
   M. Czakon, F. Eschment, M. Niggetiedt, **R. Poncelet**, T. Schellenberger,
   Phys.Rev.Lett. 132 (2024) 21, 211902
3. **Measurement of the production cross section for a W boson in association with a charm quark in proton-proton collisions at $\sqrt{s} = 13\,\mathbf{TeV}$**,
   CMS Collaboration et al.,
   Eur.Phys.J.C 84 (2024), 27
4. **Isolated photon production in association with a jet pair through next-to-next-to-leading order in QCD**,
   S. Badger, M. Czakon, B. Hartanto, R. Moodie, T. Peraro, **R. Poncelet**, S. Zoia,
   JHEP 10 (2023) 071

5. **HighTEA: High energy Theory Event Analyser**,
M. Czakon, Z. Kassabov, A. Mitov, **R. Poncelet**, A. Popescu,
J.Phys.G 51 (2024) 11, 115002
6. **NNLO QCD corrections to event shapes at the LHC**,
M. Alvarez, J. Cantero, M. Czakon, J. Llorente, A. Mitov, **R. Poncelet**,
JHEP 03 (2023) 129
7. **A detailed investigation of W+c-jet at the LHC**,
M. Czakon, A. Mitov, M. Pellen, **R. Poncelet**,
JHEP 02 (2023) 241
8. **NNLO B-fragmentation fits and their application to $t\bar{t}$ production and decay at the LHC**, M. Czakon, T. Generet, A. Mitov, **R. Poncelet**,
JHEP03 (2023) 251
9. **NNLO QCD corrections to $Wb\bar{b}$ production at the LHC**
H. Bayu Hartanto, **R. Poncelet**, A. Popescu, S. Zoia,
Phys.Rev.D 106 (2022) 7, 074016
10. **Infrared-safe flavoured anti-k_T jets**,
M. Czakon, A. Mitov, **R. Poncelet**,
JHEP 04 (2023), 138
11. **Angular coefficients in W+j production at the LHC with high precision**
M. Pellen, **R. Poncelet**, A. Popescu, T. Vitos,
Eur.Phys.J.C 82 (2022) 8, 693
12. **Polarised W+j production at the LHC: a study at NNLO QCD accuracy**,
M. Pellen, **R. Poncelet**, A. Popescu,
JHEP 02 (2022) 160
13. **Next-to-Next-to-Leading Order Study of Three-Jet Production at the LHC**,
M. Czakon, A. Mitov, **R. Poncelet**,
Phys.Rev.Lett. 127 (2021) 15, 152001
14. **NNLO QCD corrections to diphoton production with an additional jet at the LHC**,
H. Chawdhry, M. Czakon, A. Mitov, **R. Poncelet**,
JHEP 09 (2021) 093
15. **Two-loop leading-colour QCD helicity amplitudes for two-photon plus jet production at the LHC**,
H. Chawdhry, M. Czakon, A. Mitov, **R. Poncelet**,
JHEP 07 (2021) 164
16. **NNLO QCD study of polarised $\mathbf{W^+W^-}$ production at the LHC**,
R. Poncelet, A. Popescu,
JHEP 07 (2021) 023
17. **B-hadron hadro-production in NNLO QCD: application to LHC $t\bar{t}$ events with leptonic decays**, M. Czakon, T. Generet, A. Mitov, **R. Poncelet**,
JHEP 10 (2021) 216
18. **Two-loop leading-color helicity amplitudes for three-photon production at the LHC**,
H. Chawdhry, M. Czakon, A. Mitov, **R. Poncelet**,
JHEP 06 (2021) 150
19. **NNLO QCD predictions for W+c-jet production at the LHC**,
M. Czakon, A. Mitov, M. Pellen, **R. Poncelet**,
JHEP 06 (2021) 100
20. **NNLO QCD corrections to leptonic observables in top-quark pair production and decay**,
M. Czakon, A. Mitov, **R. Poncelet**,
JHEP 05 (2021) 212
21. **NNLO QCD corrections to three-photon production at the LHC**,
H. Chawdhry, M. Czakon, A. Mitov, **R. Poncelet**,
JHEP 02 (2020) 057
22. **Single-jet inclusive rates with exact color at $\mathcal{O}$ (α_s^4)**,

M. Czakon, A. van Hameren, A. Mitov, **R. Poncelet**,
JHEP 10 (2019) 262

23. **Higher order corrections to spin correlations in top quark pair production at the LHC**,
A. Behring, M. Czakon, A. Mitov, A. Papanastasiou, **R. Poncelet**,
Phys. Rev. Lett. 123 (2019) no.8, 082001
24. **Polarized double-virtual amplitudes for heavy-quark pair production**,
L. Chen, M. Czakon, **R. Poncelet**,
JHEP 03 (2018) 085

Proceedings, community efforts and other publications

1. **Open B production at hadron colliders in NNLO+NNLL QCD**,
M. Czakon, T. Generet, A. Mitov, **R. Poncelet**,
e-Print: 2411.09684 [hep-ph]
2. **Les Houches 2023: Physics at TeV Colliders: Standard Model Working Group Report**,
J. Andersen, B. Assi, K. Asteriadis, P. Azzurri, G. Barone et al.,
e-Print: 2406.00708 [hep-ph]
3. **High-precision prediction for multi-scale processes at the LHC**,
R. Poncelet,
e-Print: 2405.01330 [hep-ph]
4. **Precision comparisons between theory and data in $t\bar{t}$-production at the LHC**,
R. Poncelet,
e-Print: 2212.06019 [hep-ph]
5. **Report of the Topical Group on Top quark physics and heavy flavor production for Snowmass 2021**,
K. Agashe et al. ,
e-Print: 2209.11267 [hep-ph]
6. **Flavour anti-$k_{\mathbf{T}}$ algorithm applied to $Wb\bar{b}$ production at the LHC**,
B. Hartanto, **R. Poncelet**, A. Popescu, S. Zoia,
e-Print: 2209.03280 [hep-ph]
7. **Snowmass White Paper: prospects for the measurement of top-quark couplings**,
G. Durieux, A, Gutiérrez Camacho, L. Mantani, V. Miralles, M. Miralles López, M. Llácer Moreno, **R. Poncelet**, E. Vryonidou, M. Vos,
e-Print: 2205.02140 [hep-ph]
8. **NNLO QCD study of polarised W^+W^- production at the LHC**,
A. Popescu, **R. Poncelet**,
PoS LHCP2021 (2021), 211
9. **W+c-jet production at the LHC with NNLO QCD accuracy**,
M. Czakon, A. Mitov, M. Pellen, **R. Poncelet**,
e-Print: 2110.05104 [hep-ph]
10. **NNLO QCD Calculations with the Sector-improved Residue Subtraction Scheme**,
R. Poncelet,
Acta Phys. Polon. B 51 (2020), 1503
11. **Sector-improved residue subtraction: Improvements and Applications**,
A. Behring, M. Czakon, **R. Poncelet**,
PoS LL2018 (2018), 024
12. **Precision Top-Quark physics with leptonic final states**,
R. Poncelet,
RWTH Aachen publications (2018)

Scientific, organizational, and popularization activity

Service and organization work

Conference and workshop organization:

- 2024/7: ICHEP, convener of "Top+EW" session.
- 2024/5: SM@LHC, convener of "Top-quark" session.
- 2023/11: Local organization committee and social chair of "Polish Particle and Nuclear Physics Summit (2PiNTS)" workshop at IFJ PAN Kraków
- 2023/9: QCD@LHC23, convener of "Processes with heavy quarks" session.
- 2023/3: DIS2023, convener of WG4 "QCD and heavy flavor".

Seminar organization:

- Since 2024: Co-organizer of COMETA Colloquium series.
- 2020–2023: Organizer of the DAMPT-Cavendish Joint Seminar Series.

Other:

- Since 2024: Polish representative in COMETA Management Committee (COST action `https://www.cost.eu/actions/CA22130/`)

Journal refereeing:

- Since 2021: EPJC
- Since 2021: JHEP
- Since 2023: SciPost

Scientific outreach activities

- Popular science article: "The Higgs does not seem to contain any factors from new physics", Eurekalert, 11 Jul 2024, `https://www.eurekalert.org/news-releases/1051057`
- 2024/5: Dzień Otwarty IFJ PAN dla studentów 2024, Kraków.
  Poster: "Normalising Flows for Phasespace Integration".
- 2023/7: Public Engagement workshop, The Science Museum, London.
  Introduction To Public Engagement, a course organized by DiRAC.
- 2023/5: Isaac Newton Trust Fellows' Event, Cambridge University, Cambridge.
  Public talk to the general public: "Exploring Quantum Effects at the Terascale".
- 2021/3: Engaged Researcher Online, Cambridge University, Cambridge.
  Introduction To Public Engagement, course at the University of Cambridge.
- 2018/6: Science Fair, Wirsberg Gymnasium, Würzburg.
  Scientific contact for student feedback and advice on project design and result analysis.

Other activity

- 2024/9: Aspen Summer Programme, Tightening the Gap Between Scattering Amplitudes and Events at the LHC at Higher Orders.
- 2024/8: CERN workshop: Frontiers in precision phenomenology: Resummation, Amplitudes, and Subtraction.
- 2023/6: PhysTev 23, workshop in Les Houches.
- 2022/8: MIAPbP workshop: Gearing up for high-precision LHC physics.
- 2022/6: DiRAC workshop: Accelerated Computing with Cuda.
- 2021/2: DiRAC workshop: DiRAC AI-athon.
- 2016/7: CTEQ - MCnet School at DESY.

- 2015/4: Helmholtz Alliance Monte-Carlo School at DESY.
- 2013/7: Summer student at DESY, supervisor: Simon Plätzer.
- 2013/2: Helmholtz Alliance Introduction to the Terascale at DESY.

Academic presentations

Invited colloquia at university and laboratories

1. **Precision QCD phenomenology for multi-scale processes at the Large Hadron Collider**, Kraków, IFJ PAN, 2024.04.25
2. **Jet identification and flavoured jet algorithms**, Aachen, RTG colloquium, 2023.04.18

Presentations at national and international conferences

1. **Precision calculations for heavy-quark production**, Freiburg, QCD@LHC, 2024.10.09
2. **Precision Predictions for Polarized Electroweak Bosons**, Prague, ICHEP, 2024.10.09
3. **Polarized predictions in diboson final states**, Rome, SM@LHC, 2024.05.09
4. **Precise polarisation predictions**, Izmir, COMETA 1st General Meeting, 2024.02.28
5. **High precision prediction for multi-scale processes at the LHC**, Kraków, XXX Epiphany Conference, 2024.01.08
6. **N(N)LO 3-jet predictions**, FermiLab (remote), SM@LHC, 2023.07.10
7. **NNLO QCD corrections to event-shapes at the LHC**, Crieff, RadCor, 2023.05.30
8. **Precision phenomenology with multi-jet final states at the LHC**, MSU, DIS, 2023.03.30
9. **NNLO QCD corrections to W+2 b-jet production**, Paris, QCD@LHC, 2022.11.28
10. **Jet calculations with the Sector-improved residue subtraction scheme**, Newcastle, HP2, 2022.09.21
11. **Precision comparisons between theory and data in ttbar production at the LHC**, Durham, TOP, 2022.09.05
12. **Polarization modelling in MBI processes / Precision Predictions for Polarized Electroweak Bosons**, Shanghai (remote), MBI, 2022.08.22
13. **Progress on precision QCD calculations**, Taipei (remote), LHCP, 2022.05.19
14. **Status of (N)NNLO calculations**, CERN, SM@LHC, 2022.04.13
15. **NNLO QCD corrections for three-jet production**, La Thuile, Moriond, 2022.03.24
16. **NNLO QCD predictions for 2 to 3 processes**, Tallahassee (remote), RadCor+LoopFest, 2021.05.21
17. **NNLO QCD corrections to top-quark production and decay**, Durham (remote), TOP, 2020.09.14
18. **NNLO QCD calculations with the Sector-improved residue subtraction scheme**,

Kraków, Epiphany Conference, 2020.01.10

19. **Towards 2 → 3 NNLO QCD calculations**,
Avignon, RadCor, 2019.09.10
20. **State-of-the-art precision calculations for top quark production and decay**,
Puebla, LHCP, 2019.05.16
21. **Top production at the LHC**,
Torino, DIS, 2019.04.09
22. **NNLO QCD top quark pair production and decay**,
Bad Neuenahr, TOP, 2018.09.17
23. **NNLO predictions for top-quark pair production with leptonic final states**,
MSU, LoopFest, 2018.07.19
24. **Towards top-quark pair production and decay at NNLO QCD**,
St. Gilgen, RadCor, 2017.09.27
25. **Improvements of the sector-improved residue subtraction scheme**,
Debrecen, QCD@LHC, 2017.08.29
26. **Polarised amplitudes for top quark pair production at NNLO**,
Münster, DPG, 2017.03.27
27. **NLO event generation with the (MC)3 sampling algorithm**,
Hamburg, DPG, 2016.03.01

Invited seminars

1. **Precision phenomenology with heavy-flavour jets at the LHC**,
Münster, University of Münster, 2024.07.01
2. **Precision phenomenology with the sector-improved residue subtraction scheme**,
Dresden, Institute of Nuclear and Particle Physics seminar, 2024.06.27
3. **Techniques and phenomenology of NNLO QCD calculations for LHC processes**,
Hamburg, DESY Theory seminar, 2024.04.15
4. **Precision phenomenology with heavy-flavour jets at the LHC**,
Warsaw, NCBJ, 2024.04.09
5. **Techniques and phenomenology of cutting-edge higher-order calculations for LHC processes**,
Göttingen, Georg-August University, 2023.12.18
6. **Techniques and phenomenology of cutting-edge higher-order calculations for LHC processes**,
Kraków, AGH, 2023.12.15
7. **Precision phenomenology with heavy-flavour jets at the LHC**,
Kraków, Jagiellonian University, 2023.12.05
8. **High-precision calculations for W+charm at the LHC**,
DESY Zeuthen, 2023.11.02
9. **Precision phenomenology with heavy-flavour jets at the LHC**,
CERN, QCD seminar, 2023.10.23
10. **Precision Predictions for Polarized Electroweak Bosons**,
Kraków, IFJ theory division seminar, 2023.10.12
11. **Precision phenomenology with multi-jet final states at the LHC**,
Milano Bicocca, 2023.09.22
12. **Precision phenomenology with multi-jet final states at the LHC**,
Torino, INFN, 2023.03.22
13. **Precision phenomenology with multi-jet final states at the LHC**,
Kraków, IFJ particle physics theory department seminar, 2023.03.20
14. **Precision Predictions for Polarized Electroweak Bosons**,
Würzburg, 2023.01.19

15. **NNLO QCD corrections to W+2 b-jet production**,
Zürich, UZH, 2022.09.27
16. **Tasty jets at the LHC**,
Munich, MPI, 2022.07.01
17. **Jets at the LHC: a fixed order perspective**,
Freiburg, 2022.05.17
18. **HighTEA**,
Cambridge, Cavendish-DAMPT, 2022.02.04
19. **Jets at the LHC: a fixed order perspective**,
University of Sussex, 2021.10.25
20. **NNLO QCD predictions for 2 to 3 processes**,
CERN (remote), QCD-seminar, 2021.06.18
21. **Three photon production at the LHC: Amplitudes and Phenomenology**,
Milano Bicocca, 2020.02.19
22. **Three photon production at the LHC: Amplitudes and Phenomenology**,
Oxford, 2020.02.13
23. **Spin correlation in top-quark pair production in the 'precision'-era of the LHC**,
Dortmund, 2019.07.01
24. **Fixed-order predictions for top-quark pair production and decay at the LHC**,
Cambridge, Cavendish-DAMPT, 2019.05.16
25. **Improvements of the sector-improved residue subtraction scheme**,
Zürich, ETH, 2018.03.20
26. **NNLO QCD calculations with the sector-improved residue subtraction scheme**,
Würzburg, 2017.11.30
27. **Improvements of the sector-improved residue subtraction scheme**,
Freiburg, 2017.11.21

Presentations at workshops and working group meetings

1. **High precision prediction for multi-scale processes at the LHC**,
Pohang, APCTP Workshop on Precision Calculation and Collider Phenomenology, 2024.11.05
2. **Polarisation computations in the STRIPPER framework**
Toulouse (remote), COMETA workshop on vector-boson polarisation, 2024.09.23
3. **Fixed Order as a proxy to realistic LHC observables?**
Aspen Center for Physics, Tightening the Gap Between Scattering Amplitudes and Events at the LHC at Higher Orders, 2024.09.04
4. **STRIPPER subtraction scheme**,
CERN, Frontiers in precision phenomenology: Resummation, Amplitudes, and Subtraction, 2024.08.28
5. **CMP**,
online, LHCb flavoured jets public meeting, 2024.05.20
6. **VLVL: Precision Predictions for Polarized Electroweak Bosons**,
COMETA online meeting WG1, 2024.01.17
7. **Fixed-order calculations with massive quarks**,
Edinburgh, Heavy Flavour At High PTs, 2023.11.30
8. **High precision prediction for multi-scale processes at the LHC**,
Kraków, 2PiNTS, 2023.11.22
9. **HighTEA**,
Les Houches, 2023.06.16
10. **Flavour anti-kT**,
Les Houches, 2023.06.14
11. **Isolated photon production in association with a jet pair through next-to-next-to-leading order in QCD**,
ATLAS PDF Forum (remote), 2023.05.26

12. **HighTEA**,
    CMS TOP WG (remote), 2022.12.13
13. **Combined tt and tW analyses**,
    ATLAS TOP WG (remote), 2022.11.17
14. **Infrared-safe flavoured anti-kT jets**,
    ATLAS PDF Forum (remote), 2022.05.13
15. **NNLO QCD predictions for jet observables**,
    CMS hadronic workshop, 2022.02.24
16. **NNLO predictions for three-jet cross sections at the LHC**,
    LHC EW WG general meeting, 2022.02.15
17. **NNLO predictions for three-jet cross sections at the LHC**,
    LHC EW WG, 2021.11.29
18. **Precision predictions for jet rates**,
    CERN (remote), Jets And Their Substructure, 2021.05.31
19. **Predictions for ttbar differential cross sections**,
    CMS TOP WG, 2019.11.20
20. **NNLO predictions for ttbar spin correlations**,
    CERN TOP WG, 2018.11.21
21. **ttbar production and decay at NNLO QCD**,
    Bad Honnef, GK report week, 2016.08.30

Other presentations

1. **Spin correlation in top-quark pair production**,
   CERN, collider cross-talk, 2022.07.21
2. **Precision Top-Quark Physics with Leptonic Final States**,
   Aachen, PhD defense, 2018.09.24