Qiang Li High Energy Physics Group, Room W227, Peking University, 100871 Beijing, China
Email: qliphy0@pku.edu.cn or qliphy@gmail.com Phone number:+86-10-6274-4688

Curriculum Vitae

Qiang Li

Personal Information
Gender: Male
Date of Birth: 07/1980
Place of Birth: P. R. China
Nationality: P. R. China
Homepage: https://faculty.pku.edu.cn/liqiang/zh_CN/index.htm
Github Page: https://github.com/qliphy/
PKMuon Page: https://lyazj.github.io/pkmuon-site/

Experiences and Education

10/11/2025— :	Head of the Technical Physics Department
01/02/2024— :	Professor (Boya Titled), Peking University
01/02/2020—31/01/2024:	Researcher, Associate Prof. with Tenure, Peking University
01/11/2019—09/11/2025:	Deputy Head of the Technical Physics Department
01/09/2011—31/01/2021:	Associate Prof., Peking University
01/12/2009—30/08/2011:	Postdoc at Paul-Scherrer-Institut, Villigen, Switzerland
31/05/2007—30/11/2009:	Postdoc at ITP, Karlsruhe, Germany
07/03/2007—07/05/2007:	Visiting scientist at LPSC, Grenoble, France
30/09/2006—04/03/2007:	Visiting scientist at KEK theory division, Japan
01/09/2001—01/07/2006:	Ph.D. Student on particle Physics, PKU, China
05/09/1997—01/07/2001:	B.Sc in Physics, Peking University, China.

Honors and Awards

2025	My student Dr. Congqiao Li recevied the CMS Ph.D. thesis awards.
2024	My student Dr. Congqiao Li recevied a 1st prize Chengguang award from the HEP China society.
2023	Chinese Physics C Outstanding Reviewer Award 2023
2023	PKU Teaching awards (Xingzheng Global fund)
2022	My student Dr. Jie Xiao recevied a 1st prize Chengguang award from the HEP China society.
2022	CMS Awards 2021, LHC CMS Experiment.
2019	CHEN Huxiong Young Teaching Award, School of Physics, Peking University.
2016	Young researcher prize, State Key Laboratory, PKU.
2015	1st Prize, CAS Center for Excellence in Particle Physics, IHEP, Beijing.
2014	2nd Prize, CAS Center for Excellence in Particle Physics, IHEP, Beijing.
2014	CHEN Huxiong Young Teaching Award, School of Physics, Peking University.

Students (co-)Supervised

1. Sitian Qian (PhD 2025), Search for Rare Signals at the LHC from Vector Boson Scattering and Fusion as well as Pb-Pb collisions with the CMS experiment
2. Sen Deng (PhD 2025), Precise measurement of multiboson production and large-R boson-initiated jet tagging calibration
3. Yuzhe Zhao (PhD 2025), Search for boosted Higgs decaying to WW and boosted W decaying to charm and bottom quark
4. Congqiao Li (PhD 2024), Modern deep learning for large-R jet taggingalgorithms, calibration methods, and applications in CMS experiment, a Boya titled postdoc at PKU CMS group, China
5. Zhe Guan (PhD 2024), The Production and Search for Multi-Boson Processes WWgamma and Hgamma at CMS experiment
6. Qilong Guo (PhD 2023), Searches for new physics with triboson in the final state and vector-like lepton
7. Jing Peng (PhD 2023), The study of physic in di-boson production containing photon
8. Jie Xiao (PhD 2022), Precise testing of the Standard Model and search for new physics beyond the Standard Model through same-sign WW scattering and W production, a postdoc at Lyon CMS group, France, and then Durham, UK
9. Ying An (PhD 2022), The study of physics in the multi-boson production containing photon, a postdoc at DESY (Fellow) CMS group, Germany
10. Xudong Lyu (PhD 2021), Development for multi-quarks tagger and search for resonances decaying to triple W-boson
11. Cheng Chen (PhD 2021), Resonance decays to triple W-boson in full hadronic final state and fast simulation with deep learning
12. Meng Lu (PhD 2020), Search for the Vector Boson Scattering Z and constraints on anomalous quartic couplings, a postdoc at Northeastern Univ., US
13. Jing Li (PhD 2019), Measurement of electroweak production of a W boson and two forward jets at CMS
14. Junhao Li (PhD 2019), Study of longitudinal polarization fraction of gauge boson via vector boson scattering at CMS
15. Huang Huang (PhD 2019), Search for a heavy Di-boson resonance with W-tagging techniques
16. Qun Wang (PhD 2018), Measurement of the differential cross section of Z boson production in association with jets at the LHC, a postdoc at DESY (Fellow) CMS group, Germany
17. Daneng Yang (PhD 2018), Measurement of massive vector boson plus photon processes with the CMS experiment at the LHC, a postdoc at UC Irvin group (now working on Dark Matter), US
18. Feng Wangdong Zhang (PhD 2017), Measurement of jet production in association with a Z boson at the LHC and jet energy correction calibration at high level trigger in CMS, a postdoc at UC Davis, US
19. Zhaoru Zhang (PhD 2017), Measurement of the cross section for electroweak production of Zgamma in association with two jets and constraints on anomalous

quartic gauge couplings
20. Zijun Xu (PhD 2016), Massive Diboson Resonances Search and the CMS Detector Phase2 Upgrade, a faculty at IHEP, Beijing, China
21. Shuai Liu (PhD 2015), Search for massive resonances decaying into WW in semi-leptonic final states in CMS

Community service

1. Head of the Technical Physics Department, School of Physics, PKU (2025.11-)
2. CMS Collaboration Board Advisory Group Member (2023.9-2025.8)
3. CMS School Committee Member (2023.9- 2025.10)
4. Deputy Team Leader of the PKU CMS Group (2023.1-)
5. Deputy Head of the Technical Physics Department, School of Physics, PKU (2020.1-2025.11)
6. Level-2 Convener of CMS Computing and Softerware group (2020.9-2022.8)
7. Level-2 Convener of CMS Physics Generator group (2018.9-2020.8)
8. Level-3 Convener of CMS Matrix Element and Future Generator group (2015-2017)
9. Convener of the Physics and Simulation group for CEPC (2015-2018)
10. CMS Analysis Referee Committee member for 5 analyses
11. Referee for Phys. Rev. Lett, Phys. Rev. D, ROPP, EPJC, Euro. Phys. Lett, J. Phys. G and Chin. Phys. C.

Teaching duties

Lab Physics; Electro-Magnetism; Computational Physics; Monte-Carlo for HEP.

Conference and Workshop Organization

Chair of Workshop on Quantum Entanglement at the Energy Frontier, 2025, Beijing.
Chair of PKMu-HFRS/HIRIBL Workshop, 2025, Beijing.
Session convener (Top Quark and Electroweak Physics) of ICHEP2024, Prague, Czech.
Chair of MIP2024, Beijing.
Chair of HEPSummerDays, 2022, Beijing.
Co-Chair of MCnet School, 2021, Beijing.
Chair of CMS Data Analysis School, 2019, Beijing.
Co-organizer of 2nd CMS Flavour tagging workshop, 2019, Dubrovnik, Croatia.
Co-organizer of CLHCP 2018, CCNU, Wuhan.
Co-organizer of FeynRules/Madgraph School 2018, USTC, Hefei.
Session Chair (Beyond Standard Model) of CEPC 2018, IHEP, Beijing.
Co-organizer of CLHCP 2017, Nanjing.
Session Chair (Standard Model) of PANIC 2017, Beijing.
Co-Chair of CLHCP 2016, Beijing.

Co-organizer of Weihai High-Energy Physics School 2016, Beijing.
Co-Chair of MC4BSM 2016, Beijing.
Co-organizer of MadGraph 2015 School at SJTU, Shanghai.
Co-organizer of MadGraph 2013 Spring School, Beijing.
Co-organizer of International Summer school on TeV Experimental Physics, 2014-2019

Funding

1. NSFC, Excellent Young Scientists Fund, 12325504, Precision test of the Standard Model and Searches for new physics, 4M RMB, PI, 2024-2028.
2. NSFC, General Program, 12150005, Feasibility studies on an electron muon collider, 2.69M RMB, PI, 2022-2024.
3. NSFC, General Program, 12075004, Electroweak and QCD productions of Bosons and Jets, 630K RMB, PI, 2021-2024.
4. NSFC, International Cooperation Program, 12061141002, Multi-lepton and Multi-boson physics at CMS, 5M RMB, PI, 2020-2025.
5. MOST, National Key R&D Program, 2018YFA0403900, Run-2 physics analysis at CMS, 8.14M RMB, PI, 2018-2023.
6. NSFC, International Cooperation Program, 11661141008, Standard Model Test and New Physics Searches, 5.5M RMB, Key Participant, 2016-2020.
7. NSFC, General Program, 11575005, VBF study at CMS, 620K RMB, PI, 2016-2019.
8. NSFC, International Cooperation Program, 11411140233, Probing aQGC at high energy colliders, 80K RMB, PI, 2014-2016.
9. NSFC, General Program, 11475180, Monte-carlo tools development and Physics application, 800K RMB, Key Participant, 2015-2018.
10. NSFC, National Youth Fund, 11205008, High precision global Monte-Carlo Simulation at Hadron Colliders, 220K RMB, PI, 2012-2014.

Activities and Achievements (Only briefly summarized up to around 2022)

1. Standard Model Measurement: The high energy and high luminosity from LHC experiments open new doors to probe the Standard Model in unexplored space. In collaboration with Fermilab colleagues, we provided the 1st tri-boson measurement for ever on $WV\gamma$ (PRD 90, 032008 (2014)), and 1st probe on anomalous triple gauge coupling with boosted technique (PLB 772 (2017) 21). I have also initiated and coordinated a group at Peking University and made leading contributions on several Vector Boson Fusion/Scattering (VBF/VBS) analyses with Run-I and Run-II data, including electroweak W+2Jets (JHEP 11 (2016) 147), electroweak $W\gamma$+2Jets (JHEP 06 (2017) 106, PLB 811 (2020) 135988), $Z\gamma$+2Jets (PLB 770 (2017) 380, JHEP 06 (2020) 076), ZZ scattering (PLB 812 (2020) 135992) and polarized same-sign WW scattering (PLB 812 (2020) 136018). In addition, we performed a measurement on inclusive $W\gamma$ reaching an accuracy around 5% (PRL 126, 252002 (2021)). Based on these works, we provided the most stringent limits on sets of anomalous quartic gauge couplings. Due to these many important contributions, I was hornoured to have the chance to present a plenary talk to review recent electroweak measurements at the 28th International Symposium on Lepton Photon Interactions at High Energies, Aug, 2017.

2. Boosted W tagging and di/tri-boson resonance searches: Hadronically decayed W-boson tends to be merged more likely as a single fat-jet at higher momentum region. W tagging is a powful technique to enhance signal sensitivity by exploiting jet substructure information. Rich progresses have been made recently on W tagging and its application to di-boson resonance searches. I have joined this activity since beginning in CMS experiments and made several crucial contributions on following analyses, including, W-tagging performance (JHEP 12 (2014) 017), Run1 WW/Z resonance search (JHEP 08 (2014) 174), Run1 WH resonance search (EPJC 76 (2016) 237), first 13TeV search (JHEP 03 (2017) 162), Run-I and 2015 combination (PLB 774 (2017) 533), full 2016 update (JHEP 05 (2018) 088), and Run-II combination (PLB 798 (2019) 134952).
Recently, using deep-learning techniques, we provide the first results for TeV scale tri-massive-boson resonance searches. In this study, we developed the method to tag and calibrate 4-leg boosted Jets, which can also be used for other important studies including boosted Higgs measurements.

3. Heavy Higgs and VBF invisible Higgs searches are crucial to further understand the mechanism of electroweak symmetry and probe new physics through the Higgs portal. I have contributed significantly to VBF invisible Higgs searches (EPJC74 (2014) 2980) on W+Jets background estimations, heavy Higgs searches (EPJC 73 (2013) 2469, JHEP 10 (2015) 144) on $WW \to l\nu jj$ channel. We presented several status review and (pre)approval presentations inside CMS collaborations, and provided the most sensitive results at that time.

4. Muon Detector Related: In 2012-2013, I have contributed over 4 months on Resistive Plate Chamber upgrade on mechanics. In 2016-2017, I have been responsible for muon reconstructin with additional seeds and segements from Gas electron multiplier stations one and two. The muon recontruction performance has been checked extensively and results have been reported by me and well received by CMS Muon Group.

5. Monte-Carlo Generator: I have been level-3 and level-2 conveners in CMS Physics generator group since 2015, with the responsibility to to provide necessary samples and tools to improve interpretation of the LHC data and understanding of physics in CMS experiment. I have been leading 4 sub-groups and coordinated around 40 people working under CMS Generator group, through organizing weekly meeting and regular working discussions. In last years, the main contributions in this part include, MadGraph updated from version 242 to 26X, Herwig7 and Sherpa integrated and validated in CMS and make them ready for mass productions, and provding updated Pythia8 Tunes with 13TeV measurement (EPJC 80 (2020) 4).

6. Future Collider: I have been Convener of the Physics and Simulation group for CEPC (2015-2018). I have included Initial state radiation effect into MadGraph (github code) to make it possible to have more precise simulation for linear collider. I have also lead several studies at CEPC on $H \to ee$ (JPG45 (2018) no.1, 015004), $H \to \mu\mu$ (CPC42 (2018) no.5, 053001) and Lepton-Flavor-Violation decay (EPJC78 (2018) no.10, 835). We have also recently proposed a novel future collider i.e. an electron muon collider with asymmetrical energy, and was reported by CERN Courier. We have also carried out physics studies at a muon collider, e.g. searching for leptoquarks and polarized VBS scattering. We have also proposed a road map through neutrino neutrino and neutrino lepton collisions to muon collider. Most recently, we extend our studies to neutrino and dark matter using novel methods.

6. Popular Science: Collider animation.

Publications list 1: CMS works with significant contributions

Ongoing: HIG-24-001 (SS WWH), SMP-24-002 (Run3 ZG), HIG-24-008 (Boosted HWW), JME-25-001 (Transformer), B2G-25-003 (spin-1 resonance searches) etc.

[**33**]. *Search for light pseudoscalar bosons, pair-produced in Higgs boson decays in the four-electron final state in proton-proton collisions at sqrt(s)=13 TeV*, arXiv:2511.19563, submitted to PRL.

[**32**]. *Search for heavy HA and ZA resonances with a bottom quark-antiquark pair in the final state in proton-proton collisions at sqrt(s)=13 TeV*, arXiv:2511.14583, submitted to Sci. Bulletin.

[**31**]. *Performance of heavy-flavour jet identification in boosted topologies in proton-proton collisions at sqrt(s)=13 TeV*, CMS PAS-BTV-22-001, arXiv:2510.10228, **JINST 20** (2025) P11006.

[**30**]. *Observation of WZG production and constraints on new physics scenarios in proton-proton collisions at sqrt(s) = 13 TeV*, arXiv:2503.21977, **Phys. Rev. D** 112 (2025) 012009.

[**29**]. *Search for high-mass resonances in a final state comprising a gluon and two hadronically decaying W bosons in proton-proton collisions at sqrt(s)= 13 TeV*, arXiv:2410.17303, **JHEP 02** (2025) 199.

[**28**]. *Search for anomalous Higgs boson couplings in WH to lnubb production through Vector Boson Scattering*, CMS PAS-HIG-23-007, arXiv:2405.16566, **Phys. Lett. B 860** (2025) 139202.

[**27**]. *Observation of WWG production and search for HG production in proton-proton collisions at sqrt(s)= 13 TeV*, arXiv:2310.05164, **Phys. Rev. Lett. 132** (2024) 121901 (Editors' Suggestion and Nature's Research Highlight).

[**26**]. *Measurement of the electroweak production of Wgamma in association with two jets in proton-proton collisions at sqrt(s)=13 TeV*, CMS PAS-SMP-21-011, arXiv:2212.12592, **Phys. Rev. D 108**, (2023) 032017.

[**25**]. *Probing Majorana neutrinos and the Weinberg operator in the same-charge dimuon channel through vector boson fusion processes in proton-proton collisions at sqrt(s)=13 TeV*, CMS PAS-EXO-21-003, arXiv:2206.08956, **Phys. Rev. Lett. 131** (2023) 011803 (Editors' Suggestion, Featured in Physics).

[**24**]. *Search for resonances decaying to three W bosons in the hadronic final state at sqrt(s)=13 TeV*, CMS PAS-B2G-21-002, arXiv:2112.13090, **PRD 106**, (2022) 012002.

[**23**]. *Search for resonances decaying to triple W-boson final states in proton-proton collisions at sqrt(s)=13 TeV*, CMS PAS-B2G-20-001, arXiv:2201.08476, **Phys. Rev. Lett. 129**, (2022) 2, 021802.

[**22**]. *Search for Higgs boson decay to a charm quark-antiquark pair in proton-proton collisions at sqrt(s) = 13 TeV*, CMS PAS-HIG-21-008, arXiv:2205.05550, **Phys. Rev. Lett. 131** (2023) 061801 (Editors' Suggestion).

[**21**]. *Measurement of the electroweak production of Zgamma and two jets in proton-proton collisions at sqrt(s)= 13 TeV and constraints on anomalous quartic gauge couplings*, CMS PAS-SMP-20-016, **PRD 104**, 072001 (2021)

[**20**]. *Measurement of Wgamma production cross section in proton-proton collisions at sqrt(s)= 13 TeV and constraints on effective field theory coefficients*, CMS PAS-SMP-19-002, **Phys. Rev. Lett. 126**, (2021) 252002.

[**19**]. *Measurements of production cross sections of polarized same-sign W boson pairs in association with two jets in proton-proton collisions at sqrt(s)= 13 TeV*, CMS PAS-SMP-20-006, **PLB 812** (2021) 136018.

[**18**]. *Evidence for electroweak production of four charged leptons and two jets in proton-proton collisions at sqrt(s)= 13 TeV*, CMS PAS-SMP-20-001, **PLB 812** (2021) 135992.

[**17**]. *Observation of electroweak production of Wgamma with two jets in proton-proton collisions at sqrt(s)= 13 TeV*, CMS PAS-SMP-19-008, **PLB 811** (2020) 135988.

[**16**]. *Measurement of the cross section for electroweak production of a Z boson, a photon and two jets in proton-proton collisions at sqrt(s)= 13 TeV and constraints on anomalous quartic couplings*, CMS PAS-SMP-18-007, **JHEP 06** (2020) 076.

[**15**]. *Combination of CMS searches for heavy resonances decaying to pairs of bosons or leptons*, CMS PAS-B2G-18-006, **PLB 798** (2019) 134952.

[**14**]. *Search for a heavy resonance decaying to a pair of vector bosons in the lepton plus merged jet final state at sqrt(s) = 13 TeV*, CMS PAS-B2G-16-020/029, **JHEP 05** (2018) 088.

[**13**]. *Search for anomalous couplings in boosted WW/WZ to l nu q q-bar production in proton-proton collisions at sqrt(s) = 8 TeV*, CMS PAS-SMP-13-008, **Phys. Lett. B 772** (2017) 21.

[**12**]. *Search for massive resonances decaying into WW, WZ or ZZ bosons in proton-proton collisions at sqrt(s) = 13 TeV*, CMS PAS-B2G-16-004, **JHEP 1703** (2017) 162.

[**11**]. *Combination of searches for heavy resonances decaying to WW, WZ, ZZ, WH, and ZH boson pairs in proton-proton collisions at sqrt(s) = 8 and 13 TeV*, CMS PAS-B2G-16-007, **Phys. Lett. B 774** (2017) 533

[**10**]. *Measurement of electroweak-induced production of W gamma with two jets in pp collisions at sqrt(s) = 8 TeV and constraints on anomalous quartic gauge couplings*, CMS PAS-SMP-14-011, **JHEP 06** (2017) 106.

[**9**]. *Evidence for the electroweak Zgamma production in association with two jets and a search for anomalous quartic gauge couplings in pp collisions at sqrt(s) = 8 TeV*, CMS PAS-SMP-14-018, **Phys.Lett. B770** (2017) 380.

[**8**]. *Search for massive resonances decaying into WH in semi-leptonic final states at sqrt(s) = 8 TeV*, CMS PAS-EXO-14-010, **EPJC 76** (2016) 237.

[**7**]. *Measurement of the electroweak W production cross section in pp collisions at sqrt(s) = 8 TeV*, CMS PAS-SMP-13-012, **JHEP 11** (2016) 147.

[**6**]. *Search for a Higgs boson in the mass range from 145 to 1000 GeV decaying to a pair of W or Z bosons*, CMS PAS-HIG-13-031, **JHEP 10** (2015) 144.
[**5**]. *Search for massive resonances decaying into pairs of boosted bosons in semi-leptonic final states at sqrt(s) = 8 TeV* , CMS PAS-EXO-13-009, **JHEP 08** (2014) 174.

[**4**]. *Search for invisible Higgs decays in the VBF channel*, CMS PAS-HIG-13-013, **Eur. Phys. J. C 74** (2014) 2980.

[**3**]. *A Search for WWgamma and WZgamma production in pp Collisions at sqrt(s) = 8 TeV*, CMS PAS-SMP-13-009, **Phys. Rev. D 90**, 032008 (2014).

[**2**]. *Identifying Hadronically Decaying Vector Bosons Merged into a Single Jet*, CMS PAS-JME-13-006, **JHEP 12** (2014) 017.

[**1**]. *Search for a standard-model-like Higgs boson with a mass in the range 145 to 1000 GeV at the LHC*, CMS PAS-HIG-12-034, **Eur.Phys.J. C73** (2013) 2469.

Publications list 2: White Book, Tools and Phenomenology

[**66**]. Zijian Wang, Leyun Gao, Zhuo Chen, Cheng-en Liu, Jinning Li, Qite Li, Chen Zhou, Qiang Li, Yu Xu, Xueheng Zhang, Liangwen Chen, Zhiyu Sun, Ce Zhang, *Search for light Dark Sectors with GeV Muon Beams*, arXiv:2511.08950.

[**65**]. Cheng-en Liu, Rongfeng Zhang, Zijian Wang, Andrew Michael Levin, Leyun Gao,

Jinning Li, Minxiao Fan, Youpeng Wu, Qite Li, Chen Zhou, and Qiang Li, *Probing Cosmic Ray Composition and Muon-philic Dark Matter via Muon Tomography*, arXiv:2507.23458.

[**64**]. Rongfeng Zhang, Zibo Qin, Cheng-en Liu, Qite Li, Yong Ban, Chen Zhou, and Qiang Li, *Revealing Secondary Particle Signatures in PoCA-Based Muography*, arXiv:2507.03914.

[**63**]. Alim Ruzi, Youpeng Wu, Ran Ding, and Qiang Li, *Searching Quantum Entanglement in pp to ZZ process*, arXiv:2506.16077, accepted by CPC.

[**62**]. Ran Ding, Alim Ruzi, Sitian Qian, Andrew Levin, Youpeng Wu, and Qiang Li, *Quantum Entanglement between gauge boson pairs at a Muon Collider*, arXiv:2504.09832.

[**61**]. Leyun Gao, Cheng-en Liu, Qite Li, Chen Zhou, Qiang Li, Liangwen Chen, Xueheng Zhang, Yu Xu, Zhiyu Sun, *Probing and Knocking with Muons*, arXiv:2503.22956, **Modern Physics Letters A** (2025) 2530008.

[**60**]. Yuzhe Zhao, Congqiao Li, Antonios Agapitos, Dawei Fu, Leyun Gao, Yajun Mao, and Qiang Li, *Novel Vcb extraction method via boosted bc-tagging with in-situ calibration*, arXiv:2503.00118.

[**59**]. Leyun Gao, Alim Ruzi, Qite Li, Chen Zhou, and Qiang Li, *Testing spooky action between free-traveling electron-positron pairs*, arXiv:2502.07597, **Phys. Rev. D** 111 (2025) 116018.

[**58**]. Leyun Gao, Alim Ruzi, Qite Li, Chen Zhou, Liangwen Chen, Xueheng Zhang, Zhiyu Sun, and Qiang Li, *Quantum state tomography with muons*, arXiv:2411.12518, **JPG 52** 075002 (2025).

[**57**]. Leyun Gao, Zijian Wang, Cheng-en Liu, Jinning Li, Alim Ruzi, Qite Li, Chen Zhou, and Qiang Li, *Probing charged lepton flavor violation in an economical muon on-target experiment*, arXiv:2410.20323, **IJMPA 2550164** (2025).

[**56**]. Youpeng Wu, Ruobing Jiang, Alim Ruzi, Yong Ban, and Qiang Li, *Testing Bell inequalities and probing quantum entanglement at CEPC*, arXiv:2410.17025, **Phys.Rev.D 111** (2025) 3, 036008.

[**55**]. Ran Ding, Jingshu Li, Meng Lu, Zhengyun You, Zijian Wang, and Qiang Li, *Study of charged Lepton Flavor Violation in electron muon interactions*, arXiv:2405.09417, **JHEP 01** (2025) 165.

[**54**]. Alim Ruzi, Youpeng Wu, Ran Ding, Sitian Qian, Andrew Micheal Levin, and Qiang Li, *Testing Bell inequalities and probing quantum entanglement at a muon collider*, arXiv:2408.05429, **JHEP 10** (2024) 211.

[**53**]. Congqiao Li, Antonios Agapitos, Jovin Drews, Javier Duarte, Dawei Fu, Leyun Gao, Raghav Kansal, Gregor Kasieczka, Louis Moureaux, Huilin Qu, Cristina Mantilla Suarez, Qiang Li, *Accelerating Resonance Searches via Signature-Oriented Pre-training*, arXiv:2405.12972.

[**52**]. Leyun Gao, Dawei Fu, Yuzhe Zhao, Qilong Guo, Sitian Qian, Tianyi Yang, Sen Deng, Qiang Li, *Development and applications of boosted boson jet tagging methods in the CMS experiment (In Chinese)*, Chinese Science Bulletin (2024).

[**51**]. Zhe Guan, Jing Peng, Jie Xiao, Ying An, Qilong Guo, Sitian Qian, Tianyu Mu, Yajun Mao, Yong Ban, Qiang Li, *Progress of W boson physics at the energy frontier (In Chinese)*, Chinese Science Bulletin (2023).

[**50**]. Ruobing Jiang, Chuqiao Jiang, Alim Ruzi, Tianyi Yang, Yong Ban, Qiang Li, *Searches for multi-Z boson productions and anomalous gauge boson couplings at a muon collider*, arXiv:2404.02613, **Chin.Phys.C 48** (2024) 10, 103102.

[**49**]. Xunye Cai, Jingshu Li, Ran Ding, Meng Lu, Zhengyun You, Qiang Li, *Search for R-parity Violation induced Charged Lepton Flavor Violation at future lepton colliders*, arXiv:2403.14993, **Universe 10** (2024) 6, 243.

[**48**]. Xudong Yu, Zijian Wang, Cheng-en Liu, Yiqing Feng, Jinning Li, Xinyue Geng, Yimeng Zhang, Leyun Gao, Ruobing Jiang, Youpeng Wu, Chen Zhou, Qite Li, Siguang Wang, Yong Ban, Yajun Mao, Qiang Li, *Proposed Peking University muon experiment for muon tomography and dark matter search*, arXiv:2402.13483, **Phys. Rev. D 110** (2024) 1, 016017.

[**47**]. Ruobing Jiang, Tianyi Yang, Sitian Qian, Yong Ban, Jingshu Li, Zhengyun You, Qiang Li, *Searching for Majorana Neutrinos at a Same-Sign Muon Collider*, arXiv:2304.04483, **Phys. Rev. D 109** (2024) 3, 035020.

[**46**]. Congqiao Li, Huilin Qu, Sitian Qian, Qi Meng, Shiqi Gong, Jue Zhang, Tie-Yan Liu, Qiang Li, *Does Lorentz-symmetric design boost network performance in jet physics?*, arXiv:2208.07814, **Phys. Rev. D 109**, 056003 (2024).

[**45**]. Qilong Guo, Leyun Gao, Yajun Mao, Qiang Li, *Search for vector-like leptons at a Muon Collider*, arXiv:2304.01885, **Chin.Phys.C 47** (2023) 10, 103106.

[**44**]. Alim Ruzi, Sitian Qian, Tianyi Yang, Qiang Li, *Probing darK Matter Using free leptONs: PKMUON*, arXiv:2303.18117, **Int.J.Mod.Phys. A 38** (2023) 29n30, 2350154

[**43**]. Alim Ruzi, Sitian Qian, Tianyi Yang, Qiang Li, *Low Energy Neutrino and Mass Dark Matter Detection Using Freely Falling Atoms*, arXiv:2302.09874.

[**42**]. Jingshu Li, Wanyue Wang, Xunye Cai, Chuxue Yang, Meng Lu, Zhengyun You, Sitian Qian, Qiang Li, *A Comparative Study of Z mediated Charged Lepton Flavor Violation at future lepton colliders*, arXiv:2302.02203, **JHEP** 03 (2023) 190.

[**41**]. Alim Ruzi, Tianyi Yang, Dawei Fu, Sitian Qian, Leyun Gao, Qiang Li, *Collimated muon beam proposal for probing neutrino charge-parity violation*, arXiv:2301.02493, **Communications Physics 7**, 137 (2024).

[**40**]. Qiang Li, *Charged lepton flavor violation searches in the charmonium system* , arXiv:2211.10910, **Science China Physics, Mechanics & Astronomy** volume 66, Article number: 221031 (2023).

[**39**]. Dawei Fu, Alim Ruiz, Meng Lu, Qiang Li, *Meson Beams Through Energy- or Space-asymmetric Electron Positron Collisions*, arXiv:2211.05240, **Int.J.Mod.Phys. A 38** (2023) 04n05, 2350033.

[**38**]. Meng Lu, Qiang Li, Zhengyun You, Ce Zhang, *Richness out of smallness: a Possible Staged Blueprint on Future Colliders*, arXiv:2210.06690.

[**37**]. Sitian Qian, Tianyi Yang, Sen Deng, Jie Xiao, Leyun Gao, Andrew Michael Levin, Qiang Li, Meng Lu, Zhengyun You, *The physics case for neutrino neutrino collisions*, arXiv:2205.15350, **J. Phys. G 51** (2024) 4, 045005.

[**36**]. Tianyi Yang, Sitian Qian, Sen Deng, Jie Xiao, Leyun Gao, Andrew Michael Levin, Qiang Li, Meng Lu, Zhengyun You *The physics case for a neutrino lepton collider in light of the CDF W mass measurement*, arXiv:2204.11871, **Int.J.Mod.Phys. A 37** (2022) 35, 2245001.

[**35**]. Leyun Gao, Jing Peng, Zilin Dai, Sitian Qian, Tao Li, Qiang Li, Meng Lu, *Collider Animation with Event-time-frame Format* , arXiv:2109.14621, **Computer Physics Communications** 279 (2022) 108461.

[**34**]. Sitian Qian, Congqiao Li, Qiang Li, Fanqiang Meng, Jie Xiao, Tianyi Yang, Meng Lu, Zhengyun You, *Searching for heavy leptoquarks at a muon collider*, arXiv:2109.01265, **JHEP** 12 (2021) 047.

[**33**]. Tianyi Yang, Sitian Qian, Zhe Guan, Congqiao Li, Fanqiang Meng, Jie Xiao, Meng Lu, Qiang Li, *Longitudinally polarized ZZ scattering at the Muon Collider*, arXiv:2107.13581, **Phys. Rev. D** 104 (2021) 9, 093003.

[**32**]. Meng Lu, Andrew Michael Levin, Congqiao Li, Antonios Agapitos, Qiang Li, Fanqiang Meng, Sitian Qian, Jie Xiao, Tianyi Yang, *The physics case for an electron-muon collider*, **Adv.High Energy Phys. 2021** (2021) 6693618.

[**31**]. Congqiao Li, Ying An, Claude Charlot, Roberto Covarelli, Zhe Guan, Qiang Li, *Loop-induced ZZ production at the LHC: an improved description by matrix-element matching*, **Phys. Rev. D** (2020) no.102, 116003.

[**30**]. *Challenges in Monte Carlo event generator software for High-Luminosity LHC*, arXiv:2004.13687.

[**29**]. Junho Lee, Nicolas Chanon, Andrew Levin, Jing Li, Meng Lu, Qiang Li, Yajun Mao, *Polarization fraction measurement in ZZ scattering using deep learning*, **Phys. Rev. D** (2019) no.100, 116010.

[**28**]. Junho Lee, Nicolas Chanon, Andrew Levin, Jing Li, Meng Lu, Qiang Li, Yajun Mao, *Polarization fraction measurement in same-sign WW scattering using deep learning*, **Phys. Rev. D** (2019) no.3, 033004.

[**27**].*Standard Model Physics at the HL-LHC and HE-LHC*, arXiv:1902.04070.

[**26**].*Higgs Physics at the HL-LHC and HE-LHC*, arXiv:1902.00134.

[**25**].*Beyond the Standard Model Physics at the HL-LHC and HE-LHC*,

arXiv:1812.07831.

[**24**].*Opportunities in Flavour Physics at the HL-LHC and HE-LHC*, arXiv:1812.07638.

[**23**].*Precision Higgs Physics at CEPC*, arXiv:1810.09037.

[**22**]. Cheng Chen, Zhengwei Cui, Gang Li, Qiang Li, Manqi Ruan, Lei Wang, Qi-Shu Yan, *Hee at CEPC: ISR effect with MadGraph*, **J. Phys. G45** (2018) no.1, 015004.

[**21**]. Daneng Yang, Qiang Li, *Probing the Dark Sector through Mono-Z Boson Leptonic Decays*, **JHEP02** (2018) 090.

[**20**]. Zhenwei Cui, Gang Li, Qiang Li, Manqi Ruan, Lei Wang, Daneng Yang, *Measurement of $H\mu\mu$ production in association with a Z boson at the CEPC*, **Chin. Phys. C42** (2018) no.5, 053001.

[**19**]. Qin Qin, Qiang Li, Cai-Dian L, Fu-Sheng Yu, Si-Hong Zhou, *Charged lepton flavor violating Higgs decays at future ee colliders*, **Eur.Phys.J. C78** (2018) no.10, 835.

[**18**]. Christoph Englert, Qiang Li, Michael Spannowsky, Mengmeng Wang, Lei Wang, *VBS same-sign WWH production at the HL-LHC and a 100 TeV pp-collider*, **Int.J.Mod.Phys. A32** (2017) no.18, 1750106.

[**17**]. Xiaoran Zhao, Qiang Li, Zhao Li, Qi-Shu Yan, *Discovery potential of Higgs boson pair production through 4l+MET final states at a 100 TeV collider*, **Chin. Phys. C41** (2017) 023105.

[**16**]. Qiang Li, Zhao Li, Qi-Shu Yan, Xiaoran Zhao,
Probe Higgs boson pair production via the 3l2j + missing ET mode , **Phys. Rev. D 92**, 014015 (2015).

[**15**]. Yiwen Wen, Huilin Qu, Daneng Yang, Qi-shu Yan, Qiang Li, Yajun Mao, *Probing Triple-W Production and Anomalous WWWW Coupling at the CERN LHC and future 100TeV proton-proton collider*, **JHEP 1503** (2015) 025.

[**14**]. Qiang Li, Qi-Shu Yan, Xiaoran Zhao,
Higgs Pair Production: Improved Description by Matrix Element Matching, **Phys. Rev. D89**, 033015 (2014).

[**13**]. LHC Higgs Cross Section Working Group, *Handbook of LHC Higgs Cross Sections: 3. Higgs Properties* , [arXiv:1307.1347]

[**12**]. Ke Ye, Daneng Yang, Qiang Li, *The CERN LHC Sensitivity on measuring WZGamma Production and Anomalous WWZGamma Coupling*, **Phys. Rev. D88**, 015023 (2013).

[**11**]. K. Hagiwara, J. Kanzaki, Q. Li, N. Okamura, T. Stelzer, *Fast computation of MadGraph amplitudes on graphics processing unit (GPU)*, **Eur.Phys.J. C73** (2013) 2608.

[**10**]. Daneng Yang, Yajun Mao, Qiang Li, Shuai Liu, Zijun Xu, Ke Ye, *Probing $W^+W^-\gamma$ Production and Anomalous Quartic Gauge Boson Couplings at the CERN LHC*, **JHEP 1304 (2013) 108**.

[**9**]. LHC Higgs Cross Section Working Group, *Handbook of LHC Higgs Cross Sections: 2. Differential Distributions* , [arXiv:1201.3084]

[**8**]. Johan Alwall, Qiang Li and Fabio Maltoni, *Matched predictions for Higgs production via heavy-quark loops in the SM and beyond*, **Phys.Rev. D85** (2012) 01403.

[**7**]. Priscila de Aquino, Kaoru Hagiwara, Qiang Li and Fabio Maltoni, *Simulating graviton production at hadron colliders*, **JHEP 1106:132,2011**.

[**6**]. Qiang Li, Michael Spira, Jun Gao and Chong Sheng Li, *Higgs Boson Production via Gluon Fusion in the Standard Model with four Generations*, **Phys.Rev.D83:094018, 2011**.

[**5**]. Stefan Karg, Michael Kraemer,Qiang Li and Dieter Zeppenfeld, *NLO QCD corrections to graviton production at hadron colliders*, **Phys. Rev. D81**, 094036 (2010).

[**4**]. Kaoru Hagiwara, Qiang Li and Kentarou Mawatari, *Jet angular correlation in vector-boson fusion processes at hadron colliders*, **JHEP07**, 101 (2009).

[**3**]. Kaoru Hagiwara, Junichi Kanzaki, Qiang Li and Kentarou Mawatari, *HELAS and MadGraph MadEvent with spin-2 particles*, **EPJC 56**, 435 (2008). [arXiv:0805.2554]

[**2**]. Kaoru Hagiwara, Partha Konar, Qiang Li, Kentarou Mawatari and Dieter Zeppenfeld, *Graviton production with 2 jets at the LHC in large extra dimensions*, **JHEP 0804:019**. (2008).

[**1**]. B. Fuks, M. Klasen, F. Ledroit, Q. Li and J. Morel, *Precision predictions for Z'-production at the CERN LHC: QCD matrix elements, parton showers, and joint resummation*, **Nucl. Phys. B797**, 322 (2008).

Recent Presentations

[**T66**]. *Quantum Entanglement at the colliders*, TeV Physics Workshop, Qingdao, China, 10-12 Oct 2025.
[**T65**]. *Probing and Knocking with Muons*, NuFact 2025, Liverpool, UK, 1-6 Sep 2025.
[**T70**]. *Testing entanglement between free-traveling electron-positron or electron-muon pairs*, WQC Workshop on Quantum Entanglement of High Energy Particles, Shanghai, 19-23 July, 2025.
[**T69**]. *Various sides of bosons*, Seminar at Jianwei Forum, USTC, 13 June, 2025.
[**T68**]. *PKMu-HFRS: Probing and Knocking with a Gev Muon beam at the HIAF HFRS facility*,
International Workshop on Muon Physics at the Intensity and Precision Frontiers (MIP2025), Changsha, 16-20 May, 2025.
[**T67**]. *Multiboson Physics to Explore*, The 5th LHCb Physics Frontier workshop, Wuhan, 27 April, 2025.
[**T66**]. *Multiboson Physics to Explore*, Seminar at Zhengzhou Univ., April 24, 2025 .

[**T65**]. *Probing and Knocking with Muons for Dark Matter and others*, NuFact 2024, Argonne National Laboratory, US, 16-21 Sep 2024.
[**T64**]. *Electroweak Physics at the LHC*, Mudajiang Forum, HuHot, 6-10 Sep 2024.
[**T63**]. *A proposed PKU-Muon experiment for muon tomography and dark matter search (Poster)*, ICHEP2024, Prague, Czech, 18-24 Jul 2024.
[**T62**]. *ATLAS+CMS (+LHCb) SM Physics "Electroweak Physics, W,Z,VBS.."*, PASCOS2024, Quy Nhon, Viet Nam, 7-13 Jul 2024.
[**T61**]. *A proposed PKU-Muon experiment*, Tsung-Dao Lee Institute Seminar, Shanghai, China, 16 May, 2024.
[**T60**]. *A proposed PKU-Muon experiment*, Fudan Univ. Seminar, Shanghai, China, 15 May, 2024.
[**T59**]. *Search for Majorana Neutrinos at current and future Colliders*, COUSP2024, Xichang, China, 7-11 May, 2024.
[**T58**]. *A proposed PKU-Muon experiment for muon tomography and dark matter search*, COUSP2024, Xichang, China, 7-11 May, 2024.
[**T57**]. *Multiboson Physics Studies at the CERN LHC Experiment*, Hunan Normal University, China, 22 Dec. 2023.
[**T56**]. *Electroweak physics at the LHC (including top mass and top properties)*, DESY, Germany, ICFA Seminar 2023, 27 Nov.- 1 Dec. 2023.
[**T55**]. *Multiboson Physics Studies at the CERN LHC CMS Experiment*, Invited Seminar online at the Flavor Forum, China, 26 October 2023.
[**T54**]. *Multiboson Physics Studies at the CERN LHC CMS Experiment*, SJTU Invited Seminar, Shanghai, China, 20 October 2023.
[**T53**]. *Exotic collisions*, Nanjing Normal University Invited Seminar, China, 13 October 2023.
[**T52**]. *CP violation in SM diboson measurement*, USTC, Hefei, China,
Workshop on FIND CP violation at electroweak scale and beyond, 26-27 August 2023.
[**T51**]. *CMS Software and Computing*, Shanghai, China,
Workshop on Computation in Experimental Particle Physics, 15-18 July 2023.
[**T50**]. *Multiboson measurements*, Belgrade, Serbia,
11th Edition of the Large Hadron Collider Physics Conference, 22-26 May 2023.
[**T49**]. *Neutrino Physics at or from a Muon Collider*, Shang Hai,
Workshop on Muon Physics at the Intensity and Precision Frontiers (MIP 2023), 15-16 April 2023.
[**T48**]. *Study Neutrinos at Future Muon Collider*, Hong Kong,
IAS High Energy Physics 2023, 12-16 Feb 2023.
[**T47**]. *Possible intermediate steps towards a Muon collider*, CERN (online),
The first Collaboration Meeting of the Muon Collider Study, 11-14 Oct 2022.
[**T46**]. *TeV Physics Progress*, Dalian (online), The 11th HEP China Conference, 8 Aug 2022.
[**T45**]. *W-Boson Scattering and Interactions at the LHC-CMS experiment- Qiang li*, Guangzhou (online), The 3rd Workshop on Frontiers of Particle Physics, 22 July 2022.
[**T44**]. *Richness out of Smallness: from neutrino neutrino, neutrino lepton, electron muon, to muon muon collisions*, Jilin (online), Invited Seminar, 29 June 2022.

[**T43**]. *The Physics case for a neutrino lepton collider in light of the CDF W mass measurement*, Beijing (online), 25th Mini-workshop on the frontier of LHC, 7 May 2022.

[**T42**]. *W related Physics from the CMS experiment*, Beijing (online), W mass Workshop, 14 April 2022.

[**T41**]. *Boosted technique for Higgs measurement and New Physics Searches*, Nanjing, Higgs potential and BSM opportunity, 27-31 August 2021.

[**T40**]. *MC tools*, Qingdao, The Collider Phenomenology Summer School 2021, 2 July 2021.

[**T39**]. *Machine Learning*, The MCnet Beijing School 2021, 2 July 2021.

[**T38**]. Boson Scattering and Interactions at the LHC CMS experiment and beyond, SJTU and T.D.Lee Institute, Shanghai, 13 May 2021.

[**T37**]. *The Physics Potential of an electron muon collider*, Nanjing Normal University, Seminar, 13 Nov 2020.

[**T36**]. *Standard Model test and New Physics search at colliders*, Weidian Forum, 16 Oct 2020.

[**T35**]. *New results from searches with highly boosted Higgs and vector bosons*, Boost2019: 11th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP, 21-26 Jul 2019, Cambridge, MA, United States.

[**T34**]. *Boosted Multi-bosons*, the 23rd LHC Mini-workshop, 17-20 May 2019, Chongqing.

[**T33**]. *Event Generation at CMS*, HFT2019: CMS Heavy flavour tagging workshop 2019, 30 Apr-3 May 2019, IUC, Dubrovnik, Croatia.

[**T32**]. *MC Production and Modelling at CMS*, 14th Workshop on TeV Physics, 19-22 April 2019, Nanjing.

[**T31**]. *Recent results from the LHC and future plans*, BrAinstorming on paRticle physics and Astrophysics phenoMenology, 21-23 Mar 2018, Jeju-do, Korea.

[**T30**]. *Recent EW Measurements from LHC*, CPS Fall Meeting, Sep. 2017, Chengdu.

[**T29**]. *Electroweak Measurements from LHC and Past Experiments*, The 28th International Symposium on Lepton Photon Interactions at High Energies, 07-12 Aug, 2017, Guangzhou.

[**T28**]. *Moriond 2017 Results on New Physics Searches*, LHC Mini-workshop, 08 April 2017, ITP, Beijing.

[**T27**]. *Search for particles beyond the Standard Model*, 12th national conference on particle physics,PIC2016: XXXVI Physics in Collision, 13-17 Sep 2016, Vinh Quy Nhon (Viet Nam)

[**T26**]. *Search for massive WW and WH resonances in semi-leptonic channel at sqrt(s) = 8 TeV with CMS detector*, 12th national conference on particle physics, 22-26 Aug

2016, Hefei, China

[**T25**]. *Vector boson scattering and fusion results from ATLAS and CMS*, LHCP2016: Fourth annual Large Hadron Collider Physics, 13-18 Jun 2016, Lund University, Lund (Sweden)

[**T24**]. *Exotica Searches at the LHC*, the 1st Chinese LHC Physics Conference (CLHCP), 21 Dec. 2015, USTC, Hefei, China

[**T23**]. *Multi-boson Physics at CMS*, Mudanjiang Forum, 15 Oct. 2015, Luoyang, China

[**T22**]. *Diboson resonance searches at CMS*, East China Particle Physics Working Group, 25 Septemper, 2015, Hangzhou, China

[**T21**]. *Searches for new resonances in lepton+jets, lepton+photon and jets+photon final states*, LHCP2015: The 3rd Conference on Large Hadron Collider Physics, 31 Aug-5 Sep 2015, Saint Petersburg (Russian Federation).

[**T20**]. *Generator for Experimental Usage*, 2nd International Summer school on TeV Experimental Physics (iSTEP), Aug. 2015, Shandong Univ., China.

[**T19**]. *Hints from Run 1 and Prospects from Run 2 at CMS*, PPC2015: IX International Conference on Interconnections between Particle Physics and Cosmology, 28 Jun-3 Jul 2015, Dakota State University, Deadwood, SD (United States).

[**T18**]. *WH resonance search in boosted region*, the 14th LHC mini-workshop, 24 April, 2015, Yantai, China.

[**T17**]. *Searching for WH resonance at CMS*, FCPPL 2015, 8 April, 2015, Hefei, USTC, China.

[**T16**]. *CEPC MC group working report*, CEPC2014, Oct. 2014, SJTU, Shanghai, China.

[**T15**]. *Tutorial: MC Sample Analysis: Event generation, Background rejection and Signal selection*, International Summer school on TeV Experimental Physics (iSTEP), 2014, Beijing, China.

[**T14**]. *Anomalous Quartic Gauge Coupling at the LHC*, TeV Physics Workshop, 16 May. 2014, Guangzhou, China.

[**T13**]. *Multi-boson production at the LHC*, LHC Workshop, 2 May. 2014, KNU, Korea.

[**T12**]. *Jet Parton Matching*, the HEP Computing Min-Workshop, 30 Nov. 2013, CHEP, PKU, Beijing.

[**T11**]. *Salon Talk: Higgs Discovery at the LHC*, The IOP Young Scientists Symposium 2013 Fall Session, 25-26 Oct. 2013, Institute of Physics Chinese Academy of Sciences, Beijing.

[**T10**]. *Multiboson production and searches for anomalous gauge couplings at CMS*, the 10th LHC mini-workshop, Wuhan, Hubei province, China, 10.12.2013.

[**T9**]. *Multiboson production and searches for anomalous gauge couplings at CMS*,

WIN2013: XXIV Workshop on Weak Interactions and Neutrinos, 16-21 Sep. 2013, Natal, Brazil.
[**T8**]. *High Mass EXO-VV/HH/VH Resonance Searches with Jet-Substructure*, CMS Week 2013, 9-13 Sep. 2013, Taipei, Taiwan.
[**T7**]. *Searching for new physics with Jet substructure in CMS*, TeV Physics Working Group Meeting, Dalian, China, 08.22.2013.
[**T6**]. *Searching for Heavy Higgs boson in H to WW to lv+Fat-Jet* , the 9th LHC mini-workshop, Xinxiang, Henan province, China, 06.29.2013.

[**T5**]. *Probing WWA and WZA production and related anomalous quartic couplings at 14TeV LHC*, Snowmass EWK Group Meeting, 06.12.2013.

[**T4**]. *Moriond 2013 Results*, the 8th mini workshop on the frontier of LHC, Hangzhou, China, 03.25.2013.

[**T3**]. *First studies of reweighting for interference in HWW*, Heavy Higgs meeting, CERN,12.10.2012.

[**T2**]. *ICHEP 2012 Results*, the 6th mini workshop on the frontier of LHC, Beijing, China, 08.2012.

[**T1**]. *125 GeV Higgs-like boson discovery*, KIAA, PKU, 09.07.2012.