

# CURRICULUM VITÆ

## Zhongbo Kang

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I am an Assistant Professor in Department of Physics and Astronomy at University of California Los Angeles (UCLA), and also an affiliated Staff Scientist in Theoretical Division (Group T-2: Nuclear and Particle Physics, Astrophysics and Cosmology) at Los Alamos National Laboratory (LANL). My research interests are primarily in Quantum Chromodynamics (QCD) and strong interaction, and their applications in high energy nuclear and particle physics. The main research efforts have been focused on: (1) QCD structure of the nucleon and spin physics, (2) Perturbative QCD and effective field theory in high energy physics, (3) Hard scattering in nucleus and heavy ion collisions. My work is closely connected to the experimental programs at the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory, Jefferson Lab, the Large Hadron Collider (LHC) at CERN in Europe, as well as the future Electron Ion Collider (EIC) in US, recently recommended as a highest priority in U.S. Department of Energy's 2015 Long Range Plan for Nuclear Science.

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## Education

Ph.D., Theoretical Nuclear Physics, August 2009

Department of Physics and Astronomy, Iowa State University, Ames, Iowa, USA

– Thesis: “*QCD quantum correlation and multi-parton dynamics*”

– Supervisor: Prof. Jian-Wei Qiu

M.S., Theoretical Physics, July 2003

Institute of Particle Physics, Central China Normal University, Wuhan, China

B.S., Physics, July 2001

Department of Physics, Central China Normal University, Wuhan, China

## Professional Experience

### Positions held

Assistant Professor, November 2016 – present

Department of Physics and Astronomy

University of California Los Angeles

Staff Scientist (level 3, affiliated), February 2016 – present

Theoretical Division, Los Alamos National Laboratory

J. Robert Oppenheimer Fellow, March 2013 – February 2016

Theoretical Division, Los Alamos National Laboratory

Director's Postdoctoral Fellow, April 2012 – February 2013  
Theoretical Division, Los Alamos National Laboratory

Research Associate, September 2009 – April 2012  
RIKEN BNL Research Center, Brookhaven National Laboratory

### Other professional activities

Seminar organizer for group T-2, June 2013 – August 2015  
Group T-2 (Nuclear and Particle Physics, Astrophysics and Cosmology), Theoretical Division, Los Alamos National Laboratory

Organizer for RIKEN lunch seminar, September 2011 – March 2012  
RIKEN BNL Research Center, Brookhaven National Laboratory

Member of Nuclear Theory / RIKEN seminar committee, October 2010 – September 2011  
Physics Department, Brookhaven National Laboratory

Visiting Scholar, March 31 – April 29, 2011  
Theoretical Division (T-2), Los Alamos National Laboratory

Visiting Scholar, October 11–23, 2009, and March 20–25, 2011  
Nuclear Theory Group, Lawrence Berkeley National Laboratory

## Funding

1. Principle Investigator (PI) for the LANL LDRD ER project “Shining light on the dense gluon structure of large nuclei”, \$320K/year, October 2015 – September 2018, Los Alamos National Laboratory
2. Co-PI for the LANL LDRD ER project “Direct search for dark photons produced in proton-nucleus collisions at Fermilab”, \$350K/year, October 2015 – September 2018, Los Alamos National Laboratory
3. Co-Investigator of the LANL LDRD DR project “Probing quark-gluon plasma with bottom quark jets at sPHENIX”, \$1.65M/year, October 2016 – September 2019, Los Alamos National Laboratory
4. LANL LDRD project “Theoretical investigation of nucleon and nuclear structure at very high energies”, \$200K/year, Los Alamos National Laboratory  
August 2015 – March 2016 as Principle Investigator, March 2013 – July 2015 as Co-Investigator
5. Co-Investigator of the LANL LDRD DR project “Illuminating the Origin of the Nucleon Spin”, \$1.8M/year, October 2012 – September 2016, Los Alamos National Laboratory

## Advisees

Postdocs and students I am working with and/or have worked with closely:

### Current

- ◇ John Terry, graduate student (03/2017 – present), UCLA
- ◇ Jaroslav Balitsky, graduate student (12/2016 – present), UCLA
- ◇ Manvir Grewal, undergraduate student (04/2017 – present), UCLA

- ◇ George Chen, undergraduate student (04/2017 – present), UCLA
- ◇ Cindy Ling, undergraduate student (05/2017 – present), UCLA
- ◇ Dr. Shinsuke Yoshida, Director’s postdoctoral fellow (08/2016 – present), Los Alamos National Laboratory, USA
  - mainly on spin physics and hadron structure

## Past

- ◇ Dr. Felix Ringer, postdoc (07/2015 – 03/2017), Los Alamos National Laboratory, USA
  - mainly on QCD resummation and effective field theory techniques, now a postdoctoral research associate at Lawrence Berkeley National Laboratory
- ◇ Dr. Hongxi Xing, postdoc (09/2013 – 09/2016), Los Alamos National Laboratory, USA
  - mainly on hard scattering in nucleus and heavy ion collisions, now a postdoctoral research associate at Northwestern University/Argonne National Laboratory
- ◇ Mr. Sifu Luo, master’s student (09/2014 – 07/2016), Central China Normal University, China
  - on bottom jets and jet substructure through Pythia and FastJet, moved to Texas A&M University in 08/2016 to pursue a PhD degree through a distinguished graduate fellowship

## Community Service

### Grant reviewer

U.S. Department of Energy, Advanced Scientific Computing Research (ASCR) Leadership Computing Challenge (related to nuclear physics), 2015 – present

### Journal referee

Physical Review Letters

Physical Review C

Physical Review D

Physics Letters B

Nuclear Physics A

Nuclear Physics B

Progress in Particle and Nuclear Physics

Journal of Physics G

European Physical Journal A

Advances in High Energy Physics

International Journal of Modern Physics E

New Journal of Physics

### Committee work

1. Member of the Writing Group: “The RHIC cold QCD Plan for 2017 to 2023: A portal to the EIC”, submitted to the Office of Nuclear Physics, Office of Science, Department of Energy, charged by Dr. Berndt Mueller, Associate Laboratory Director for Nuclear & Particle Physics at Brookhaven National Laboratory, 2015, arXiv:1602.03922 [nucl-ex].
2. Member of the Community White Paper Writing Group: “The RHIC Spin Program: Achievements and Future Opportunities”, submitted to 2014-2015 Nuclear Science Advisory Committee Long Range Plan Working Group, 2014, arXiv:1501.01220 [nucl-ex].
3. Member of the Community White Paper Writing Group: “Study of Fragmentation Functions in  $e^+e^-$  Annihilation”, submitted to 2014-2015 Nuclear Science Advisory Committee Long Range Plan Working Group, 2014.
4. Member of the Community White Paper Writing Group: “The RHIC Spin Program: Achievements and Future Opportunities”, submitted to the Tribble Panel of Nuclear Science Advisory Committee, 2012, arXiv:1304.0079 [nucl-ex].

### Conference organization

1. Co-convener on “Phenomenology and new observables”, Electron Ion Collider User Group Meeting 2017, Trieste, Italy, July 18–22, 2017.  
<http://eicug2017.ts.infn.it/>
2. Co-organizer of QCD Evolution Workshop 2017, Jefferson Lab, Newport News, VA, May 22–26, 2017.  
<https://www.jlab.org/conferences/qcd-evolution2017/index.html>
3. Co-organizer of Topical Workshop on QCD Structure of Nucleons in the Modern Era, University of California, Los Angeles, CA, May 4–6, 2017.  
<http://indico.hep.anl.gov/indico/event/TMD-UCLA>
4. Co-organizer of QCD Chirality Workshop 2017, University of California, Los Angeles, CA, March 27–30, 2017.  
<http://starmetings.physics.ucla.edu/>
5. Co-convener on “Spin and 3D Structure”, 25th International Workshop on Deep Inelastic Scattering and Related Topics (DIS 2017), Birmingham, UK, April 3–7, 2017.  
<http://www.ep.ph.bham.ac.uk/DIS2017/>
6. Co-organizer of Santa Fe Jets and Heavy Flavor 2017 Workshop, Santa Fe, NM, February 13–15, 2017.  
<http://indico.fnal.gov/event/sfjet17>
7. Local Program Committee member, 22nd International Symposium on Spin Physics (SPIN 2016), Urbana-Champaign, IL, September 25–30, 2016.  
<http://www.indiana.edu/~spin2016/>
8. Co-organizer of QCD Evolution 2016 Workshop, National Institute for Subatomic Physics (Nikhef), Amsterdam, May 30–June 3, 2016.  
<https://indico.nikhef.nl/conferenceDisplay.py?confId=191>
9. Co-organizer of Santa Fe Jets and Heavy Flavor 2016 Workshop, Santa Fe, NM, January 11–13, 2016.  
<http://indico.fnal.gov/event/sfjet16>

10. Co-chair of QCD Evolution 2015 Workshop, Jefferson Lab, Newport News, VA, May 26–30, 2015.  
<http://www.jlab.org/conferences/qcd-evolution2015/>
11. Co-organizer of XIIth Annual Workshop on Soft-Collinear Effective Theory (SCET 2015), Santa Fe, NM, March 25–27, 2015.  
<http://www.cvent.com/d/v4qt93>
12. Co-organizer of Informal Pre-Town Meeting at JLab, Jefferson Lab, Newport News, VA, August 13–15, 2014.  
<http://www.jlab.org/conferences/pretownjlab2014/>
13. Co-chair of QCD Evolution 2014 Workshop, Jointly organized by Los Alamos National Laboratory and Jefferson Lab, Santa Fe, NM, May 12–16, 2014.  
<http://www.jlab.org/conferences/qcd2014/>
14. Co-convenor of Berkeley Summer Program 2013, QCD Landscape of the Nucleon and Atomic Nuclei, Lawrence Berkeley National Laboratory, Berkeley, CA, August 12–16, 2013.  
<https://sites.google.com/a/lbl.gov/berkeley-summer-program/>
15. Co-convenor of QCD Evolution Workshop 2013, Jefferson Lab, Newport News, VA, May 6–10, 2013.  
<http://www.jlab.org/conferences/qcd2013/index.html>
16. International coordinator for Frontier Physics Working Month 2013, Center for High-Energy Physics (Director: Professor T. D. Lee), Peking University, China, May 27 – June 28, 2013.
17. Co-organizer of Frontier Physics Working Month 2012, Center for High-Energy Physics (Director: Professor T. D. Lee), Peking University, China, August 13 – September 14, 2012.  
<http://rhep.pku.edu.cn/workshop/fpwm2012/>
18. Co-convenor of QCD Evolution Workshop 2012, Jefferson Lab, Newport News, VA, May 14–17, 2012.  
<http://www.jlab.org/conferences/qcd2012/index.html>
19. Co-organizer of RIKEN BNL Research Center Workshop: Opportunities for Drell-Yan Physics at RHIC, Brookhaven National Laboratory, Upton, NY, May 11–13, 2011.  
<http://www.bnl.gov/dpworkshop/>

## Outreach

1. Serve as a faculty member for Joint Research Institute in Science and Engineering by Peking University and UCLA, since March 2017.
2. Poster judge, 13th Annual Student Symposium – “Championing Scientific Careers”, undergraduate students, Los Alamos National Laboratory, Los Alamos, NM, July 26, 2013.

## Teaching Experience

1. Physics 124: A Modern Introduction to Nuclear Physics (Senior elective), fall quarter 2017.
2. Physics 124: Nuclear Physics (Senior elective), UCLA, winter quarter 2017.
3. Invited lectures on “Introduction to pQCD and TMD physics” (four one-hour lectures), Spinfest 2016, University of California, Riverside, CA, July 25–26, 2016.
4. Invited lectures on “QCD structure of the nucleon and spin physics” (six one-hour lectures), The 30th Annual Hampton University Graduate Studies Program (HUGS 2015 Summer School), organized by Jefferson Lab, Newport News, VA, June 1–19, 2015.

5. Invited lectures on “Introduction to pQCD and jets” (three one-hour lectures), DOE JET Topical Collaboration Summer School, University of California, Davis, CA, June 19–21, 2014.
6. Invited lectures on “QCD and transverse spin physics” (five one-hour lectures), PHENIX Spin Work Fest 2012 Summer School, organized by PHENIX experimental collaboration at RHIC at Brookhaven National Laboratory, University of New Mexico, Albuquerque, NM, July 9–13, 2012.
7. Teaching Assistant, recitation, General Physics, Iowa State University, Spring 2007, Summer 2008.
8. Teaching Assistant, Introductory Physics Laboratories in both general and classical physics, Iowa State University, Fall 2003, Spring 2004, Spring 2007.
9. Teaching Assistant, first-year graduate course “Advanced Electricity and Magnetism”, Iowa State University, Fall 2004, Spring 2005.
10. Instructor for first-year graduate course “Advanced Quantum Mechanics”, Central China Normal University, Wuhan, China, Spring 2002.

## Awards, Honors and Memberships

### Awards

J. Robert Oppenheimer Fellowship  
Los Alamos National Laboratory, March 2013 – February 2016

Excellence in Peer Review  
Nuclear Physics A, 2013 and 2014

Director’s Postdoctoral Fellowship  
Los Alamos National Laboratory, April 2012 – February 2013

Frontier Physics Working Month Fellowship  
Center for High Energy Physics (Director: Professor T. D. Lee), Peking University, Beijing, China, 2012

Named one of the most valued reviewers of 2011  
Nuclear Physics A, 2012

Our work on spin physics has been selected as research highlight by RIKEN  
RIKEN, Japan, February 2012  
See links at [riken.jp](http://riken.jp) and [phys.org](http://phys.org)

G. W. Fox Memorial Award for excellence in research  
Iowa State University, 2009

### Honorary Society

Golden Key International Honor Society, 2008

The Honor Society of Phi Kappa Phi, 2007

### Membership

Member of the American Physical Society (APS), 2007 – Present

## Publications

### Letters (PRL, PLB, and Rapid Communications)

1. “ $J/\psi$  production and polarization within a jet”  
Z. B. Kang, J. W. Qiu, F. Ringer, H. Xing and H. Zhang, arXiv:1702.03287 [hep-ph], *Phys. Rev. Lett.*, in press.
2. “Jet quenching phenomenology from soft-collinear effective theory with Glauber gluons”  
Z. B. Kang, R. Lashof-Regas, G. Ovanesyan, P. Saad and I. Vitev, *Phys. Rev. Lett.* **114**, 092002 (2015) [arXiv:1405.2612 [hep-ph]].
3. “Next-to-leading order forward hadron production in the small- $x$  regime: the role of rapidity factorization”  
Z. B. Kang, I. Vitev and H. Xing, *Phys. Rev. Lett.* **113**, 062002 (2014) [arXiv:1403.5221 [hep-ph]].
4. “Next-to-leading order QCD factorization for semi-inclusive deep inelastic scattering at twist-4”  
Z. B. Kang, E. Wang, X. N. Wang and H. Xing, *Phys. Rev. Lett.* **112**, 102001 (2014) [arXiv:1310.6759 [hep-ph]].
5. “Indication on the process-dependence of the Sivers effect”  
L. Gamberg, Z. B. Kang and A. Prokudin, *Phys. Rev. Lett.* **110**, 232301 (2013) [arXiv:1302.3218 [hep-ph]].
6. “Heavy quarkonium production and polarization”  
Z. B. Kang, J. W. Qiu and G. Sterman, *Phys. Rev. Lett.* **108**, 102002 (2012) [arXiv:1109.1520 [hep-ph]].
7. “QCD resummation for single spin asymmetries”  
Z. B. Kang, B. W. Xiao and F. Yuan, *Phys. Rev. Lett.* **107**, 152002 (2011) [arXiv:1106.0266 [hep-ph]].
8. “Quark fragmentation in the  $\theta$ -vacuum”  
Z. B. Kang and D. E. Kharzeev, *Phys. Rev. Lett.* **106**, 042001 (2011) [arXiv:1006.2132 [hep-ph]].
9. “Test of the Universality of Naive-time-reversal-odd Fragmentation Functions”  
D. Boer, Z. B. Kang, W. Vogelsang and F. Yuan, *Phys. Rev. Lett.* **105**, 202001 (2010) [arXiv:1008.3543 [hep-ph]].
10. “Test the time-reversal modified universality of the Sivers function”  
Z. B. Kang and J. W. Qiu, *Phys. Rev. Lett.* **103**, 172001 (2009) [arXiv:0903.3629 [hep-ph]].
11. “Phenomenological constraints on  $A_N$  in  $p^\uparrow p \rightarrow \pi X$  from Lorentz invariance relations”  
L. Gamberg, Z. B. Kang, D. Pitonyak and A. Prokudin, *Phys. Lett. B* **770**, 242 (2017) [arXiv:1701.09170 [hep-ph]].
12. “Inclusive production of small radius jets in heavy-ion collisions”  
Z. B. Kang, F. Ringer and I. Vitev, *Phys. Lett. B* **769**, 242 (2017) [arXiv:1701.05839 [hep-ph]].
13. “Unveiling the nucleon tensor charge at Jefferson Lab: A study of the SoLID case”  
Z. Ye, N. Sato, K. Allada, T. Liu, J. P. Chen, H. Gao, Z. B. Kang *et al.*, *Phys. Lett. B* **767**, 91 (2017) [arXiv:1609.02449 [hep-ph]].
14. “Photon-tagged and B-meson-tagged b-jet production at the LHC”  
J. Huang, Z. B. Kang, I. Vitev and H. Xing, *Phys. Lett. B* **750**, 287 (2015) [arXiv:1505.03517 [hep-ph]].

15. “Quasi-parton distribution functions: a study in the diquark spectator model”  
L. Gamberg, Z. B. Kang, I. Vitev and H. Xing, *Phys. Lett. B* **743**, 112 (2015) [arXiv:1412.3401 [hep-ph]].
16. “Multiple scattering effects on heavy meson production in p+A collisions at backward rapidity”  
Z. B. Kang, I. Vitev, E. Wang, H. Xing and C. Zhang, *Phys. Lett. B* **740**, 23 (2015) [arXiv:1409.2494 [hep-ph]].
17. “Inclusive b-jet production in heavy ion collisions at the LHC”  
J. Huang, Z. B. Kang and I. Vitev, *Phys. Lett. B* **726**, 251 (2013) [arXiv:1306.0909 [hep-ph]].
18. “Nuclear modification of vector boson production in proton-lead collisions at the LHC”  
Z. B. Kang and J. W. Qiu, *Phys. Lett. B* **721**, 277 (2013) [arXiv:1212.6541 [hep-ph]].
19. “Nuclear modification of high transverse momentum particle production in p+A collisions at RHIC and LHC”  
Z. B. Kang, I. Vitev and H. Xing, *Phys. Lett. B* **718**, 482 (2012) [arXiv:1209.6030 [hep-ph]].
20. “Single transverse spin asymmetry of prompt photon production”  
L. Gamberg and Z. B. Kang, *Phys. Lett. B* **718**, 181 (2012) [arXiv:1208.1962 [hep-ph]].
21. “QCD evolution of naive-time-reversal-odd parton distribution functions”  
Z. B. Kang and J. W. Qiu, *Phys. Lett. B* **713**, 273 (2012) [arXiv:1205.1019 [hep-ph]].
22. “Testing the process dependence of the Sivers function via hadron distributions inside a jet”  
U. D’Alesio, L. Gamberg, Z. B. Kang, F. Murgia and C. Pisano, *Phys. Lett. B* **704**, 637 (2011) [arXiv:1108.0827 [hep-ph]].
23. “Process-dependent Sivers function and implication for single spin asymmetry in inclusive hadron production”  
L. Gamberg and Z. B. Kang, *Phys. Lett. B* **696**, 109 (2011) [arXiv:1009.1936 [hep-ph]].
24. “Positivity bounds for Sivers functions”  
Z. B. Kang and J. Soffer, *Phys. Lett. B* **695**, 275 (2011) [arXiv:1003.4913 [hep-ph]].
25. “Twist-three fragmentation function contribution to the single spin asymmetry in  $pp$  collisions”  
Z. B. Kang, F. Yuan and J. Zhou, *Phys. Lett. B* **691**, 243 (2010) [arXiv:1002.0399 [hep-ph]].
26. “Nucleon Tensor Charge from Collins Azimuthal Asymmetry Measurements”  
Z. B. Kang, A. Prokudin, P. Sun and F. Yuan, *Phys. Rev. D* **91**, 071501(R) (2015) [arXiv:1410.4877 [hep-ph]].

### Regular articles

27. “Collins azimuthal asymmetries of hadron production inside jets”  
Z. B. Kang, A. Prokudin, F. Ringer and F. Yuan, arXiv:1706.xxxxx [hep-ph], to appear soon.
28. “The transverse momentum distribution of hadrons within jets”  
Z. B. Kang, X. Liu, F. Ringer and H. Xing, arXiv:1705.08443 [hep-ph], submitted to JHEP.
29. “The Energy Distribution of Subjets and the Jet Shape”  
Z. B. Kang, F. Ringer and W. J. Waalewijn, arXiv:1705.05375 [hep-ph], submitted to JHEP.
30. “Vector boson-tagged jet production in heavy ion collisions at the LHC”  
Z. B. Kang, I. Vitev and H. Xing, arXiv:1702.07276 [hep-ph], *Phys. Rev. C.*, in press.
31. “Effective field theory approach to open heavy flavor production in heavy-ion collisions”  
Z. B. Kang, F. Ringer and I. Vitev, *JHEP* **1703**, 146 (2017) [arXiv:1610.02043 [hep-ph]].



32. “Jet substructure using semi-inclusive jet functions within SCET”  
Z. B. Kang, F. Ringer and I. Vitev, *JHEP* **1611**, 155 (2016) [arXiv:1606.07063 [hep-ph]].
33. “The semi-inclusive jet function in SCET and small radius resummation for inclusive jet production”  
Z. B. Kang, F. Ringer and I. Vitev, *JHEP* **1610**, 125 (2016) [arXiv:1606.06732 [hep-ph]].
34. “Predictions for  $p$ +Pb collisions at  $\sqrt{s_{NN}} = 5$  TeV: comparison with data”  
J. L. Albacete *et al.*, *Int. J. Mod. Phys. E* **25**, 1630005 (2016) [arXiv:1605.09479 [hep-ph]].
35. “Next-to-leading order transverse momentum broadening for Drell-Yan production in p+A collisions”  
Z. B. Kang, J. W. Qiu, X. N. Wang and H. Xing, *Phys. Rev. D* **94**, 074038 (2016) [arXiv:1605.07175 [hep-ph]].
36. “Jet fragmentation functions in proton-proton collisions using soft-collinear effective theory”  
Y. T. Chien, Z. B. Kang, F. Ringer, I. Vitev and H. Xing, *JHEP* **1605**, 125 (2016) [arXiv:1512.06851 [hep-ph]].
37. “Spin asymmetries for vector boson production in polarized p+p collisions”  
J. Huang, Z. B. Kang, I. Vitev and H. Xing, *Phys. Rev. D* **93**, 014036 (2016) [arXiv:1511.06764 [hep-ph]].
38. “Jet quenching from QCD evolution”  
Y. T. Chien, A. Emerman, Z. B. Kang, G. Ovanessian and I. Vitev, *Phys. Rev. D* **93**, 074030 (2016) [arXiv:1509.02936 [hep-ph]].
39. “Initial-state cold nuclear matter energy loss effects on inclusive jet production in p+A collisions at RHIC and LHC”  
Z. B. Kang, I. Vitev and H. Xing, *Phys. Rev. C* **92**, 054911 (2015) [arXiv:1507.05987 [hep-ph]].
40. “Extraction of quark transversity distribution and Collins fragmentation functions with QCD evolution”  
Z. B. Kang, A. Prokudin, P. Sun and F. Yuan, *Phys. Rev. D* **93**, 014009 (2016) [arXiv:1505.05589 [hep-ph]].
41. “Transverse momentum broadening in semi-inclusive deep inelastic scattering at next-to-leading order”  
Z. B. Kang, E. Wang, X. N. Wang and H. Xing, *Phys. Rev. D* **94**, 114024 (2016) [arXiv:1409.1315 [hep-ph]].
42. “Hadronic production of  $W$  and  $Z$  bosons at large transverse momentum”  
E. L. Berger, J. Gao, Z. B. Kang, J. W. Qiu and H. Zhang, *Phys. Rev. D* **91**, 113001 (2015) [arxiv:1503.08836 [hep-ph]].
43. “Heavy quarkonium production at collider energies: partonic cross sections and polarization”  
Z. B. Kang, Y. Q. Ma, J. W. Qiu and G. Sterman, *Phys. Rev. D* **91**, 014030 (2015) [arXiv:1411.2456 [hep-ph]].
44. “Next-to-leading order transverse momentum-weighted Sivvers asymmetry in semi-inclusive deep inelastic scattering: the role of the three-gluon correlator”  
L. Y. Dai, Z. B. Kang, A. Prokudin and I. Vitev, *Phys. Rev. D* **92**, 114024 (2015) [arXiv:1409.5851 [hep-ph]].
45. “Left-right spin asymmetry in  $\ell N^\uparrow \rightarrow h X$ ”  
L. Gamberg, Z. B. Kang, A. Metz, D. Pitonyak and A. Prokudin, *Phys. Rev. D* **90**, 074012 (2014) [arXiv:1407.5078 [hep-ph]].

46. “QCD evolution of the Sivers asymmetry”  
M. G. Echevarria, A. Idilbi, Z. B. Kang and I. Vitev, *Phys. Rev. D* **89**, 074013 (2014) [arXiv:1401.5078 [hep-ph]].
47. “Heavy quarkonium production at collider Energies: factorization and evolution”  
Z. B. Kang, Y. Q. Ma, J. W. Qiu and G. Sterman, *Phys. Rev. D* **90**, 034006 (2014) [arXiv:1401.0923 [hep-ph]].
48. “The 1-Jettiness DIS event shape: NNLL + NLO results”  
Z. B. Kang, X. Liu and S. Mantry, *Phys. Rev. D* **90**, 014041 (2014) [arXiv:1312.0301 [hep-ph]].
49. “Quarkonium production in high energy proton-nucleus collisions: CGC meets NRQCD”  
Z. B. Kang, Y. Q. Ma and R. Venugopalan, *JHEP* **1401**, 056 (2014) [arXiv:1309.7337 [hep-ph]].
50. “Multiple scattering effects on inclusive particle production in the large- $x$  regime”  
Z. B. Kang, I. Vitev and H. Xing, *Phys. Rev. D* **88**, 054010 (2013) [arXiv:1307.3557 [hep-ph]].
51. “Probing nuclear dynamics in jet production with a global event shape”  
Z. B. Kang, X. Liu, S. Mantry and J. W. Qiu, *Phys. Rev. D* **88**, 074020 (2013) [arXiv:1303.3063 [hep-ph]].
52. “Predictions for p+Pb Collisions at  $\sqrt{s_{NN}} = 5$  TeV”  
J. L. Albacete *et al.*, *Int. J. Mod. Phys. E* **22**, 1330007 (2013) [arXiv:1301.3395 [hep-ph]].
53. “Sivers asymmetry of Drell-Yan production in small- $x$  regime”  
Z. B. Kang and B. W. Xiao, *Phys. Rev. D* **87**, 034038 (2013) [arXiv:1212.4809 [hep-ph]].
54. “Transverse momentum-weighted Sivers asymmetry in semi-inclusive deep inelastic scattering at next-to-leading order”  
Z. B. Kang, I. Vitev and H. Xing, *Phys. Rev. D* **87**, 034024 (2013) [arXiv:1212.1221 [hep-ph]].
55. “Transverse momentum imbalance of back-to-back particle production in p+A and e+A collisions”  
H. Xing, Z. B. Kang, I. Vitev and E. Wang, *Phys. Rev. D* **86**, 094010 (2012) [arXiv:1206.1826 [hep-ph]].
56. “ $N$ -Jettiness as a probe of nuclear dynamics”  
Z. B. Kang, S. Mantry and J. W. Qiu, *Phys. Rev. D* **86**, 114011 (2012) [arXiv:1204.5469 [hep-ph]].
57. “Global fitting of single spin asymmetry: an attempt”  
Z. B. Kang and A. Prokudin, *Phys. Rev. D* **85**, 074008 (2012) [arXiv:1201.5427 [hep-ph]].
58. “Dihadron momentum imbalance and correlations in d+Au collisions”  
Z. B. Kang, I. Vitev and H. Xing, *Phys. Rev. D* **85**, 054024 (2012) [arXiv:1112.6021 [hep-ph]].
59. “Exploring the structure of the proton through polarization observables in  $lp \rightarrow \text{jet } X$ ”  
Z. B. Kang, A. Metz, J. W. Qiu and J. Zhou, *Phys. Rev. D* **84**, 034046 (2011) [arXiv:1106.3514 [hep-ph]].
60. “Single spin asymmetry scaling in the forward rapidity region at RHIC”  
Z. B. Kang and F. Yuan, *Phys. Rev. D* **84**, 034019 (2011) [arXiv:1106.1375 [hep-ph]].
61. “Photon-tagged heavy meson production in high energy nuclear collisions”  
Z. B. Kang and I. Vitev, *Phys. Rev. D* **84**, 014034 (2011) [arXiv:1106.1493 [hep-ph]].
62. “General positivity bounds for spin observables in single particle inclusive production”  
Z. B. Kang and J. Soffer, *Phys. Rev. D* **83**, 114020 (2011) [arXiv:1104.2920 [hep-ph]].

63. “An observation concerning the process dependence of the Sivers functions”  
Z. B. Kang, J. W. Qiu, W. Vogelsang and F. Yuan, *Phys. Rev. D* **83**, 094001 (2011) [arXiv:1103.1591 [hep-ph]].
64. “Transverse momentum dependent parton distribution / fragmentation functions at an Electron-Ion Collider”  
M. Anselmino *et al.*, *Eur. Phys. J. A* **47**, 35 (2011) [arXiv:1101.4199 [hep-ex]].
65. “QCD evolution of naive-time-reversal-odd fragmentation functions”  
Z. B. Kang, *Phys. Rev. D* **83**, 036006 (2011) [arXiv:1012.3419 [hep-ph]].
66. “Recursive method for opacity expansion at finite temperature”  
J. Liu, Z. B. Kang and E. Wang, *Chin. Phys. C* **35** (1), 44 (2011).
67. “Quark-gluon correlation functions relevant to single transverse spin asymmetries”  
Z. B. Kang, J. W. Qiu and H. Zhang, *Phys. Rev. D* **81**, 114030 (2010) [arXiv:1004.4183 [hep-ph]].
68. “Dihadron azimuthal correlation from Collins effect in unpolarized hadron collisions”  
Z. B. Kang and F. Yuan, *Phys. Rev. D* **81**, 054007 (2010) [arXiv:1001.0247 [hep-ph]].
69. “Single transverse spin asymmetry of dilepton production near  $Z^0$  pole”  
Z. B. Kang and J. W. Qiu, *Phys. Rev. D* **81**, 054020 (2010) [arXiv:0912.1319 [hep-ph]].
70. “Photon radiation and dilepton production induced by rescattering in strong interacting medium”  
H. Z. Zhang, Z. B. Kang, B. W. Zhang, and E. Wang, *Eur. Phys. J. C* **67**, 445 (2010) [arXiv:hep-ph/0609159].
71. “Low-mass lepton pair production at large transverse momentum”  
Z. B. Kang, J. W. Qiu and W. Vogelsang, *Phys. Rev. D* **79**, 054007 (2009) [arXiv:0811.3662 [hep-ph]].
72. “Evolution of twist-3 multi-parton correlation functions relevant to single transverse-spin asymmetry”  
Z. B. Kang and J. W. Qiu, *Phys. Rev. D* **79**, 016003 (2009) [arXiv:0811.3101 [hep-ph]].
73. “Accessing tri-gluon correlations in the nucleon via the single spin asymmetry in open charm production”  
Z. B. Kang, J. W. Qiu, W. Vogelsang and F. Yuan, *Phys. Rev. D* **78**, 114013 (2008) [arXiv:0810.3333 [hep-ph]].
74. “Single transverse-spin asymmetry for  $D$ -meson production in semi-inclusive deep inelastic scattering”  
Z. B. Kang and J. W. Qiu, *Phys. Rev. D* **78**, 034005 (2008) [arXiv:0806.1970 [hep-ph]].
75. “Transverse momentum broadening of vector boson production in high energy nuclear collisions”  
Z. B. Kang and J. W. Qiu, *Phys. Rev. D* **77**, 114027 (2008) [arXiv:0802.2904 [hep-ph]].
76. “Heavy Ion Collisions at the LHC – Last Call for Predictions”  
N. Armesto *et al.*, *J. Phys. G* **35**, 054001 (2008) [arXiv:0711.0974 [hep-ph]].
77. “Induced photon radiation and dilepton production in strong interaction medium”  
Z. B. Kang, H. Z. Zhang and E. Wang, *Chin. Phys. C* **27** (11), 960 (2003).

### Conference proceedings

1. “Jet and heavy flavor production in heavy-ion collisions”  
Z. B. Kang, F. Ringer and I. Vitev, arXiv:1612.06511 [hep-ph], to appear in proceedings of Hard Probes 2016 Conference.
2. “Semi-inclusive jet cross sections within SCET”  
Z. B. Kang, F. Ringer and I. Vitev, *PoS QCDEV* **2016**, 022 (2017) [arXiv:1609.07112 [hep-ph]].
3. “Heavy flavor production in heavy-ion collisions from soft collinear effective theory”  
Z. B. Kang, F. Ringer and I. Vitev, *J. Phys. Conf. Ser.* **779**, 012029 (2017) [arXiv:1609.04908 [hep-ph]].
4. “Extraction of Collins function and transversity distribution from  $e^+e^-$  annihilation and SIDIS data”  
P. Sun, Z. B. Kang, A. Prokudin and F. Yuan, *PoS QCDEV* **2015**, 031 (2015).
5. “Recent developments in NLO corrections to in-medium jets”  
Z. B. Kang, *Nucl. Part. Phys. Proc.* **276**, 48 (2016).
6. “Quenching of inclusive and tagged b-jets at the LHC”  
H. Xing, J. Huang, Z. B. Kang and I. Vitev, *Nucl. Part. Phys. Proc.* **276**, 281 (2016) [arXiv:1509.05126 [hep-ph]].
7. “A study of quasi-parton distribution functions in the diquark spectator model”  
L. Gamberg, Z. B. Kang, I. Vitev and H. Xing, *PoS QCDEV* **2015**, 045 (2015) [arXiv:1511.05242 [hep-ph]].
8. “Twist-3 spin asymmetries in  $\ell N \rightarrow hX$  studied in collinear factorization”  
A. Metz, L. Gamberg, K. Kanazawa, Z. B. Kang, D. Pitonyak, A. Prokudin and M. Schlegel, *PoS QCDEV* **2015**, 020 (2015).
9. “The 1-jettiness DIS spectrum: factorization, resummation, and jet algorithm dependence”  
Z. B. Kang, X. Liu, S. Mantry and J. Qiu, arXiv:1503.04210 [hep-ph].
10. “Next-to-leading order weighted Sivers asymmetry in semi-inclusive deep inelastic scattering: three-gluon correlator”  
L. Dai, Z. B. Kang, A. Prokudin and I. Vitev, *PoS DIS* **2015**, 246 (2015).
11. “Twist-3 spin observables for single-hadron production in DIS”  
L. Gamberg, K. Kanazawa, Z. B. Kang, A. Metz, D. Pitonyak, A. Prokudin and M. Schlegel, *PoS DIS* **2015**, 208 (2015).
12. “TMD evolution for Collins asymmetries in  $e^+e^-$  annihilation and SIDIS”  
Z. B. Kang, A. Prokudin, P. Sun and F. Yuan, *Int. J. Mod. Phys. Conf. Ser.* **37**, 1560027 (2015).
13. “QCD evolution of nuclear quark-gluon correlation function”  
H. Xing, Z. B. Kang, E. Wang and X. N. Wang, *Int. J. Mod. Phys. Conf. Ser.* **37**, 1560061 (2015).
14. “Sivers asymmetry with QCD evolution”  
M. G. Echevarria, A. Idilbi, Z. B. Kang and I. Vitev, *Int. J. Mod. Phys. Conf. Ser.* **37**, 1560025 (2015) [arXiv:1411.3682 [hep-ph]].
15. “Transverse momentum broadening at NLO and QCD evolution of  $\hat{q}$ ”  
H. Xing, Z. B. Kang, E. Wang and X. N. Wang, *Nucl. Phys. A* **931**, 493 (2014) [arXiv:1407.8506 [hep-ph]].

16. “Double parton fragmentation function and its evolution in quarkonium production”  
Z. B. Kang, *Int. J. Mod. Phys. Conf. Ser.* **25**, 1460040 (2014).
17. “Transverse momentum-weighted Siverts asymmetry in semi-inclusive deep inelastic scattering at next-to-leading order”  
I. Vitev, Z. B. Kang and H. Xing, *Int. J. Mod. Phys. Conf. Ser.* **25**, 1460019 (2014).
18. “Process dependence and the Siverts effect in inclusive and semi-inclusive reactions”  
L. Gamberg, Z. B. Kang and A. Prokudin, *Int. J. Mod. Phys. Conf. Ser.* **25**, 1460018 (2014).
19. “The 1-Jettiness event shape for DIS with NNLL resummation”  
Z. B. Kang, X. Liu, S. Mantry and J. W. Qiu, *Int. J. Mod. Phys. Conf. Ser.* **25**, 1460041 (2014) [arXiv:1307.6460 [hep-ph]].
20. “Heavy quarkonium production in pQCD factorization”  
Z. B. Kang, Y. Q. Ma, J. W. Qiu and G. Sterman, *PoS Hadron* **2013**, 136 (2013).
21. “Indication on the process-dependence of the Siverts effect”  
A. Prokudin, L. Gamberg and Z. B. Kang, *PoS DIS* **2013**, 258 (2013).
22. “QCD evolution and resummation for transverse momentum distribution”  
Z. B. Kang, *Int. J. Mod. Phys. Conf. Ser.* **20**, 129 (2012).
23. “QCD evolution of naive-time-reversal-odd quark-gluon correlation functions”  
Z. B. Kang and J. W. Qiu, *Int. J. Mod. Phys. Conf. Ser.* **20**, 118 (2012) [arXiv:1210.4103 [hep-ph]].
24. “Process dependence and spin asymmetries in hadronic reactions”  
L. Gamberg and Z. B. Kang, *Nuovo Cim. C* **035N2**, 151 (2012).
25. “Scale dependence of twist-3 correlation functions”  
Z. B. Kang and J. W. Qiu, *Int. J. Mod. Phys. Conf. Ser.* **04**, 146 (2011).
26. “Factorization and quarkonium production”  
Z. B. Kang, J. W. Qiu and G. Sterman, *Nucl. Phys. Proc. Suppl.* **214**, 39 (2011).
27. “Low-mass dilepton production in  $pp$  and  $AA$  collisions”  
Z. B. Kang, J. W. Qiu and W. Vogelsang, *Nucl. Phys. A* **830**, 571 (2009) [arXiv:0907.4498 [hep-ph]].
28. “Trigluon correlations and single transverse spin asymmetry in open charm production”  
Z. B. Kang and J. W. Qiu, *AIP Conf. Proc.* **1149**, 443 (2009) [arXiv:0901.2539 [hep-ph]].
29. “QCD resummation for heavy quarkonium production in high energy collisions”  
Z. B. Kang and J. W. Qiu, *AIP Conf. Proc.* **1056**, 170 (2008).
30. “Transverse momentum broadening of vector bosons in heavy ion collisions at the LHC”  
Z. B. Kang and J. W. Qiu, arXiv:0707.0276 [hep-ph].
31. “Nuclear modification to parton distribution functions and parton saturation”  
Z. B. Kang and J. W. Qiu, *J. Phys. G* **34**, S607 (2007) [arXiv:hep-ph/0702040].

### Book chapters, white papers and contributions

32. “Dark Sectors 2016 Workshop: Community Report”  
J. Alexander *et al.*, arXiv:1608.08632 [hep-ph].
33. “The RHIC Cold QCD Plan for 2017 to 2023: A Portal to the EIC”  
E. C. Aschenauer, C. Aidala, A. Bazilevsky, M. Diehl, R. Fatemi, C. Gagliardi and Z. B. Kang *et al.*, arXiv:1602.03922 [nucl-ex].

34. “The RHIC SPIN Program: Achievements and Future Opportunities”  
E. C. Aschenauer, A. Bazilevsky, M. Diehl, J. Drachenberg, K. O. Eyser, R. Fatemi, C. Gagliardi and Z. B. Kang *et al.*, arXiv:1501.01220 [nucl-ex].
35. “Pre-Town Meeting on Spin Physics at an Electron-Ion Collider”  
E. C. Aschenauer, I. Balitsky, L. Bland, S. J. Brodsky, M. Burkardt, V. Burkert, J. P. Chen and A. Deshpande *et al.*, *Eur. Phys. J. A* **53**, 71 (2017) [arXiv:1410.8831 [hep-ph]].
36. “The RHIC Spin Program: Achievements and Future Opportunities”  
E. C. Aschenauer, A. Bazilevsky, K. Boyle, K. O. Eyser, R. Fatemi, C. Gagliardi, M. Grosse-Perdekamp and J. Lajoie *et al.*, arXiv:1304.0079 [nucl-ex].
37. “Gluons and the quark sea at high energies: distributions, polarization, tomography”  
D. Boer *et al.*, arXiv:1108.1713 [nucl-th].

## Talks

### Invited lectures

1. “Introduction to pQCD and TMD physics”  
Invited lectures (four one-hour lectures), Spinfest 2016, University of California, Riverside, CA, July 25–26, 2016.
2. “QCD structure of the nucleon and spin physics”  
Invited lectures (six one-hour lectures), The 30th Annual Hampton University Graduate Studies Program (HUGS 2015 Summer School), organized by Jefferson Lab, Newport News, VA, June 1–19, 2015.
3. “Introduction to pQCD and jets”  
Invited lectures (three one-hour lectures), DOE JET Topical Collaboration Summer School, University of California, Davis, CA, June 19–21, 2014.
4. “QCD and transverse spin physics”  
Invited lectures (five one-hour lectures), PHENIX Spin Work Fest 2012 Summer School, organized by PHENIX experimental collaboration at RHIC at Brookhaven National Laboratory, University of New Mexico, Albuquerque, NM, July 9–13, 2012.

### Panelist/Discussant

1. Panelist in a panel discussion: “Future plans of pp/pA program at RHIC”  
Spin and Proton Structure Workshop, 2017 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 20–23, 2017. Panel members: Elke-Caroline Aschenauer (BNL), Zhongbo Kang (UCLA), John Lajoie (ISU), Rodolfo Sassot (Buenos Aires U.), Matthew Sievert (LANL).
2. Panelist in a panel discussion: “QCD tools for future  $ep/eA$  colliders”  
Joint CTEQ Meeting and POETIC 7 (7th International Conference on Physics Opportunities at an Electron-Ion-Collider), Temple University, Philadelphia, PA, November 14–18, 2016. Panel members: Frank Petriello (moderator, Northwestern), Zhongbo Kang (UCLA), Christopher Lee (LANL), Stefan Prestel (SLAC), Pavel Nadolsky (SMU).
3. “EIC discussion: just questions”, Round Table Discussion: Sharpening the case for the EIC  
2014 Electron Ion Collider Users Meeting, Stony Brook University, Stony Brook, NY, June 24–27, 2014.

**Invited talks**

1. “Hadron distribution inside jets for hadronization and spin dynamics”  
Invited talk, RIKEN BNL Workshop - Synergies of pp and pA Collisions with an Electron-Ion Collider, Brookhaven National Laboratory, Upton, NY, June 26–28, 2017.
2. “Overview: jet production in p+p and A+A collisions”  
Invited talk, 2017 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 20–23, 2017.
3. “Introduction to TMD physics”  
Invited talk, The 12th particle physics phenomenology workshop (PPP12), National Chiao Tung University, Hsinchu, Taiwan, May 16–19, 2017.
4. “Inclusive jets and their substructure at the LHC”  
Invited seminar, Institute of Physics, Academia Sinica, Taipei, Taiwan, May 12, 2017.
5. “Effective field theory approach to open heavy flavor production in heavy-ion collisions”  
Invited talk, 25th International Workshop on Deep Inelastic Scattering and Related Topics (DIS 2017), Birmingham, UK, April 3–7, 2017.
6. “Probing collinear and TMD fragmentation functions through hadron distribution inside the jet”  
Invited talk, 7th Workshop of the APS Topical Group on Hadronic Physics (GHP 2017), Washington, DC, February 1–3, 2017.
7. “TMDs at an EIC”  
Invited plenary talk, Joint CTEQ Meeting and 7th International Conference on Physics Opportunities at an EIC (POETIC 7), Temple University, Philadelphia, PA, November 14–18, 2016.
8. “How advances in pQCD help us understand QGP?”  
Invited talk, Recent RHIC and LHC results and their implications for heavy ion physics in the 2020’s, Massachusetts Institute of Technology, Cambridge, MA, October 28–29, 2016.
9. “Inclusive jets and jet substructure for QCD and spin dynamics”  
Invited talk, Advances in QCD and Applications to Hadron Colliders Workshop, Argonne National Laboratory, Lemont, IL, October 26–28, 2016.
10. “Phenomenology of TMD evolution: recent progress”  
Invited talk, The 22nd International Spin Symposium (Spin 2016), University of Illinois at Urbana-Champaign, Champaign, IL, September 25–30, 2016.
11. “Jets and jet substructure for inclusive jet production at the LHC”  
Invited seminar, INT special seminar, Institute for Nuclear Theory, University of Washington, Seattle, WA, August 3, 2016.
12. “Spin physics of Sivers, Collins, pA, and jets”  
Invited talk, 2016 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 7–10, 2016.
13. “QCD frontiers in high energy nuclear physics: quantum correlation and many-body dynamics”  
Invited seminar, High Energy and Astro-Particle (HEAP) seminar, Department of Physics and Astronomy, University of California, Los Angeles, CA, May 25, 2016.
14. “Recent progress on TMD study and future perspective at the EIC”  
Invited talk, International Conference on the Structure of Baryons, Baryons 2016, Tallahassee, Florida, May 16–20, 2016.

15. “TMDs: Theory overview”  
Invited talk, APS April Meeting 2016, Salt Lake City, Utah, April 16–19, 2016.
16. “Opportunities in hadron distribution inside the jet”  
Invited talk, RIKEN BNL Workshop on Emerging Spin and Transverse Momentum Effects in p+p and p+A Collisions, Brookhaven National Laboratory, Upton, NY, February 8–10, 2016.
17. “Recent developments in NLO corrections to in-medium jets”  
Invited plenary talk, The 7th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions (Hard Probes 2015), McGill University, Montreal, Canada, June 29–July 3, 2015.
18. “SCET approach to energy loss”  
Invited talk, Symposium on Jet and Electromagnetic Tomography of Dense Matter, McGill University, Montreal, Canada, June 26–27, 2015.
19. “Transverse single spin asymmetry of the  $W$  production at RHIC”  
Invited talk, 2015 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 9–12, 2015.
20. “TMD evolution and global analysis”  
Invited talk, The 6th Workshop of the APS Topical Group on Hadronic Physics, Baltimore, MD, April 8–10, 2015.
21. “Advances in the determination of TMDs from global analysis”  
Invited talk, E1039/E906 Collaboration Meeting 2015, Santa Fe, NM, February 11–13, 2015.
22. “Unique opportunities in p+A collisions at RHIC and LHC”  
Invited talk, Phases of QCD Matter, APS Division of Nuclear Physics 2014 Long-range plan: Joint Town Meetings on QCD, Philadelphia, PA, September 13–15, 2014.
23. “Energy loss and heavy flavor jet production”  
Invited talk, The 3rd Workshop on Jet Modification in the RHIC and LHC Era, Wayne State University, Detroit, MI, August 18–20, 2014.
24. “QCD new frontiers for studying nucleon structure”  
Invited nuclear theory seminar, Jefferson Lab, Newport News, VA, July 25, 2014.
25. “QCD new frontiers for studying nucleon structure”  
Invited colloquium, Department of Physics, Old Dominion University, Norfolk, VA, July 24, 2014.
26. “Nucleon spin: longitudinal, transverse, and evolution”  
Invited theory overview, 2014 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 17–20, 2014.
27. “Discussion on NLO energy loss: questions, thoughts, and motivations”  
Invited talk, Workshop on NLO Energy Loss, Lawrence Berkeley National Laboratory, Berkeley, CA, March 3–14, 2014.
28. “TMD evolution of Sivers asymmetry”  
Invited talk, Institute for Nuclear Theory Workshop - Studies of 3D Structure of Nucleon, Institute for Nuclear Theory, Seattle, WA, February 24–28, 2014.
29. “Forward physics from a theoretical perspective”  
Invited theory overview, Forward sPHENIX Workshop at Santa Fe, Organized by PHENIX experimental group at RHIC, Santa Fe, NM, February 19, 2014.



30. “Universality and evolution of Sivers effect”  
Invited Nuclear Physics & RIKEN Theory Seminar, Brookhaven National Laboratory, Upton, NY, February 7, 2014.
31. “A unified picture of parton multiple scattering in the small- $x$  regime”  
Invited physics seminar, Department of Natural Sciences, Baruch College, New York, NY, February 3, 2014.
32. “QCD evolution of TMDs: what works?”  
Invited talk, Indiana-Illinois Workshop on Fragmentation Functions, Indiana University, Bloomington, IN, December 12–14, 2013.
33. “Heavy flavor production in heavy ion collisions”  
Invited high energy physics seminar, University of Illinois at Chicago, Chicago, IL, November 11, 2013.
34. “TMDs: Mechanism/universality with  $ep$  and  $pp$  collisions”  
Invited talk, QCD Frontier 2013, Jefferson Lab, Newport News, VA, October 21–22, 2013.
35. “Forward physics from a theoretical perspective”  
Invited theory overview, STAR Meeting on eSTAR Letter of Intent, Forward-Upgrades and Results from U+U Collisions, University of California, Los Angeles, CA, August 28–30, 2013.
36. “Parton multiple scattering and small- $x$  physics”  
Invited talk, Berkeley Summer Program 2013, QCD Landscape of the Nucleon and Atomic Nuclei, Lawrence Berkeley National Laboratory, Berkeley, CA, August 12–16, 2013.
37. “Double parton fragmentation function and its evolution in quarkonium production”  
Invited talk, QCD Evolution Workshop 2013, Jefferson Lab, Newport News, VA, May 6–10, 2013.
38. “Single transverse spin asymmetries in polarized SIDIS and  $pp$  scattering”  
Invited plenary talk, The 5th Workshop of the APS Topical Group on Hadronic Physics, Denver, CO, April 10–12, 2013.
39. “Exploring new frontiers of Quantum Chromodynamics”  
Invited seminar, Department of Physics, Temple University, Philadelphia, PA, January 23, 2013.
40. “Polarized p+A, single spin asymmetries”  
Invited talk, BNL-LANL-RBRC Joint Workshop on The Physics of p+A Collisions at RHIC, Brookhaven National Laboratory, Upton, NY, January 7–9, 2013.
41. “Cold nuclear matter effects on dilepton and photon production”  
Invited talk, Thermal Radiation Workshop (2012), RIKEN BNL Research Center, Brookhaven National Laboratory, Upton, NY, December 5–7, 2012.
42. “Introduction on spin-dependent fragmentation function and evolution of TMDs”  
Invited talk, Workshop on Fragmentation Functions and QCD 2012 (Fragmentation 2012), RIKEN Wako, Japan, November 9–11, 2012.
43. “QCD and RHIC spin physics”  
Invited talk on theory overview of spin physics, 2012 Fall Meeting of the APS Division of Nuclear Physics, Newport Beach, CA, October 24–27, 2012.
44. “QCD evolution and resummation for spin-dependent parton distribution functions”  
Invited talk, Medium/High Energy Seminar, Department of Physics, University of Illinois at Urbana-Champaign, October 1, 2012.

45. “Sivers effect of Drell-Yan production in small- $x$  regime”  
Invited talk, RIKEN BNL Workshop - Forward Physics at RHIC, RIKEN BNL Research Center, Brookhaven National Laboratory, Upton, NY, July 30–August 1, 2012.
46. “Recent progress in spin physics: Theoretical overview”  
Invited talk, 2012 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 12–15, 2012.
47. “Correlation measurements in  $pp/pA$ ”  
Invited talk, STAR Upgrade Workshop, Brookhaven National Laboratory, Upton, NY, June 11, 2012.
48. “QCD evolution and resummation for transverse momentum distribution”  
Invited talk, QCD Evolution Workshop 2012, Jefferson Lab, Newport News, VA, May 14–17, 2012.
49. “QCD new frontiers for studying nucleon structure”  
Invited theoretical physics seminar, Physics Division, Argonne National Laboratory, Argonne, IL, April 17, 2012.
50. “Multiple scattering effects in high energy nuclear collisions”  
Invited seminar, Nuclear Physics Seminar, Department of Physics, Temple University, Philadelphia, PA, April 13, 2012.
51. “Exploring new frontiers of Quantum Chromodynamics”  
Invited colloquium, Department of Physics, Kent State University, Kent, OH, February 23, 2012.
52. “Orbital angular momentum in collinear factorization: Does  $A_N$  come from parton orbital motion?”  
Invited talk, Institute for Nuclear Theory workshop - Orbital angular momentum in QCD, Institute for Nuclear Theory, Seattle, WA, February 6–17, 2012.
53. “Spin structure of the proton”  
Invited talk, Charles A. Whitten Memorial Symposium on Frontier of Nuclear Physics, University of California, Los Angeles, CA, December 15–16, 2011.
54. “Unraveling the transverse structure of nucleons with  $p+He-3$  and  $e+He-3$ ”  
Invited talk, Workshop on opportunities for polarized He-3 in RHIC and EIC, Brookhaven National Laboratory, Upton, NY, September 28–30, 2011.
55. “Spin physics: transverse theory and overview”  
Invited talk on theory overview, 2011 RHIC and AGS Annual Users’ Meeting, Brookhaven National Laboratory, Upton, NY, June 20–24, 2011.
56. “Sivers effect: from SIDIS to  $pp$  - sign change and sign mismatch”  
Invited talk, RIKEN BNL Workshop - Opportunities for Drell-Yan Physics at RHIC, Brookhaven National Laboratory, Upton, NY, May 11–13, 2011.
57. “Spin physics: past, present and future”  
Invited colloquium, Theoretical Division (Group T-2), Los Alamos National Laboratory, Los Alamos, NM, April 25, 2011.
58. “Sivers effect in SIDIS and  $pp$  collisions”  
Invited talk, XIX International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2011), Newport News, VA, April 11–15, 2011.
59. “QCD and transverse spin physics”  
Invited seminar, Joint Experiment and Theory Seminar (Group P-25 and T-2), Los Alamos National Laboratory, Los Alamos, NM, April 04, 2011.

60. “Single transverse spin asymmetry: progress and puzzles ”  
Invited seminar, Nuclear Physics Seminar, Department of Physics, University of Maryland, College Park, MD, March 30, 2011.
61. “QCD factorization and heavy quarkonium production”  
Invited seminar, Nuclear Theory Seminar, Lawrence Berkeley National Laboratory, Berkeley, CA, March 24, 2011.
62. “Sivers effect in SIDIS and  $pp$  collisions”  
Invited seminar, Nuclear Physics Seminar, Department of Physics, Temple University, Philadelphia, PA, March 08, 2011.
63. “QCD and spin physics - explore the nucleon using spin”  
Invited nuclear seminar, Department of Physics, Indiana University, Bloomington, IN, February 28, 2011.
64. “Single transverse spin asymmetry: progress and puzzles”  
Invited seminar, Nuclear Theory Seminar, Jefferson Lab, Newport News, VA, February 07, 2011.
65. “Scale evolution for the correlations (TMD moments)”  
Invited talk, Institute for Nuclear Theory Program - Gluons and the quark sea at high energies: distributions, polarization, tomography, week 8-9 on *longitudinal and transverse nucleon structure; spin and orbital effects (GPDs, TMDs, and all that)*, Institute for Nuclear Theory, Seattle, WA, November 1–12, 2010.
66. “Recent progress on spin physics”  
Invited talk on theory overview of spin physics, 2010 Fall Meeting of the APS Division of Nuclear Physics, Workshop: Quark Gluon Plasma, Santa Fe, NM, November 2–6, 2010
67. “Process dependent transverse spin asymmetry - understanding inclusive hadron production”  
Invited talk for Polarized Drell-Yan Physics Workshop, Santa Fe, NM, October 31–November 1, 2010.
68. “Overview of DIS results, global fitting and DY predictions”  
Invited summary talk, Polarized Drell-Yan Physics Workshop, Santa Fe, NM, October 31–November 1, 2010.
69. “Test of the universality of naive T-odd fragmentation functions”  
Invited talk, Institute for Nuclear Theory Program - Gluons and the quark sea at high energies: distributions, polarization, tomography, week 6 on *parton densities (unpolarized and polarized), fragmentation functions, electroweak physics*, Institute for Nuclear Theory, Seattle, WA, October 17–23, 2010.
70. “Single transverse-spin asymmetry in inclusive hadron production”  
Invited talk, Brookhaven Summer Program on Nucleon Spin Physics, Brookhaven National Laboratory, Upton, NY, July 14–27, 2010.
71. “ $A_N$  of  $W$  production in polarized  $pp$  collisions”  
Invited talk, The Physics of  $W$  and  $Z$  Bosons, Brookhaven National Laboratory, Upton, NY, June 24–25, 2010.
72. “Spin physics at RHIC”  
Invited talk on theory overview of spin physics, STAR Analysis Meeting, University of California, Los Angeles, CA, June 15–18, 2010.
73. “Theory predictions for polarized He-3”  
Invited talk, RHIC Spin: The Next Decade, Iowa State University, Ames, IA, May 14–16, 2010.

74. “P-odd correlations in quark fragmentation”  
Invited talk, P- and CP-odd effects in hot and dense matter, Brookhaven National Laboratory, Upton, NY, April 26–30, 2010.
75. “Evolution of Transverse Momentum Dependent distributions (moments)”  
Invited talk, Workshop on Partonic Transverse Momentum in Hadrons: Quark Spin-Orbit Correlations and Quark-Gluon Interactions, Duke University, Durham, NC, March 12–13, 2010.
76. “Some recent progress on single transverse-spin asymmetry”  
Invited seminar, Nuclear Theory Seminar, Lawrence Berkeley National Laboratory, Berkeley, CA, October 14, 2009.
77. “Single transverse-spin asymmetry (SSA) of  $W/Z$  bosons”  
Invited talk, Berkeley Summer Program on Nucleon Spin Physics, Berkeley, CA, June 1–12, 2009.
78. “Some recent developments in single transverse-spin asymmetry”  
Invited seminar, Nuclear Physics Seminar, Temple University, Philadelphia, PA, March 26, 2009.
79. “Collinear factorization approach to single transverse-spin asymmetry”  
Invited seminar, Nuclear Theory Seminar, Jefferson Lab, Newport News, VA, March 09, 2009.
80. “QCD factorization and its role in understanding high energy nuclear collisions”  
Invited seminar, Nuclear Theory Seminar, Lawrence Berkeley National Laboratory, Berkeley, CA, January 23, 2009.
81. “QCD and the hadron structure beyond the probability distributions”  
Invited seminar, T-2 Nuclear Theory Seminar, Los Alamos National Laboratory, Los Alamos, NM, January 06, 2009.

#### Other talks

82. “TMDs: general and fits”  
The 2nd meeting of TMD Collaboration, DOE Topical Collaboration for the Coordinated Theoretical Approach to Transverse Momentum Dependent Hadron Structure in QCD (TMD Collaboration), Temple University, Philadelphia, PA, June 29–30, 2017.
83. “Quantum tomography of the nucleons”  
Physics and Astronomy Colloquium, Department of Physics and Astronomy, University of California, Los Angeles, CA, March 2, 2017.
84. “Jets and jet substructure: inclusive jet production”  
Astro-particle Journal Club, Theory of Elementary Particles, Astroparticle Physics and Phenomenology (TEPAPP group), University of California, Los Angeles, CA, January 25, 2017.
85. “Sivers effect: Aharonov-Bohm effect in QCD?”  
Theoretical Division Group Leaders Meeting, Los Alamos National Laboratory, Los Alamos, NM, September 9, 2015.
86. “New QCD frontiers in understanding the nucleon structure”  
Nuclear seminar, Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM, November 18, 2013.
87. “QCD new frontiers for studying nucleon structure”  
Physics Division Summer Seminar Series, Los Alamos National Laboratory, Los Alamos, NM, July 17, 2013.

88. “Dihadron momentum imbalance and correlations in d+Au collisions”  
Parallel talk, The 11th International Conference on Nucleus-Nucleus Collisions (NN2012), San Antonio, TX, May 27–June 1, 2012.
89. “Sivers effect in SIDIS and  $pp$  collisions: a sign mismatch”  
RHIC Spin Seminar, Brookhaven National Laboratory, Upton, NY, March 29, 2011.
90. “Understanding single transverse spin asymmetry - on universality property of  $k_T$ -dependent functions”  
RIKEN BNL Center Scientific Review Committee (SRC) Meeting, Brookhaven National Laboratory, Upton, NY, October 27–29, 2010.
91. “Quark fragmentation in parity-odd bubbles”  
JET summer school 2010, Lawrence Berkeley National Laboratory, Berkeley, CA, June 14–17, 2010.
92. “Theory for Drell-Yan single transverse spin asymmetry”  
PHENIX Forward Upgrade (Next Decade), Brookhaven National Laboratory, Upton, NY, March 26, 2010.
93. “Violation of TMD factorization in hadronic collisions”  
RHIC Spin Seminar, Brookhaven National Laboratory, Upton, NY, February 09, 2010.
94. “Some recent progress on single transverse-spin asymmetry”  
RIKEN Lunch Seminar, RIKEN BNL Research Center, Brookhaven National Laboratory, Upton, NY, October 1, 2009.
95. “Low mass lepton pair production at large transverse momentum”  
Parallel talk, The 21th International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions (Quark Matter 2009), Knoxville, TN, March 30–April 04, 2009.
96. “QCD and the hadron structure beyond the probability distributions”  
Nuclear Theory Seminar, Iowa State University, Ames, IA, December 11, 2008.
97. “Low mass lepton pair production at large transverse momentum”  
2008 CTEQ Collaboration Meeting, Argonne National Laboratory, Argonne, IL, December 5–7, 2008.
98. “Tri-gluon correlation and transverse spin asymmetry for open charm production in SIDIS”  
2008 Annual Fall Meeting of the APS Division of Nuclear Physics (DNP 2008), Oakland, CA, October 23–26, 2008.
99. “Low mass lepton pair production at large transverse momentum”  
2008 Annual Fall Meeting of the APS Division of Nuclear Physics (DNP 2008), Oakland, CA, October 23–26, 2008.
100. “Tri-gluon correlation and transverse spin asymmetry in open charm production”  
The 18th International Symposium on Spin Physics (SPIN 2008), Charlottesville, VA, October 6–11, 2008.
101. “QCD resummation for heavy quarkonium production in high energy collisions”  
PHENO 2008 Symposium: LHC turn on, Madison, WI, April 28–30, 2008.
102. “Transverse momentum broadening of vector bosons in nuclear collisions”  
2007 Annual Fall Meeting of the APS Division of Nuclear Physics (DNP 2007), Newport News, VA, October 10–13, 2007.

103. “Rescattering effects in high energy nuclear collisions”  
Nuclear Physics Seminar, Institute of Particle Physics, Central China Normal University, Wuhan, China, November 27, 2006.
104. “Nuclear modification to parton evolution and onset of parton saturation”  
Parallel talk, The 19th International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions (Quark Matter 2006), Shanghai, China, November 14–20, 2006.
105. “Universal nuclear dependence in parton distributions”  
Midwest nuclear theory get-together, Argonne National Laboratory, Argonne, IL, October 14, 2006.