CURRICULM VITAE: FEBRUARY 2021

MOMCHIL VELKOVSKY

EDUCATION

Ph.D. 1997 SUNY Stony Brook Stony Brook, NY

Dissertation: "The Role of the Instantons in the QCD Phase Transitions"

Advisor: Prof. Edward Shuryak

M.S. 1987 Sofia University Sofia, Bulgaria

M.S. Thesis: "Studies of the Phase Structure of the Lattice Abelian Higgs Model"

Advisors: Dr. Ivan Zlatev and Dr. Asen Ilchev

Valedictorian of Class of 1987 (100 physics students)

PROFESSIONAL EXPERIENCE

Vanderbilt University, Department of Physics and Astronomy Nashville, TN

Senior Lecturer 2015 - present

Research Assistant Professor 2003 - 2015

SUNY Stony Brook, Experimental Heavy Ion Group Stony Brook, NY

Post-doctoral Research Associate 1999-2003

Brookhaven National Laboratory, Nuclear Theory Group Upton, NY

Post-doctoral Research Associate 1997-1999

SUNY Stony Brook, Department of Physics 1991-1997 Stony Brook, NY

Research and Teaching Assistant

University of California at Riverside Spring 1991 Riverside, CA

Graduate Assistant

Sofia University, Theoretical Physics Division 1986-1990 Sofia, Bulgaria

Research and Teaching Assistant

TEACHING

- Undergraduate courses taught as a Senior Lecturer (2015- present):
  - Phys1601 – introductory course for science and engineering majors, part 1: Fall 2015 (2 sections), Spring 2016, Fall 2020
  - Phys1602 – introductory course for science and engineering majors, part 2: Fall 2016 (2 sections), Fall 2017 (3 sections), Spring 2018, Fall 2018 (2 sections), Spring 2019, Spring 2020, Spring 2021
  - Phys1502 – introductory course for biomedical majors, part 2: Spring 2018
  - Phys2260W – Advanced lab for and writing class for physics majors: Spring 2015, Spring 2016, Spring 2017
  - Phys2250W – Concepts and Applications of Quantum mechanics lab and writing class for physics majors: Fall 2016

- Undergraduate courses taught as a Research Assistant Professor 2009-2015:
  - Phys116 A – introductory course for non-physics majors, taught every semester since Spring 2009, except Spring 2014
  - Phys 226 W – Lab course and writing class for advanced undergraduate students, taught in Spring 2014 and Spring 2015
- Graduate level courses taught as a Senior Lecturer (2015- present):
  - Phys8010 – Particle and Continuum Mechanics (Classical Mechanics) - graduate course: Fall 2018, Fall 2019
  - Phys8030 – Quantum Mechanics I – core graduate course: Fall 2019, Fall 2020
  - Phys8031 – Quantum Mechanics II – core graduate course: Spring 2021
  - Phys8160 – General Relativity and Cosmology- elective graduate course: Fall 2015
  - Phys8170 – Quantum Field Theory – elective graduate course: Spring 2017, Spring 2019, Spring 2020, Spring 2021
  - Phys8001 – Physics Colloquium practicum: Spring 2020
- Graduate level courses taught a Research Assistant Professor 2009-2015:
  - Phys 370A - Quantum Field Theory – elective graduate course: Spring 2009, Fall 2011
  - Phys 370B - Quantum Field Theory, (second part) Spring 2012
  - Phys 360 B – Cosmology – elective graduate course: Fall 2010
- Graduate students supervised as a member of Ph.D. committee
  - Brandon Blankenship: 2020 –
  - Justin Malave: 2020 –
  - Michael Reynolds: 2021 –
  - Andrey Klots: 2012 – 2018

SERVICE TO THE DEPARTMENT OF PHYSICS AND ASTRONOMY AT VANDERBILT

- Communications Committee: 2017 – present
- Rankings, Research and Awards Committee: 2015 – 2017
- Department website manager: 2015 -2021
- System administrator of the Vpac computing cluster: 2007-2008
- Curriculum task force for PHYS 2250/2260 undergraduate advanced laboratory classes

RESEARCH

- 2003 – 2008: Vanderbilt Institute for Integrative Biosystems Research and Education (VIIBRE), Vanderbilt University, Nashville, Tennessee

  Worked with Prof. John Wikswo and the VIIBRE group on the development of dynamic metabolic models, needed to understand the vast amount of fast metabolic rate data from live cells perturbed with toxins and internal metabolites, obtained with the Multianalyte Microphysiometer (MMP). Developed software for data reduction of the MMP. Created a universal approach to thin enzyme electrodes, using an analytic diffusion-reaction model, and applied this to the MMP to allow the conversion of amperometric measurements into cell consumption and excretion rates. Applied the model to interpret data from the VIIBRE Nanophysiometer.

- 2003 – 2008: PHENIX heavy ion experimental group

  Worked with the Heavy Ion Group on the conversion of the PHENIX simulation software to object-oriented framework.
- 1999 – 2003: Experimental Heavy Ion Group, State University of New York at Stony Brook, Stony Brook, New York

  Participated in the PHENIX experiment at the Relativistic Heavy Ion Collider (RHIC) at the Brookhaven National Laboratory. Involved in the analysis of K-short in Year 2 PHENIX data. Worked with the Offline Software Group and wrote scripts on the computing infrastructure, and maintenance of PHENIX software. Installed and applied open source tools needed for the PHENIX infrastructure, configured and maintained Apache, Samba and MySQL severs. As a rebuild manager was responsible for automatic rebuilds of all the PHENIX software, testing and quality control, including builds and tests with Insure++. Responsible for the maintenance and the backups for the main Objectivity Federation database. Served as a PHENIX liaison to the RHIC Computing Facility (RCF), helping to solve the day-to-day problems between this unique data-intensive experiment and RCF.
- 1997 – 1999: Nuclear Theory Group, Physics Department, Brookhaven National Laboratory Upton, New York

  Studied the properties of nuclear matter at very high densities. Together with E. Shuryak, T. Schaeffer and R. Rapp proposed an instanton induced quark matter color-superconducting phase. Several of our papers are cited widely (the first one with over 1000 citations)
- 1993 – 1997: Nuclear Theory Group, Physics Department, State University of New York at Stony Brook, Stony Brook, New York

  Studied the detailed mechanism of the high temperature phase transition in Nuclear Physics. Studied the role of the instantons and instanton molecules for the phase transition. Proved that their density does not change significantly until the transition point. Later this was demonstrated through Lattice Gauge Simulations. Published 4 papers.
- 1991, Department of Physics, University of California, Riverside

  Studied an extension of the Standard Model with a large N representation of the Higgs sector. Published a paper with Dr. J. Wudka
- 1986 - 1990: Theoretical Physics Division, University of Sofia, Sofia, Bulgaria

  Studied Lattice Gauge Models by Monte Carlo Simulations and Mean Field analysis. Grader, taught the recitation sections of courses given by the Division of Theoretical Physics

RESEARCH PRESENTATIONS

1. Extracting Metabolic Fluxes from Measurements with a Multianalyte MicroPhysiometer, Poster at the Biophysical Society 49th Annual Meeting, Long Beach, California, February 12-16, 2005
2. Kaon production in $\sqrt{s_{NN}}$ = 200 GeV Au-Au collisions measured with the PHENIX experiment at RHIC, 7th International Conference on Strangeness in Quark Matter, Atlantic Beach, North Carolina, March 12-17 2003
3. Reviving the Strong Coupling Expansion: Baryon Junctions and Other “Resonances” Workshop on “Baryon Dynamics at RHIC”, RIKEN-BNL Research Center, March 28-30, 2002
4. Is the Gravitational Scale in Reach? Joint APS/JPS Fall meeting, Hawaii, Oct. 2001
5. Open-Source Tools in PHENIX.

International Conference on Computing in High Energy and Nuclear Physic CHEP2000, Padua, Italy, February 2000

6. Vacuum Energy in Large N_f QCD and Instanton Molecules. Workshop on "QCD at Finite Baryon Density", November 1998, Brookhaven National Laboratory, USA
7. Mean Field, Instantons and Finite Baryon Density, Workshop on "QCD at Finite Baryon Density", April 1998, Bielefeld, Germany
8. Mean Field, Instantons and Finite Baryon Density, Seminar at the Department of Physics, BNL, July 1998
9. Does QCD know about iron? A seminar given at the Department of Physics, BNL in July 1997
10. The role of the instantons for the QCD phase transitions, seminar at the Department of Physics, BNL in January 1997
11. The role of the instantons for the QCD phase transitions, seminar at the Department of Physics, Los Alamos National Lab, March 1997
12. The role of the instantons for the QCD phase transitions, seminar at the Department of Physics, University of Maryland, March 1997
13. A mean field approach to the instanton induced effect close to the QCD phase transition, Fall Meeting of the APS Division of Nuclear Physics, 2-5 October 1996, Cambridge, Massachusetts
14. A mean field approach to the instanton induced effect close to the QCD phase transition, BNL-Columbia-Stony Brook meeting on April 28, 1996, Stony Brook, New York
15. On the instanton induced baryon number violation, Division of Theoretical Physics, University of Sofia, June 1993, Sofia, Bulgaria

PUBLICATIONS

- Publications on mathematical modeling of microbiodevices

1. **The Engineering Challenges of BioNEMS: The Integration of Microfluidics, Micro and Nanodevices, Models, and External Control for Systems Biology**, John P. Wikswo Ales Prokop, Franz Baudenbacher, David Cliffel, Bela Csukas, and Momchil Velkovsky, IEE Proc. Nanobiotech.(2006) 153:81-101
2. **Modeling the measurements of cellular fluxes in microbioreactor devices using thin enzyme electrodes**, Momchil Velkovsky, Rachel Snider, David E. Cliffel and John P. Wikswo, J. Math. Chem. (2011) 49:251-275

- Theoretical physics publications in quantum chromodynamics (QCD)

3. **High density QCD and instantons,** R. Rapp (SUNY, Stony Brook), Thomas Schaefer (Princeton, Inst. Advanced Study), Edward V. Shuryak (SUNY, Stony Brook), M. Velkovsky (Brookhaven), DOI: 10.1006/aphy.1999.5991, Annals Phys. 280 (2000), 35-99
4. **Mean field, instantons and finite baryon density**, Momchil Velkovsky (Brookhaven), DOI: 10.1016/S0375-9474(98)00499-0, Nucl. Phys. A 642 (1998), 58-64
5. **Diquark Bose condensates in high density matter and instantons,** R. Rapp (SUNY, Stony Brook), Thomas Schaefer (Washington U., Seattle), Edward V. Shuryak (SUNY, Stony Brook), M. Velkovsky (Brookhaven)**,** DOI: 10.1103/PhysRevLett.81.53, Phys. Rev. Lett. 81 (1998), 53-56

TOPCITE 1000+

6. **QCD with large number of quarks: Effects of the instanton - anti-instanton pairs**, M. Velkovsky (SUNY, Stony Brook), Edward V. Shuryak (SUNY, Stony Brook), DOI: 10.1016/S0370-2693(98)00930-7, Phys. Lett. B 437 (1998), 398-402
7. **A Mean field approach to the instanton induced effect close to the QCD phase transition**, M. Velkovsky (SUNY, Stony Brook), Edward V. Shuryak (SUNY, Stony Brook), DOI: 10.1103/PhysRevD.56.2766, Phys. Rev. D 56 (1997), 2766-2777
8. **Instantons and QCD phase transitions**, Momchil Stoychev Velkovsky (SUNY, Stony Brook),. UMI-97-36180-mc (microfiche), 1997. 124pp. Ph.D. Thesis.
9. **The Instanton density at finite temperatures**, Edward V. Shuryak (SUNY, Stony Brook), M. Velkovsky (SUNY, Stony Brook), DOI: 10.1103/PhysRevD.50.3323, Phys. Rev. D 50 (1994), 3323-3327
10. **On the Higgs induced contribution to baryon number violation at very high-energies**, M. Velkovsky (SUNY, Stony Brook), Edward V. Shuryak (SUNY, Stony Brook), DOI: 10.1016/0370-2693(93)90295-S, Phys. Lett. B 304 (1993), 281-284
11. **A Large N standard model**, Momchil Velkovsky (UC, Riverside), Jose Wudka (UC, Riverside), DOI: 10.1016/0550-3213(93)90500-O, Nucl. Phys. B 399 (1993), 349-363
12. **On the charged D = 3 U(1) Higgs lattice model**, A. Ilchev (Sofiya U.), M. Velkovsky (Sofiya U.), Bulg. J. Phys. 16 (1989), 457-460

- Experimental physics publications as a member of the PHENIX collaboration

13. **Transverse-energy distributions at midrapidity in p+p , d+Au , and Au+Au collisions at $\sqrt{s_{NN}}$ = 62.4 to 200 GeV and implications for particle-production models,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.89.044905, Phys. Rev. C 89 (2014) 4, 044905
14. **Direct photon production in d+Au collisions at $\sqrt{s_{NN}}$ =200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.87.054907, Phys. Rev. C 87 (2013), 054907
15. **Charged hadron multiplicity fluctuations in Au+Au and Cu+Cu collisions from $\sqrt{s_{NN}}$ =22.5 to 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.78.044902, Phys. Rev. C 78 (2008), 044902
16. **Cold nuclear matter effects on J/Psi as constrained by deuteron-gold measurements at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.77.024912 ,
17. 10.1103/PhysRevC.79.059901, Phys. Rev. C 77 (2008), 024912, Phys. Rev. C 79 (2009), 059901 (erratum)
18. **Centrality dependence of charged hadron production in deuteron + gold and nucleon + gold collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.77.014905, Phys. Rev. C 77 (2008), 014905
19. **Measurement of density correlations in pseudorapidity via charged particle multiplicity fluctuations in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.76.034903, Phys. Rev. C 76 (2007), 034903
20. **Production of omega mesons at Large Transverse Momenta in p + p and d + Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.75.051902, Phys. Rev. C 75 (2007), 051902

21. **System size and energy dependence of jet-induced hadron pair correlation shapes in Cu+Cu and Au+Au collisions at $\sqrt{s_{NN}}$ = 200 and 62.4 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.98.232302, Phys. Rev. Lett. 98 (2007), 232302
22. **High transverse momentum eta meson production in p+ p, d+ Au and Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.75.024909, Phys. Rev. C 75 (2007), 024909
23. **A detailed study of high-p_T neutral pion suppression and azimuthal anisotropy in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.76.034904, Phys. Rev. C 76 (2007), 034904
24. **Centrality dependence of pi0 and eta production at large transverse momentum in $\sqrt{s_{NN}}$ = 200 GeV d+Au collisions,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.98.172302, Phys. Rev. Lett. 98 (2007), 172302
25. **Measurement of direct photon production in p + p collisions at $\sqrt{s}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.98.012002, Phys. Rev. Lett. 98 (2007), 012002
26. **Measurement of single muons at forward rapidity in p+p collisions $\sqrt{s}$ = 200 GeV and implications for charm production**, PHENIX Collaboration, DOI: 10.1103/PhysRevD.76.092002, Phys. Rev. D 76 (2007), 092002
27. **Evidence for a long-range component in the pion emission source in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.98.132301, Phys. Rev. Lett. 98 (2007), 132301
28. **Jet properties from dihadron correlations in p+ p collisions at $\sqrt{s}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevD.74.072002, Phys. Rev. D 74 (2006), 072002
29. **Azimuthal angle correlations for rapidity separated hadron pairs in d + Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.96.222301, Phys. Rev. Lett. 96 (2006), 222301
30. **Nuclear effects on hadron production in d+Au and p + p collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.74.024904, Phys. Rev. C 74 (2006), 024904
31. **Improved measurement of double helicity asymmetry in inclusive midrapidity pi0 production for polarized p+p collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevD.73.091102, Phys. Rev. D 73 (2006), 091102
32. **Common suppression pattern of eta and pi0 mesons at high transverse momentum in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.96.202301, Phys. Rev. Lett. 96 (2006), 202301
33. **Heavy flavor production in PHENIX**, PHENIX Collaboration, O. Drapier et al., DOI: 10.1140/epjc/s2005-02307-9, Eur. Phys. J. C 43 (2005), 201-208
34. **Low mass dilepton production at RHIC energies**, PHENIX Collaboration, Kyoichiro Ozawa et al., DOI: 10.1140/epjc/s2005-02212-3, Eur. Phys. J. C 43 (2005), 421-426
35. **Quarkonium production from d + Au to Au + Au collisions**, PHENIX Collaboration, M. Rosati et al., DOI: 10.1140/epjc/s2005-02325-7, Eur. Phys. J. C 43 (2005), 173-178
36. **Can phi mesons give an answer to the baryon puzzle at RHIC?**, PHENIX Collaboration, J. Velkovska et al., DOI: 10.1140/epjc/s2005-02326-6, Eur. Phys. J. C 43 (2005), 317-322
37. **Differential probes of medium-induced energy loss**, PHENIX Collaboration, B.A. Cole et al., DOI: 10.1140/epjc/s2005-02333-7, Eur. Phys. J. C 43 (2005), 271-280
38. **Medium effects on high particle production measured with the PHENIX experiment**, PHENIX Collaboration, H. Busching et al., DOI: 10.1140/epjc/s2005-02324-8, Eur. Phys. J. C 43 (2005), 303-310

39. **Nuclear modification of electron spectra and implications for heavy quark energy loss in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.96.032301, Phys. Rev. Lett. 96 (2006), 032301
40. **Jet structure from dihadron correlations in d+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.73.054903,Phys. Rev. C 73 (2006), 054903
41. **Measurement of identified pi0 and inclusive photon v2 and implication to the direct photon production in $\sqrt{s_{NN}}$ = 200 GeV Au+Au collisions,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.96.032302, Phys. Rev. Lett. 96 (2006), 032302
42. **Single electrons from heavy flavor decays in p+p collisions at $\sqrt{s}$ = 200-GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.96.032001, Phys. Rev. Lett. 96 (2006), 032001
43. **J/psi production and nuclear effects for d+Au and p+p collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration,DOI: 10.1103/PhysRevLett.96.012304, Phys. Rev.Lett. 96 (2006), 012304
44. **Measurement of transverse single-spin asymmetries for mid-rapidity production of neutral pions and charged hadrons in polarized p+p collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.95.202001, Phys. Rev. Lett. 95 (2005), 202001
45. **Dense-Medium Modifications to Jet-Induced Hadron Pair Distributions in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.97.052301, Phys. Rev. Lett. 97 (2006), 052301
46. **Centrality dependence of direct photon production in $\sqrt{s_{NN}}$ = 200 GeV Au + Au collisions,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.94.232301, Phys. Rev. Lett. 94 (2005), 232301
47. **Measurement of single electron event anisotropy in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.72.024901, Phys. Rev. C 72 (2005), 024901
48. **Mid-rapidity direct-photon production in p+p collisions at $\sqrt{s}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevD.71.071102, Phys. Rev. D 71 (2005), 071102
49. **Nuclear modification factors for hadrons at forward and backward rapidities in deuteron-gold collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.94.082302, Phys. Rev. Lett. 94 (2005), 082302
50. **Saturation of azimuthal anisotropy in Au + Au collisions at $\sqrt{s_{NN}}$ 62 GeV to 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.94.232302, Phys. Rev. Lett. 94 (2005), 232302
51. **Production of phi mesons at mid-rapidity in $\sqrt{s_{NN}}$ = 200 GeV Au+Au collisions at RHIC,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.72.014903, Phys. Rev. C 72 (2005), 014903
52. **Formation of dense partonic matter in relativistic nucleus-nucleus collisions at RHIC: Experimental evaluation by the PHENIX collaboration**, PHENIX Collaboration, DOI: 10.1016/j.nuclphysa.2005.03.086, Nucl. Phys. A 757 (2005), 184-283

TOPCITE 1000+

53. **Centrality dependence of charm production from single electrons measurement in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.94.082301, Phys. Rev. Lett. 94 (2005), 082301
54. **Systematic studies of the centrality and $\sqrt{s_{NN}}$ dependence of the $dE_T/d\eta$ and $dN_{ch}/d\eta$ in heavy ion collisions at mid-rapidity,** PHENIX Collaboration, DOI: 10.1103/PhysRevC.71.034908 , 10.1103/PhysRevC.71.049901, Phys. Rev. C 71 (2005), 034908, Phys. Rev. C 71 (2005), 049901 (erratum)

55. **Jet structure of baryon excess in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.71.051902, Phys. Rev. C 71 (2005), 051902
56. **Deuteron and antideuteron production in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.94.122302, Phys. Rev. Lett. 94 (2005), 122302
57. **Double helicity asymmetry in inclusive mid-rapidity pi0 production for polarized p + p collisions at $\sqrt{s}$ = 200 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.93.202002, Phys. Rev. Lett. 93 (2004), 202002
58. **Kaon production in $\sqrt{s_{NN}}$ = 200 GeV Au - Au collisions measured with the PHENIX experiment at RHIC,** PHENIX Collaboration, M. Velkovsky (SUNY, Stony Brook) for the collaboration, DOI: 10.1088/0954-3899/30/1/019, J. Phys. G 30 (2004), S187-S192
59. **Bose-Einstein correlations of charged pion pairs in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.93.152302, Phys. Rev. Lett. 93 (2004), 152302
60. **Measurement of nonrandom event by event fluctuations of average transverse momentum in $\sqrt{s_{NN}}$ = 200 GeV Au+Au and p+p collisions**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.93.092301, Phys. Rev. Lett. 93 (2004), 092301
61. **PHENIX on-line and off-line computing**, PHENIX Collaboration, DOI: 10.1016/S0168-9002(02)01958-7, Nucl. Instrum. Meth. A 499 (2003), 593-602
62. **PHENIX central arm tracking detectors**, PHENIX Collaboration, DOI: 10.1016/S0168-9002(02)01952-6, Nucl. Instrum. Meth. A 499 (2003), 489-507
63. **PHENIX detector overview**, PHENIX Collaboration, DOI: 10.1016/S0168-9002(02)01950-2, Nucl. Instrum. Meth. A 499 (2003), 469-479

TOPCITE 500+

64. **High p_T charged hadron suppression in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV,** PHENIX Collaboration DOI: 10.1103/PhysRevC.69.034910, Phys. Rev. C 69 (2004), 034910
65. **Single identified hadron spectra from $\sqrt{s_{NN}}$ = 130 GeV Au+Au collisions**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.69.024904, Phys. Rev. C 69 (2004), 024904
66. **J/psi production from proton proton collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.92.051802, Phys. Rev. Lett. 92 (2004), 051802
67. **Identified charged particle spectra and yields in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.69.034909, Phys. Rev. C 69 (2004), 034909

TOPCITE 500+

68. **Absence of suppression in particle production at large transverse momentum in $\sqrt{s_{NN}}$ = 200 GeV d + Au collisions**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.91.072303, Phys. Rev. Lett. 91 (2003), 072303

TOPCITE 500+

69. **Heavy ion collisions at collider energies: Insights from PHENIX**, PHENIX Collaboration, A. Drees et al., DOI: 10.1007/BF02705164, Pramana 60 (2003), 639-650
70. **J/psi production in Au Au collisions at $\sqrt{s_{NN}}$ = 200 GeV at the Relativistic Heavy Ion Collider**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.69.014901, Phys. Rev. C 69 (2004), 014901

71. **Elliptic flow of identified hadrons in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.91.182301, Phys. Rev. Lett. 91 (2003), 182301

    TOPCITE 500+

72. **Scaling properties of proton and anti-proton production in $\sqrt{s_{NN}}$ = 200 GeV Au+Au collisions**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.91.172301, Phys. Rev. Lett. 91 (2003), 172301
73. **Mid-rapidity neutral pion production in proton proton collisions at $\sqrt{s}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.91.241803, Phys. Rev. Lett. 91 (2003), 241803
74. **Suppressed pi0 production at large transverse momentum in central Au+ Au collisions at $\sqrt{s_{NN}}$ = 200 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.91.072301, Phys. Rev. Lett. 91 (2003), 072301

    TOPCITE 500+

75. **Centrality dependence of the high p_T charged hadron suppression in Au+Au collisions at $\sqrt{s_{NN}}$ =130 GeV,** PHENIX Collaboration, DOI: 10.1016/S0370-2693(03)00423-4, Phys. Lett. B 561 (2003), 82-92
76. **Measurement of the Lambda and anti-Lambda particles in Au+Au collisions at $\sqrt{s_{NN}}$ = 130 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.89.092302, Phys. Rev. Lett. 89 (2002), 092302
77. **Flow measurements via two particle azimuthal correlations in Au+Au collisions at $\sqrt{s_{NN}}$ = 130 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.89.212301, Phys. Rev. Lett. 89 (2002), 212301
78. **Event-by-event fluctuations in mean p_T and mean E_T in $\sqrt{s_{NN}}$ = 130 GeV Au+Au collisions**, PHENIX Collaboration, DOI: 10.1103/PhysRevC.66.024901, Phys. Rev. C 66 (2002), 024901
79. **Net charge fluctuations in Au+Au interactions at $\sqrt{s_{NN}}$ = 130 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.89.082301, Phys. Rev. Lett. 89 (2002), 082301
80. **Measurement of single electrons and implications for charm production in Au+Au collisions at $\sqrt{s_{NN}}$ = 130 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.88.192303, Phys. Rev. Lett. 88 (2002), 192303
81. **Transverse mass dependence of two pion correlations in Au+Au collisions at $\sqrt{s_{NN}}$ = 130 GeV**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.88.192302, Phys. Rev. Lett. 88 (2002), 192302
82. **Centrality dependence of pi+ / pi-, K+ / K-, p and anti-p production from $\sqrt{s_{NN}}$ = 130 GeV Au+Au collisions at RHIC**, PHENIX Collaboration, DOI: 10.1103/PhysRevLett.88.242301, Phys. Rev. Lett. 88 (2002), 242301
83. **First results from RHIC-PHENIX**, PHENIX Collaboration, DOI: 10.1007/s12043-001-0045-5, Pramana 57 (2001), 355-369
84. **Suppression of hadrons with large transverse momentum in central Au+Au collisions at $\sqrt{s_{NN}}$ = 130 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.88.022301, Phys. Rev. Lett. 88 (2002), 022301

    TOPCITE 1000+

85. **Overview of PHENIX results from the first RHIC run**, PHENIX Collaboration, W.A. Zajc et al., DOI: 10.1016/S0375-9474(01)01347-1, Nucl. Phys. A 698 (2002), 39-53

86. **Measurement of the mid-rapidity transverse energy distribution from $\sqrt{s_{NN}}$ = 130 GeV Au+Au collisions at RHIC,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.87.052301, Phys. Rev. Lett. 87 (2001), 052301
87. **Centrality dependence of charged particle multiplicity in Au+Au collisions at $\sqrt{s_{NN}}$ = 130 GeV,** PHENIX Collaboration, DOI: 10.1103/PhysRevLett.86.3500, Phys. Rev. Lett. 86 (2001), 3500-3505

HONORS AND AWARDS

- Outstanding Undergraduate Teaching Award, Department of Physics & Astronomy, Vanderbilt University 2013
- 1st place National College Physics Olympiad 1983
- 1st place National College Physics Olympiad 1982