

Volodymyr Vovchenko

Curriculum Vitae

University of Houston
Physics Department
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🌐 vovchenko.net

Research Interests and Expertise

- **Thermodynamics of hot and dense QCD matter:** I apply methods of statistical mechanics and phenomenological models to describe QCD equation of state at finite temperature and density, utilizing first-principle constraints from lattice QCD. I pioneered the incorporation of van der Waals (non-resonant) hadron interactions in hadron resonance gas and the use imaginary chemical potentials to constrain interaction parameters.
- **Phenomenology of Heavy-Ion Collisions:** I use statistical, transport, and hydrodynamical models to analyze observables in heavy-ion collisions, with an emphasis on fluctuations and correlations of hadron numbers used in the search for QCD critical point. I performed the first calculation of non-critical baseline for fluctuations within beam
- **Dense QCD matter, neutron stars and cosmology:** I am also interested in QCD in astrophysical and cosmological environment, including dense QCD matter and neutron stars, exotic states of matter such as quarkyonic matter, and cosmic trajectories in Early Universe at non-zero lepton flavor asymmetries.
- **Numerical calculations and open source computer code development:** I apply advanced computational techniques and foster the development of open source for use in the community. I developed *Thermal-FIST* – an open source C++ package for general-purpose hadron resonance gas model applications in heavy-ion collisions and QCD thermodynamics, used by theorists and experimentalists alike.

Education

- 2014–2018 **PhD Student**, *Goethe University Frankfurt am Main*, Germany, Grade: summa cum laude (with distinction)
Thesis: Quantum statistical van der Waals equation and its QCD applications
Advisor: Prof. Dr. Horst Stoecker
- 2011–2013 **Master Student**, *Taras Shevchenko National University*, Kyiv, Ukraine
Subject: Theoretical Physics
Thesis: Evolution of the interacting hadronic system created in relativistic nuclear collisions
Advisor: Prof. Dr. Dmitry Anchishkin
- 2007–2011 **Bachelor Student**, *Taras Shevchenko National University*, Kyiv, Ukraine
Subject: Physics

Academic appointments

- Dec 2022–... **Assistant Professor (tenure-track)**, *Physics Department, University of Houston*, Houston, TX, USA
 Research (theoretical nuclear physics), teaching, and service
- Apr 2022–
 Nov 2022 **Research Assistant Professor**, *Institute for Nuclear Theory, University of Washington*, Seattle, WA, USA
 Research in theoretical nuclear physics
- Feb 2020– **Research Fellow**, *Lawrence Berkeley National Laboratory*, Berkeley, CA, USA
 Mar 2022 Advisor: Dr. Volker Koch
 Feodor Lynen Fellowship of the Alexander von Humboldt foundation.
 Research on heavy-ion phenomenology, event-by-event fluctuations, light nuclei
- Jan 2017– **Research Associate**, *Goethe University Frankfurt am Main*, Germany
 Feb 2020 Advisor: Prof. Carsten Greiner
 Research on the QCD equation of state, hadronic interactions, heavy-ion collisions; PhD dissertation work; statistical-thermal model code Thermal-FIST

Honors

- 2025 U.S. Department of Energy Early Career Award. A highly competitive 5-year federal research grant for outstanding early career scientists at universities, national laboratories, and Office of Science User Facilities ([UH NSM news release](#))
- 2022 IUPAP (International Union of Pure and Applied Physics) Young Scientist Prize in Nuclear Physics. ([IUPAP website](#)) ([Berkeley Lab article](#))
- 2019 Feodor Lynen Research Fellowship of the Alexander von Humboldt foundation.
- 2018 Prize of the Association of Friends and Sponsors of Goethe University for Young Scientists for best dissertation in the natural sciences. ([FIAS news release](#)) ([Goethe University newspaper article](#))
- 2018 Giersch-Excellence-Award for an outstanding doctoral thesis.
- 2016 & 2017 Giersch-Excellence-Grant for outstanding work and progress in the PhD thesis project within the past year.
- 2013 Award of the National Academy of Sciences of Ukraine for the best scientific works of young scientists and students in 2012.

Research

○ Publications (as of January 8, 2026)

More than **100 publications** in peer-reviewed international journals, including Physical Review Letters, Physics Letters B, Physical Review C, Physical Review D, Journal of High Energy Physics, and Computer Physics Communications. Additionally, 4 review articles, and 39 conference proceedings. Of all the papers, about half were first-authored, and 10 were single-authored.

Google Scholar profile: <https://scholar.google.com/citations?user=IWSNP-QAAAAJ>

INSPIRE-HEP profile: <https://inspirehep.net/authors/1259390>

Total citations: 5480 (Google Scholar), 4826 (INSPIRE-HEP)

h-index: 39 (Google Scholar), 37 (INSPIRE-HEP)

Top five most cited publications:

1. "Thermal-FIST: A package for heavy-ion collisions and hadronic equation of state"
V. Vovchenko, H. Stoecker
Computer Physics Communications 244, 295 (2019) **247 citations**
2. "van der Waals Interactions in Hadron Resonance Gas: From Nuclear Matter to Lattice QCD"
V. Vovchenko, M.I. Gorenstein, and H. Stoecker
Physical Review Letters 118, 182301 (2017) **237 citations**
3. "Canonical statistical model analysis of Pb-Pb, and Pb-Pb collisions at energies available at the CERN Large Hadron Collider"
V. Vovchenko, B. Dönigus, and H. Stoecker
Physical Review C 100, 054906 (2019) **188 citations**
4. "Van der Waals equation of state with Fermi statistics for nuclear matter"
V. Vovchenko, D.V. Anchishkin, and M.I. Gorenstein
Physical Review C 91, 064314 (2015) **153 citations**
5. "Multiplicity dependence of light nuclei production at LHC energies in the canonical statistical model"
V. Vovchenko, B. Dönigus, and H. Stoecker
Physics Letters B 785, 171 (2018) **144 citations**

○ Talks

101 talks at international conferences, workshops, and seminars, of which ~ 30 were invited.

○ Career supervision

Currently supervising two postdocs, three Ph.D. students, and one undergraduate student.

■ Funding

Grants

- 2025-2030 Sole PI of a U.S. Department of Energy (Office of Science, Office of Nuclear Physics) Early Career Award "*Thermodynamic Properties Of Hot And Dense QCD Matter From Fluctuations Of Conserved Charges*". Total funding: \$875,000 (UH only).
- 2023-2026 Co-PI (25% percentage credit) of U.S. Department of Energy funded grant "*NuSTEAM – Nuclear Science in Texas to Enhance and Advance Mentees*". Collaborative grant between four institutions, of which UH is the leading one. Total funding: \$1.36M, of which \$485,000 for UH.
- 2020-2022 Sole PI of a Feodor Lynen Research Fellowship of the Alexander von Humboldt foundation to carry out a research project "*QCD equation of state at finite baryon density through relativistic virial expansion*" as a postdoc at the Lawrence Berkeley National Laboratory. Total funding: 120,000 EUR.

Computational awards

- 2024-2026 Co-PI of DOE-INCITE large scale computational project for lattice QCD.

■ Career Supervision

Postdoctoral researchers

2. Grégoire Pihan (since Oct 2024, previously at Wayne State University)

1. Roman Poberezhniuk (since Apr 2024, previously at Frankfurt Institute for Advanced Studies, Germany)

Graduate students

3. Jean Guma de la Vega (since Sep 2025, 1st year Ph.D. student, expected graduation date 05/2030)
2. Volodymyr Kuznietsov (since Aug 2023, 3rd year Ph.D. student, expected graduation date 05/2028)
1. Max (Tripp) Moss (since Feb 2023, 4th year Ph.D. student, expected graduation date 05/2027)

Undergraduate students

1. Jonathan Parra (since Aug 2023)

Service for the community

○ Referee for international journals

Reviewed more than 50 unique papers for various international journals, including

- Nature Communications
- Physical Review Letters
- Progress in Particle and Nuclear Physics
- Physical Review C & D
- Physics Letters B
- Journal of High Energy Physics
- Nuclear Physics A
- European Physical Journal A & Plus

○ Program proposal reviewer for funding agencies

- Department of Energy, Office of Science (USA)
- National Science Foundation (USA)
- National Science Centre (Poland)
- Regular Fondecyt National Projects Competition (Ministry of Science, Technology, Knowledge and Innovation of Chile)

○ Open-source computer code development

Thermal- A documented C++ package for general-purpose hadron resonance gas model
FIST applications. Cited in 200+ publications. (<https://github.com/vlvovch/Thermal-FIST>)

CUDA Molecular dynamics simulation and visualization of the Lennard-Jones system utilizing
Lennard CUDA-enabled GPU's (<https://github.com/vlvovch/lennard-jones-cuda>)
Jones

sample- A header-only C++ library for mean and standard error estimation moments of moments, cumulants and factorial cumulants of random number (<https://github.com/vlvovch/sample-moments>)

○ Outreach

- Jun 2025 Faculty Presentation at QuarkNet Summer Workshop at Rice University 2025 to an audience of high-school teachers
- Feb 2024 Judge at the UH Physics Research Day
- Nov 2023 Representative at UH Physics Booth at 6th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan
- 2015-2017 Developer of several educational physics apps for Android, available on Play Store: <https://play.google.com/store/apps/developer?id=Voladd>

Teaching experience

- Fall 2025 Lecturer, PHYS1302 "College Physics II", Physics Department, University of Houston
- Apr 2025 Invited lecture at Quark Matter 2025 conference to an audience of 400+ students and early-career researchers, Goethe University Frankfurt
- Spring 2025 Lecturer and Course Developer, PHYS6350 "Computational Physics", Physics Department, University of Houston. Open source online textbook: <https://vovchenko.net/computational-physics>
- Fall 2024 Lecturer, PHYS1302 "College Physics II", Physics Department, University of Houston
- Spring 2023 Lecturer, PHYS6350 "Computational Physics", Physics Department, University of Houston. Open source: <https://github.com/vlvovch/PHYS6350-ComputationalPhysics>
- Feb 2019 Invited lecture at the International School "COST Workshop on Interplay of hard and soft QCD probes for collectivity in heavy-ion collisions", Lund University
- Winter 2017/2018 Teaching assistant for the course "Statistical Physics", Physics Department, Goethe University Frankfurt
- Winter 2016/2017 Teaching assistant for the course "Classical Electrodynamics", Physics Department, Goethe University Frankfurt
- Fall 2012-2013 Teaching assistant for the course "Methods of mathematical physics", Physics Department, Taras Shevchenko National University of Kyiv

Scholarly Work

The works are sorted by reverse chronological order.

Works performed entirely while employed by the University of Houston are marked by the asterisk near the author's name, while works that were partially performed while employed by the University of Houston are marked by a double asterisk.

Publications with 50+ citations are highlighted with the corresponding citation count.

Citation summary

As of **January 12, 2026**:

h-index: 39 (source: Google Scholar), 37 (source: INSPIRE-HEP)

Citations: 5478 (source: Google Scholar), 4825 (source: INSPIRE-HEP)

Publication list also available at [INSPIRE-HEP](#) and [Google Scholar](#)

Journal articles

o Works performed entirely while employed by the University of Houston

102. "Upper Bound on the Cosmic Baryon Chemical Potential from Lepton-Flavor Asymmetry"
F. di Clemente, A. Drago, L. Formaggio, C. Ratti, **V. Vovchenko***, G. Yadav
arXiv:2511.11995 [hep-ph], submitted for publication
101. "Systematics of the chemical freeze-out line in the high baryon density regime explored at SIS100"
E.L. Hofmann, T. Reichert, **V. Vovchenko***, J. Steinheimer, M. Bleicher
arXiv:2511.01413 [nucl-th], accepted for publication in **European Physical Journal Special Topics**
100. "High-order cumulants and correlation functions near the critical point from molecular dynamics"
V.A. Kuznietsov, R. Poberezhniuk, M.I. Gorenstein, V.Koch, **V. Vovchenko***
arXiv:2511.00755 [nucl-th], submitted for publication
99. "Indications for Freeze-Out of Charge Fluctuations in the Quark-Gluon Plasma at the LHC"
J. Parra, R. Poberezhniuk, V. Koch, C. Ratti, **V. Vovchenko***
Physical Review Letters 135, 242302 (2025)
98. "Acceptance dependence of factorial cumulants, long-range correlations, and the antiproton puzzle"
A. Bzdak, V. Koch, **V. Vovchenko***
Physical Review C 112, 024901 (2025)
97. "Lattice QCD constraints on the critical point from an improved precision equation of state"
S. Borsanyi, Z. Fodor, J.N. Guenther, P. Parotto, A. Pasztor, C. Ratti, **V. Vovchenko***, C.H. Wong
Physical Review D 112, L111505 (2025)
96. "Building neutron stars with the MUSES calculation engine"
M. R. Pelicer, N. Cruz-Camacho, C. Conde, D. Friedenberg, S. Roy, Z. Zhang, T. A. Manning, M. G. Alford, A. Clevinger, J. Grefa, R. Haas, A. Haber, M. Hippert, J. W. Holt, J. Jahan, M. Kahangirwe, R. Kumar, J. Peterson, H. Shah, A. W. Steiner, H. Tan, Y. Yang, **V. Vovchenko***, V. Dexheimer, J. Noronha, J. Noronha-Hostler, C. Ratti, N. Yunes
Physical Review D 111, 103037 (2025)
95. "Correlations between nuclear incompressibility, liquid-gas critical point, and quarkyonic transition"
A. Lysenko, M.I. Gorenstein, T. Moss, R. Poberezhniuk, **V. Vovchenko***
Physical Review C 111, 035204 (2025)
94. "Quantum van der Waals quarkyonic matter at nonzero isospin asymmetry"
T. Moss, R. Poberezhniuk, **V. Vovchenko***
Physical Review C 111, 025803 (2025)
93. "Locating the QCD critical point from first principles through contours of constant entropy density"

- H. Shah, M. Hippert, J. Noronha, C. Ratti, **V. Vovchenko***
Physical Review C 113, L012201 (2026)
92. "Density correlations under global and local charge conservation"
V. Vovchenko*
Physical Review C 110, L601902 (2024)
91. "Chemical freeze-out curve in heavy-ion collisions and the QCD critical point"
A. Lysenko, M.I. Gorenstein, R. Poberezhniuk, **V. Vovchenko***
Physical Review C 111, 054903 (2025)
90. "Convergence properties of T' -Expansion Scheme: Hadron Resonance Gas and Cluster Expansion Model"
M. Kahangirwe, I. Gonzalez, J.A. Muñoz, C. Ratti, **V. Vovchenko***
Physical Review D 111, 094034 (2025)
89. "Magnetic field effect on hadron yield ratios and fluctuations in hadron resonance gas"
V. Vovchenko*
Physical Review C 110, 034914 (2024)
88. "The structure of the $f_0(980)$ from system size dependent hadronic resonance ratios in p+p, p+Pb, and Pb+Pb collisions at the LHC"
T. Reichert, J. Steinheimer, **V. Vovchenko***, C. Herold, A. Limphirat, M. Bleicher
European Physical Journal C 84, 1301 (2024)
87. "Examining the possibility that normal nuclear matter is quarkyonic"
V. Koch, L. McLerran, G.A. Miller, **V. Vovchenko***
Physical Review C 110, 025201 (2024) [Editors' Suggestion]
86. "Coordinate versus momentum cuts and effects of collective flow on critical fluctuations"
V.A. Kuznietsov, M.I. Gorenstein, V. Koch, **V. Vovchenko***
Physical Review C 110, 015206 (2024)
85. "Quarkyonic matter with quantum van der Waals theory"
R.V. Poberezhnyuk, H. Stoecker, **V. Vovchenko***
Physical Review C 108, 045202 (2023)
84. "Effect of finite volume on thermodynamics of quark-hadron matter"
S. Pal, A. Motornenko, **V. Vovchenko***, A. Bhattacharyya, J. Steinheimer, H. Stoecker
Physical Review D 109, 014009 (2024)
83. "Molecular dynamics analysis of particle number fluctuations in the mixed phase of a first-order phase transition"
V.A. Kuznietsov, O. Savchuk, R.V. Poberezhnyuk, **V. Vovchenko***, M.I. Gorenstein, H. Stoecker
Physical Review C 107, 055206 (2023)
- **Works that were partially performed while employed by the University of Houston**
82. "Quarkyonic or baryquark matter? On the dynamical generation of momentum space shell structure"
V. Koch, **V. Vovchenko****
Physics Letters B 841, 137942 (2023)

81. "Phase transition amplification of proton number fluctuations in nuclear collisions from a transport model approach"
O. Savchuk, R.V. Poberezhnyuk, A. Motornenko, J. Steinheimer, M.I. Gorenstein, **V. Vovchenko****
Physical Review C 107, 024913 (2023)

○ **Works performed before being employed by the University of Houston**

80. "Energy dependence of light hypernuclei production in heavy-ion collisions from a coalescence and statistical-thermal model perspective"
T. Reichert, J. Steinheimer, **V. Vovchenko**, B. Dönigus, M. Bleicher
Physical Review C 107, 014912 (2023)

79. "Enhanced dilepton emission from a phase transition in dense matter"
O. Savchuk, A. Motornenko, J. Steinheimer, **V. Vovchenko**, M. Bleicher, M.I. Gorenstein, T. Galatyuk
Journal of Physics G 50, 125104 (2023)

78. "Centrality dependence of proton and light nuclei yields as a consequence of baryon annihilation in the hadronic phase"
V. Vovchenko, V. Koch
Physics Letters B 835, 137577 (2022)

77. "Cooper-Frye sampling with short-range repulsion"
V. Vovchenko
Physical Review C 106, 064906 (2022)

76. "Thermodynamic approach to proton number fluctuations in baryon-rich heavy-ion matter created at moderate collision energies"
V. Vovchenko, V. Koch
Physics Letters B 833, 137368 (2022)

75. "Critical point particle number fluctuations from molecular dynamics"
V.A. Kuznietsov, O. Savchuk, M.I. Gorenstein, V. Koch, **V. Vovchenko**
Physical Review C 105, 044903 (2022)

74. "Coalescence, the thermal model and multi-fragmentation: The energy and volume dependence of light nuclei production in heavy ion collisions"
P. Hillmann, K. Käfer, J. Steinheimer, **V. Vovchenko**, M. Bleicher
Journal of Physics G 49, 055107 (2022)

73. "Towards solving the puzzle of high temperature light (anti)-nuclei production in ultra-relativistic heavy ion collisions"
T. Neidig, K. Gallmeister, C. Greiner, M. Bleicher, **V. Vovchenko**
Physics Letters B 827, 136891 (2022)

72. "Proton number cumulants and correlation functions in Au-Au collisions at $\sqrt{s_{NN}} = 7.7 - 200$ GeV from hydrodynamics"
V. Vovchenko, V. Koch, C. Shen
Physical Review C 105, 014904 (2022) **[91 citations]**

71. "Correcting event-by-event fluctuations in heavy-ion collisions for exact global conservation laws with the generalized subensemble acceptance method"
V. Vovchenko
Physical Review C 105, 014903 (2022)

70. "Constraining the hadronic spectrum and repulsive interactions in a hadron resonance gas via fluctuations of conserved charges"
J.M. Kartheim, V. Koch, **V. Vovchenko**, C. Ratti
Physical Review D 104, 094009 (2021)
69. "Constraining baryon annihilation in the hadronic phase of heavy-ion collisions via event-by-event fluctuations"
O. Savchuk, **V. Vovchenko**, V. Koch, J. Steinheimer, H. Stoecker
Physics Letters B 827, 136983 (2022)
68. "Machine learning based approach to fluid dynamics"
K. Taradiy, K. Zhou, J. Steinheimer, R.V. Poberezhnyuk, **V. Vovchenko**, H. Stoecker
arXiv:2106.02841 [physics.comp-ph], submitted for publication
67. "Ambiguities in the hadro-chemical freeze-out of Au+Au collisions at SIS18 energies and how to resolve them"
A. Motornenko, J. Steinheimer, **V. Vovchenko**, R. Stock, H. Stoecker
Physics Letters B 822, 136703 (2021)
66. "Efficiency corrections for factorial moments and cumulants of overlapping sets of particles"
V. Vovchenko, V. Koch
Nuclear Physics A 1010, 122179 (2021)
65. "Phase diagram of interacting pion matter and isospin charge fluctuations"
O.S. Stashko, O.V. Savchuk, R.V. Poberezhnyuk, **V. Vovchenko**, M.I. Gorenstein
Physical Review C 103, 065201 (2021)
64. "Particlization of an interacting hadron resonance gas with global conservation laws for event-by-event fluctuations in heavy-ion collisions"
V. Vovchenko, V. Koch
Physical Review C 103, 044903 (2021) **[64 citations]**
63. "Higher order conserved charge fluctuations inside the mixed phase"
R.V. Poberezhnyuk, O. Savchuk, M.I. Gorenstein, **V. Vovchenko**, H. Stoecker
Physical Review C 103, 024912 (2021)
62. "Pion Condensation in the Early Universe at Nonvanishing Lepton Flavor Asymmetry and Its Gravitational Wave Signatures"
V. Vovchenko, B.B. Brandt, F. Cuteri, G. Endrodi, F. Hajkarim, J. Schaffner-Bielich
Physical Review Letters 126, 012701 (2021) **[55 citations]**
61. "Cumulants of multiple conserved charges and global conservation laws"
V. Vovchenko, R.V. Poberezhnyuk, V. Koch
JHEP 10, 089 (2020) **[53 citations]**
60. "Feeddown contributions from unstable nuclei in relativistic heavy-ion collisions"
V. Vovchenko, B. Dönigus, B. Kardan, M. Lorenz, H. Stoecker
Physics Letters B 809, 135746 (2020)
59. "Bose-Einstein condensation phenomenology in systems with repulsive interactions"
O. Savchuk, Y. Bondar, O. Stashko, R.V. Poberezhnyuk, **V. Vovchenko**, M.I. Gorenstein, H. Stoecker
Physical Review C 102, 035202 (2020)
58. "Critical point fluctuations: Finite size and global charge conservation effects"
R.V. Poberezhnyuk, O. Savchuk, M.I. Gorenstein, **V. Vovchenko**, K. Taradiy, V.V. Begun, L.

- Satarov, J. Steinheimer, H. Stoecker
Physical Review C 102, 024908 (2020)
57. "Connecting fluctuation measurements in heavy-ion collisions with the grand-canonical susceptibilities"
V. Vovchenko, O. Savchuk, R.V. Poberezhnyuk, M.I. Gorenstein, V. Koch
Physics Letters B 811, 135868 (2020) **[82 citations]**
56. "Binomial acceptance corrections for particle number distributions in high-energy reactions"
O. Savchuk, R.V. Poberezhnyuk, **V. Vovchenko**, and M.I. Gorenstein
Physical Review C 101, 024917 (2020)
55. "Traces of the nuclear liquid-gas phase transition in the analytic properties of hot QCD"
O. Savchuk, **V. Vovchenko**, R.V. Poberezhnyuk, M.I. Gorenstein, and H. Stoecker
Physical Review C 101, 035205 (2020)
54. "Critical point signatures in the cluster expansion in fugacities"
V. Vovchenko, C. Greiner, V. Koch, and H. Stoecker
Physical Review D 101, 014015 (2020)
53. "Kinetic freeze-out temperature from yields of short-lived resonances"
A. Motornenko, **V. Vovchenko**, C. Greiner, H. Stoecker
Physical Review C 102, 024909 (2020) **[53 citations]**
52. "Canonical statistical model analysis of p-p, p-Pb, and Pb-Pb collisions at the LHC"
V. Vovchenko, B. Dönigus, and H. Stoecker
Physical Review C 100, 054906 (2019) **[189 citations]**
51. "Chemical freeze-out conditions and fluctuations of conserved charges in heavy-ion collisions within quantum van der Waals model"
R. Poberezhnyuk, **V. Vovchenko**, A. Motornenko, M.I. Gorenstein, H. Stoecker
Physical Review C 100, 054904 (2019)
50. "Equation of state for hot QCD and compact stars from a mean field approach"
A. Motornenko, J. Steinheimer, **V. Vovchenko**, S. Schramm, and H. Stoecker
Physical Review C 101, 034904 (2020) **[113 citations]**
49. "Detecting the Hadron-Quark Phase Transition with Gravitational Waves"
M. Hanauske, L. Bovard, E. Most, J. Papenfort, J. Steinheimer, A. Motornenko, **V. Vovchenko**,
V. Dexheimer, S. Schramm, H. Stöcker
Universe 5, 156 (2019)
48. "Neutron Star Mergers: Probing the EoS of Hot, Dense Matter by Gravitational Waves"
M. Hanauske, J. Steinheimer, A. Motornenko, **V. Vovchenko**, L. Bovard, E.R. Most, L.J.
Papenfort, S. Schramm, H. Stöcker
Particles 2, 44 (2019) **[65 citations]**
47. "Phase transitions and Bose-Einstein condensation in alpha-nucleon matter"
L.M. Satarov, I.N. Mishustin, A. Motornenko, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Physical Review C 99, 024909 (2019)
46. "Analytic structure of thermodynamic systems with repulsive interactions"
K. Taradiy, A. Motornenko, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Physical Review C 100, 065202 (2019)

45. "Nucleosynthesis in heavy-ion collisions at the LHC via the Saha equation"
V. Vovchenko, K. Gallmeister, J. Schaffner-Bielich, C. Greiner
Physics Letters B 800, 135131 (2020) **[58 citations]**
44. "Thermal-FIST: A package for heavy-ion collisions and hadronic equation of state"
V. Vovchenko and H. Stoecker
Computer Physics Communications 244, 295 (2019) **[246 citations]**
43. "Hadron yields and fluctuations at the CERN Super Proton Synchrotron: system size dependence from Pb+Pb to p+p collisions"
A. Motornenko, V.V. Begun, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Physical Review C 99, 034909 (2019)
42. "Hagedorn bag-like model with a crossover transition meets lattice QCD"
V. Vovchenko, M.I. Gorenstein, C. Greiner, and H. Stoecker,
Physical Review C 99, 045204 (2019)
41. "Noncongruent phase transitions in strongly interacting matter within the quantum van der Waals model"
R.V. Poberezhnyuk, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Physical Review C 99, 024907 (2019)
40. "Multiplicity dependence of light nuclei production at LHC energies in the canonical statistical model"
V. Vovchenko, B. Dönigus, and H. Stoecker
Physics Letters B 785, 171 (2018) **[145 citations]**
39. "Finite resonance widths influence the thermal-model description of hadron yields"
V. Vovchenko, M.I. Gorenstein, and H. Stoecker
Physical Review C 98, 034906 (2018) **[89 citations]**
38. "Monte Carlo approach to the excluded-volume hadron resonance gas in grand canonical and canonical ensembles"
V. Vovchenko, M.I. Gorenstein, and H. Stoecker
Physical Review C 98, 064909 (2018)
37. "Statistical hadron-gas treatment of systems created in proton-proton interactions at energies available at the CERN Super Proton Synchrotron"
V.V. Begun, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Physical Review C 98, 054909 (2018)
36. "Estimation of the freeze-out parameters reachable in a fixed-target experiment at the CERN Large Hadron Collider"
V. Begun, D. Kikoła, **V. Vovchenko**, and D. Wielanek
Physical Review C 98, 034905 (2018)
35. "Flavor-dependent eigenvolume interactions in a hadron resonance gas"
P. Alba, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Nuclear Physics A 974, 22 (2018) **[55 citations]**
34. "Critical point of nuclear matter and beam energy dependence of net proton number fluctuations"
V. Vovchenko, L. Jiang, M.I. Gorenstein, and H. Stoecker
Physical Review C 97, 024910 (2018)
33. "Cluster Expansion Model for QCD Baryon Number Fluctuations: No Phase Transition at $\mu_B/T < \pi$ "

- V. Vovchenko**, J. Steinheimer, O. Philipsen, and H. Stoecker
Physical Review D 97, 114030 (2018) [86 citations]
32. “Beth-Uhlenbeck approach for repulsive interactions between baryons in a hadron gas”
V. Vovchenko, A. Motornenko, M.I. Gorenstein, and H. Stoecker
Physical Review C 97, 035202 (2018)
31. “Modeling baryonic interactions with the Clausius-type equation of state”
V. Vovchenko, M.I. Gorenstein, and H. Stoecker
European Physical Journal A 54, 16 (2018)
30. “Repulsive baryonic interactions and lattice QCD observables at imaginary chemical potential”
V. Vovchenko, A. Pásztor, S.D. Katz, Z. Fodor, and H. Stoecker
Physics Letters B 775, 71 (2017) [121 citations]
29. “Multicomponent van der Waals equation of state: Applications in nuclear and hadronic physics”
V. Vovchenko, A. Motornenko, P. Alba, M.I. Gorenstein, L.M. Satarov, and H. Stoecker
Physical Review C 96, 045202 (2017) [92 citations]
28. “Equations of state for real gases on the nuclear scale”
V. Vovchenko
Physical Review C 96, 015206 (2017) [65 citations]
27. “Quantum van der Waals and Walecka models of nuclear matter”
R.V. Poberezhnyuk, **V. Vovchenko**, D.V. Anchishkin, and M.I. Gorenstein
International Journal of Modern Physics E 26, 1750061 (2017)
26. “Bose-Einstein condensation and liquid-gas phase transition in strongly interacting matter composed of α particles”
L.M. Satarov, M.I. Gorenstein, A. Motornenko, **V. Vovchenko**, I.N. Mishustin, and H. Stoecker
Journal of Physics G 44, 125102 (2017)
25. “New scenarios for hard-core interactions in a hadron resonance gas”
L.M. Satarov, **V. Vovchenko**, P. Alba, M.I. Gorenstein, and H. Stoecker,
Physical Review C 95, 024902 (2017)
24. “van der Waals Interactions in Hadron Resonance Gas: From Nuclear Matter to Lattice QCD”
V. Vovchenko, M.I. Gorenstein, and H. Stoecker
Physical Review Letters 118, 182301 (2017) [237 citations]
23. “Conserved charge fluctuations are not conserved during the hadronic phase”
J. Steinheimer, **V. Vovchenko**, J. Aichelin, M. Bleicher, and H. Stoecker
Physics Letters B 776, 32 (2018)
22. “Limiting temperature of pion gas with the van der Waals equation of state”
R.V. Poberezhnyuk, **V. Vovchenko**, D.V. Anchishkin, and M.I. Gorenstein
Journal of Physics G 43, 095105 (2016)
21. “Challenges in QCD matter physics – The scientific programme of the Compressed Baryonic Matter experiment at FAIR”
T. Ablyazimov, **V. Vovchenko** et al. [CBM Collaboration]
The European Physical Journal A 53, 1 (2017) [470 citations]
20. “Electromagnetic probes of a pure-gluon initial state in nucleus-nucleus collisions at energies available at the CERN Large Hadron Collider”

- V. Vovchenko**, Iu.A. Karpenko, M.I. Gorenstein, L.M. Satarov, I.N. Mishustin, B. Kämpfer, and H. Stoecker
Physical Review C 94, 024906 (2016)
19. "Examination of the sensitivity of the thermal fits to heavy-ion hadron yield data to the modeling of the eigenvolume interactions"
V. Vovchenko and H. Stoecker
Physical Review C 95, 044904 (2017) **[66 citations]**
18. "Surprisingly large uncertainties in temperature extraction from thermal fits to hadron yield data at LHC"
V. Vovchenko and H. Stoecker
Journal of Physics G 44, 055103 (2017)
17. "Hadron multiplicities and chemical freeze-out conditions in proton-proton and nucleus-nucleus collisions"
V. Vovchenko, V.V. Begun, and M.I. Gorenstein
Physical Review C 93, 064906 (2016) **[139 citations]**
16. "Entropy production in chemically nonequilibrium quark-gluon plasma created in central Pb+Pb collisions at energies available at the CERN Large Hadron Collider"
V. Vovchenko, M.I. Gorenstein, L.M. Satarov, I.N. Mishustin, L.P. Csernai, I. Kisel, and H. Stoecker
Physical Review C 93, 014906 (2016)
15. "Glueballs amass at RHIC and LHC Colliders! - The early quarkless 1st order phase transition at $T=270$ MeV - from pure Yang-Mills glue plasma to GlueBall-Hagedorn states"
H. Stoecker, K. Zhou, S. Schramm, F. Senzel, C. Greiner, M. Beitel, K. Gallmeister, M. Gorenstein, I. Mishustin, D. Vasak, J. Steinheimer, J. Struckmeier, **V. Vovchenko**, L. Satarov, Z. Xu, P. Zhuang, L.P. Csernai, B. Sinha, S. Raha, T.S. Biró, M. Panero
Journal of Physics G 43, 015105 (2016)
14. "Non-Gaussian particle number fluctuations in vicinity of the critical point for van der Waals equation of state"
V. Vovchenko, R.V. Poberezhnyuk, D.V. Anchishkin, and M.I. Gorenstein
Journal of Physics A 49, 015003 (2016)
13. "Scaled variance, skewness, and kurtosis near the critical point of nuclear matter"
V. Vovchenko, D.V. Anchishkin, M.I. Gorenstein, and R.V. Poberezhnyuk
Physical Review C 92, 054901 (2015) **[104 citations]**
12. "Van der Waals equation of state with Fermi statistics for nuclear matter"
V. Vovchenko, D.V. Anchishkin, and M.I. Gorenstein
Physical Review C 91, 064314 (2015) **[153 citations]**
11. "Particle Number Fluctuations for van der Waals Equation of State"
V. Vovchenko, D.V. Anchishkin, and M.I. Gorenstein
Journal of Physics A 48, 305001 (2015) **[83 citations]**
10. "Mean-field approach in the multi-component gas of interacting particles applied to relativistic heavy-ion collisions"
D. Anchishkin and **V. Vovchenko**
Journal of Physics G 42, 105102 (2015)

9. "Hadron Resonance Gas Equation of State from Lattice QCD"
V. Vovchenko, D.V. Anchishkin, and M.I. Gorenstein
Physical Review C 91, 024905 (2015) **[103 citations]**
8. "Mean transverse mass of hadrons in proton-proton reactions"
V.Yu. Vovchenko, D.V. Anchishkin, and M.I. Gorenstein
Nuclear Physics A 936, 1-5 (2015)
7. "Time dependence of partition into spectators and participants in relativistic heavy-ion collisions"
V. Vovchenko, D. Anchishkin, and L.P. Csernai
Physical Review C 90, 044907 (2014)
6. "System-size and energy dependence of particle momentum spectra: The UrQMD analysis of p+p and Pb+Pb collisions"
V.Yu. Vovchenko, D.V. Anchishkin, and M.I. Gorenstein
Physical Review C 90, 024916 (2014)
5. "A new approach to time-dependent transport through an interacting quantum dot within the Keldysh formalism"
V. Vovchenko, D. Anchishkin, J. Azema, P. Lombardo, R. Hayn, and A.-M. Daré
Journal of Physics: Condensed Matter 26, 015306 (2014)
4. "Longitudinal fluctuations of the center of mass of the participants in heavy-ion collisions"
V. Vovchenko, D. Anchishkin, and L.P. Csernai
Physical Review C 88, 014901 (2013)
3. "Hadronic Reaction Zones in Relativistic Nucleus-Nucleus Collisions"
D. Anchishkin, **V. Vovchenko**, and S. Yezhov
International Journal of Modern Physics E 22, 1350042 (2013)
2. "Pionic freeze-out hypersurfaces in relativistic nucleus-nucleus collisions"
D. Anchishkin, **V. Vovchenko**, and L.P. Csernai
Physical Review C 87, 014906 (2013)
1. "Simulation of percolation threshold in composites filled with conducting particles of various morphologies"
L. Vovchenko and **V. Vovchenko**
Materialwissenschaft und Werkstofftechnik 42, 70-74 (2011)

Review articles

5. "Exploring the QCD phase diagram through correlations and fluctuations"
V. Koch, **V. Vovchenko**
arXiv:2512.04288 [nucl-th], submitted for publication
4. "The BEST framework for the search for the QCD critical point and the chiral magnetic effect"
X. An, **V. Vovchenko** *et al.*
Nuclear Physics A 1017, 122343 (2022) **[144 citations]**
3. "Hadron resonance gas with van der Waals interactions"
V. Vovchenko
International Journal of Modern Physics E 29, 2040002 (2020)

2. "Dynamics of critical fluctuations: Theory – phenomenology – heavy-ion collisions"
M. Bluhm, **V. Vovchenko** *et al.*
Nuclear Physics A 1003, 122016 (2020) **[129 citations]**
1. "PANDA as midrapidity detector for a future HESR Collider at FAIR"
L. Frankfurt, M. Strikman, A. Larionov, A. Lehrach, R. Maier, H. Hees, C. Spieles, **V. Vovchenko**,
H. Stoecker
European Physical Journal A 56, 171 (2020)

Community white paper contributions

5. "Hot QCD White Paper"
M. Arslanod, **V. Vovchenko*** *et al.*
arXiv:2303.17254 [nucl-ex] **[57 citations]**
4. "The Present and Future of QCD"
P. Achenbach, **V. Vovchenko*** *et al.*
Nuclear Physics A 1047, 122874 (2024) **[119 citations]**
3. "Dense Nuclear Matter Equation of State from Heavy-Ion Collisions"
A. Sorensen, **V. Vovchenko*** *et al.*
Progress in Particle and Nuclear Physics 134, 104080 (2024) **[225 citations]**
2. "Long Range Plan: Dense matter theory for heavy-ion collisions and neutron stars"
A. Lovato, **V. Vovchenko**** *et al.*
arXiv:2211.02224 [nucl-th] **[58 citations]**
1. "QCD Phase Structure and Interactions at High Baryon Density: Continuation of BES Physics Program with CBM at FAIR"
D. Almaalol, **V. Vovchenko**** *et al.*
arXiv:2209.05009 [nucl-ex]

Contributions to conference proceedings

37. "Searching for the QCD critical point through constant entropy density contours "
H. Shah, M. Hippert, J. Noronha, C. Ratti, **V. Vovchenko***
arXiv:2510.13001 [hep-ph], *Quark Matter 2025 Proceedings*
36. "Probing QGP using local charge fluctuations in heavy-ion collisions "
J. Parra, R. Poberezhniuk, V. Koch, C. Ratti, **V. Vovchenko***
arXiv:2509.16167 [nucl-th], *Quark Matter 2025 Proceedings*
35. "Proton cumulants from hydrodynamics in light of new STAR data "
V. Vovchenko*, V. Koch
Journal of Subatomic Particles and Cosmology 3, 100053 (2025)
34. "Quarkyonic or baryquark matter"
V. Koch, **V. Vovchenko***
Journal of Subatomic Particles and Cosmology 3, 100025 (2025)

33. "Critical Point Fluctuations in Heavy-Ion Collisions within Molecular Dynamics with Expansion"
V.A. Kuznietsov, **V. Vovchenko***, V. Koch, M.I. Gorenstein
EPJ Web of Conferences **316**, 06003 (2025), *SQM 2024 Proceedings*
32. "Magnetic Field Effects on Hadron Yields and Fluctuations"
V. Vovchenko*
EPJ Web of Conferences **316**, 06015 (2025), *SQM 2024 Proceedings*
31. "Exploring the QCD Phase Diagram with Fluctuations"
V. Koch and **V. Vovchenko***
Acta Physica Polonica B: Proceedings Supplement **55**, 5-A5 (2024), *LXIII Cracow School of Theoretical Physics Proceedings*
30. "Spinodal enhancement of fluctuations in nucleus-nucleus collisions"
R.V. Poberezhnyuk, O. Savchuk, **V. Vovchenko***, V. Kuznietsov, J. Steinheimer, M. Gorenstein, H. Stoecker
EPJ Web of Conferences **296**, 06002 (2022), *Quark Matter 2023 Proceedings*
29. "QCD at finite temperature and density: Criticality"
V. Vovchenko*
EPJ Web of Conferences **296**, 01017 (2024), *Quark Matter 2023 Proceedings*
28. "Constraints on hadron resonance gas interactions via first-principles Lattice QCD susceptibilities"
J.M. Karthein, V. Koch, C. Ratti, **V. Vovchenko****
EPJ Web of Conferences **276**, 03014 (2022), *SQM 2022 Proceedings*
27. "Fluctuations in heavy ion collisions and global conservation effects"
R.V. Poberezhnyuk, **V. Vovchenko**, O. Savchuk, V. Koch, M.I. Gorenstein, H. Stoecker
EPJ Web of Conferences **276**, 01005 (2022), *SQM 2022 Proceedings*
26. "Fluctuations of conserved charges in hydrodynamics and molecular dynamics"
V. Vovchenko
EPJ Web of Conferences **276**, 01027 (2022), *SQM 2022 Proceedings*
25. "Proton number cumulants and correlation functions from hydrodynamics and the QCD phase diagram"
V. Vovchenko, V. Koch, C. Shen
Acta Physica Polonica B: Proceedings Supplement **16**, 83 (2023), *Quark Matter 2022 Proceedings*
24. "Phenomenological developments for event-by-event fluctuations of conserved charges"
V. Vovchenko
PoS **CPOD2021** (2022) 013, *CPOD 2021 Proceedings*
23. "Thermal-model-based characterization of heavy-ion-collision systems at chemical freeze-out"
J.M. Karthein, P. Alba, V. Mantovani-Sarti, J. Noronha-Hostler, P. Parotto, I. Portillo-Vazquez, **V. Vovchenko**, V. Koch, C. Ratti
EPJ Web of Conferences **259**, 11010 (2022), *SQM2021 Proceedings*
22. "Net-particle number fluctuations in a hydrodynamic description of heavy-ion collisions"
V. Vovchenko, V. Koch, C. Shen
EPJ Web of Conferences **259**, 10011 (2022), *SQM2021 Proceedings*

21. "Exploring the QCD phase diagram with fluctuations"
V. Koch and **V. Vovchenko**
Acta Physica Polonica B: Proceedings Supplement **52**, 203 (2021), *60th Cracow School Proceedings*
20. "Exploring the QCD phase diagram with fluctuations"
V. Koch, **V. Vovchenko**, and R.V. Poberezhnyuk
Acta Physica Polonica B: Proceedings Supplement **14**, 363 (2021)
19. "QCD equation of state at vanishing and high baryon density: Chiral Mean Field model"
A. Motornenko, **V. Vovchenko**, J. Steinheimer, S. Schramm, and H. Stoecker
Nuclear Physics A **1005**, 121836 (2021), *Quark Matter 2019 Proceedings*
18. "Equation of state of QCD matter within the Hagedorn bag-like model"
V. Vovchenko, M.I. Gorenstein, C. Greiner, and H. Stoecker
Springer Proceedings in Physics **250**, 361 (2020), *SQM 2019 Proceedings*
17. "Phase Transitions and Bose-Einstein Condensation in Alpha-Nucleon Matter"
L.M. Satarov, I.N. Mishustin, A. Motornenko, **V. Vovchenko**, M.I. Gorenstein, and H. Stoecker
Ukrainian Journal of Physics 64, 745 (2019)
16. "MAGIC - how MATter's extreme phases can be revealed in Gravitational wave observations and in relativistic heavy Ion Collision experiments"
M. Hanauske, L. Bovard, J. Steinheimer, A. Motornenko, **V. Vovchenko**, S. Schramm, V. Dexheimer, J. Papenfort, E.R. Most, and H. Stoecker
Journal of Physics: Conference Series **1271**, 012023 (2019), *Kruger 2018 Proceedings*
15. "Matter And Gravitation In Collisions of heavy ions and neutron stars: equation of state"
A. Motornenko, J. Steinheimer, **V. Vovchenko**, S. Schramm, and H. Stoecker
PoS **CORFU2018** (2019) 150, *CPOD 2018 Proceedings*
14. "QCD equation of state at finite baryon density with fugacity expansion"
V. Vovchenko, J. Steinheimer, O. Philipsen, and H. Stoecker
PoS **CORFU2018** (2019) 199, *CPOD 2018 Proceedings*
13. "QCD at high density: Equation of state for nuclear collisions and neutron stars"
A. Motornenko, **V. Vovchenko**, J. Steinheimer, S. Schramm, and H. Stoecker
Nuclear Physics A **982**, 891 (2019), *Quark Matter 2018 Proceedings*
12. "Lattice-based QCD equation of state at finite baryon density: Cluster Expansion Model"
V. Vovchenko, J. Steinheimer, O. Philipsen, A. Pasztor, Z. Fodor, S.D. Katz, and H. Stoecker
Nuclear Physics A **982**, 859 (2019), *Quark Matter 2018 Proceedings*
11. "Hadron thermodynamics from imaginary chemical potentials"
A. Pásztor, P. Alba, R. Bellwied, S. Borsányi, Z. Fodor, J. Günther, S. Katz, C. Ratti, V. Mantovani Sarti, J. Noronha-Hostler, P. Parotto, I. Portillo Vazquez, **V. Vovchenko**, and H. Stoecker
EPJ Web of Conferences **175**, 07046 (2018), *Lattice 2017 Proceedings*

10. "Final state hadronic rescattering with UrQMD"
J. Steinheimer, **V. Vovchenko**, J. Aichelin, M. Bleicher, and H. Stoecker
EPJ Web of Conferences **171**, 05003 (2018), *SQM 2017 Proceedings*
9. "van der Waals Interactions and Hadron Resonance Gas: Role of resonance widths modeling on conserved charges fluctuations"
V. Vovchenko, P. Alba, M.I. Gorenstein, and H. Stoecker
EPJ Web of Conferences **171**, 14006 (2018), *SQM 2017 Proceedings*
8. "Surprises for the Chemical Freeze-out Lines from the New Data in p+p and A+A Collisions"
V.V. Begun, **V. Vovchenko**, and M.I. Gorenstein
Acta Physica Polonica B: Proceedings Supplement **10**, 467 (2017), *CPOD 2016 Proceedings*
7. "Critical fluctuations in models with van der Waals interactions"
V. Vovchenko, D.V. Anchishkin, M.I. Gorenstein, and R.V. Poberezhnyuk, and H. Stoecker
Acta Physica Polonica B: Proceedings Supplement **10**, 753 (2017), *CPOD 2016 Proceedings*
6. "Analysis of hadron yield data within hadron resonance gas model with multi-component eigen-volume corrections"
V. Vovchenko and H. Stoecker
Journal of Physics: Conference Series **779**, 012078 (2017), *SQM 2016 Proceedings*
5. "Updates to the p+p and A+A chemical freeze-out lines from the new experimental data"
V.V. Begun, **V. Vovchenko**, and M.I. Gorenstein
Journal of Physics: Conference Series **779**, 012080 (2017), *SQM 2016 Proceedings*
4. "Hydrodynamic modeling of a pure-gluon initial scenario in high-energy hadron and heavy-ion collisions"
V. Vovchenko, L.G. Pang, H. Niemi, Iu.A. Karpenko, M.I. Gorenstein, L.M. Satarov, I.N. Mishustin, B. Kämpfer, and H. Stoecker
PoS **BORMIO2016** (2016) 039, *Bormio 2016 Proceedings*
3. "Study of hard core repulsive interactions in an hadronic gas from a comparison with lattice QCD"
P. Alba, **V. Vovchenko**, and H. Stoecker
Journal of Physics: Conference Series **736**, 012022 (2016), *WWND 2016 Proceedings*
2. "Undersaturation of quarks at early stages of relativistic nuclear collisions: the hot glue initial scenario and its observable signatures"
H. Stoecker, M. Beitel, T.S. Biró, L.P. Csernai, K. Gallmeister, M.I. Gorenstein, C. Greiner, I.N. Mishustin, M. Panero, S. Raha, L.M. Satarov, S. Schramm, F. Senzel, B. Sinha, J. Steinheimer, J. Struckmeier, **V. Vovchenko**, Z. Xu, K. Zhou, P. Zhuang
Astronomische Nachrichten **336**, 744 (2015)
1. "Evolution of the hadronic system created in relativistic nucleus-nucleus collisions"
D.V. Anchishkin, A.O. Muskeyev, **V.Yu. Vovchenko**, and S.N. Yezhov
Problems of Atomic Science and Technology **57**, 115-120 (2012)

Presentations

Presentations at international conferences and workshops

65. "Phase Structure of Strongly Interacting Matter under Extreme Conditions"
Invited talk at Bogolyubov Readings 2025, Nov 25, 2025, Bogolyubov Institute for Theoretical Physics, Kyiv, Ukraine
64. "Probing the Nature's Primordial Fluid"
Faculty presentation at QuarkNet Teacher Workshop 2025, Jun 11, 2025, Rice University, Houston, USA
63. "Cumulants and fluctuations measurement at the BES II"
Invited talk at "RHIC & AGS Annual Users' Meeting 2025" conference, May 20, 2025, Brookhaven National Laboratory, Upton, USA
62. "The antiproton puzzle, QCD critical point, and fireball properties in heavy-ion collisions"
Talk at Quark Matter 2025, Apr 9, 2025, Frankfurt am Main, Germany
61. "High density QCD/Phase diagram"
Invited lecture at Quark Matter 2025, Apr 6, 2025, Frankfurt am Main, Germany
60. "Factorial cumulants as a probe of fireball properties in heavy-ion collisions"
Talk at APS Physics Summit 2025: Mini-Symposium on Experimental and Theoretical Searches for the QCD Critical Point, Mar 17, 2025, Anaheim, CA, USA
59. "Probing the QCD phase structure with heavy-ion collisions"
Invited talk at Compact Stars in the QCD Phase Diagram (CSQCD2024) conference, October 10, 2024, Yukawa Institute for Theoretical Physics, Kyoto, Japan
58. "Proton cumulants from hydrodynamics in light of new STAR data"
Talk at EMMI Workshop "Aspects of Criticality II", July 4, 2024, University of Wroclaw, Poland
57. "High-Order Moments and EoS Theory Overview"
Invited talk at "RHIC & AGS Annual Users' Meeting 2024" conference, Jun 12, 2024, Brookhaven National Laboratory, Upton, USA
56. "Magnetic field effect on hadron yield ratios and fluctuations in a hadron resonance gas"
Talk at "Strangeness in Quark Matter 2024" conference, Jun 5, 2024, Strasbourg, France
55. "Thermal production of light (anti)(hyper)nuclei"
Invited talk at EMMI Rapid Reaction Task Force "Understanding light (anti-)nuclei production at RHIC and LHC", April 8, 2024, GSI, Darmstadt, Germany
54. "Cooper-Frye sampling with short-range repulsion"
Talk at 6th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, Nov 30, 2023, Hilton Waikoloa Village, HI, USA
53. "Experimental results vs theory predictions"
Invited talk at EMMI Rapid Reaction Task Force "Fluctuations and Correlations of Conserved Charges: Challenges and Perspectives", November 9, 2023, GSI, Darmstadt, Germany
52. "QCD at finite temperature and density: Criticality "
Plenary talk at Quark Matter 2023, September 7, 2023, Houston, TX, USA

51. "Proton number cumulants in heavy-ion collisions and search for the QCD critical point"
Talk at INT Workshop INT-20-R1C "Chirality and Criticality: Novel Phenomena in Heavy-Ion Collisions", Aug 23, 2023, University of Washington, Seattle, USA
50. "Thermal-FIST package"
Invited talk at 2023 MUSES Collaboration Meeting, May 17, 2023, University of Illinois Urbana-Champaign, IL, USA
49. "Proton number cumulants and correlation functions at RHIC-BES from hydrodynamics"
Talk at 10th workshop of the APS Topical Group on Hadronic Physics, Apr 12, 2023, Minneapolis, MN, USA
48. "Quarkyonic or Baryquark matter?"
Talk at the 38th Winter Workshop on Nuclear Dynamics, Feb 9, 2023, Puerto Vallarta, Mexico
47. "Probing the EoS of dense matter with fluctuation observables in heavy-ion collisions"
Invited talk at INT Workshop INT-22-84W "Dense Nuclear Matter Equation of State from Heavy-Ion Collisions", Dec 7, 2022, University of Washington, Seattle, USA
46. "Phenomenological developments for event-by-event fluctuations of conserved charges"
Talk at "Critical Point and Onset of Deconfinement 2022" conference (online), Nov 29, 2022
45. "Fluctuations of conserved charges in hydrodynamics and molecular dynamics"
Plenary talk at "Strangeness in Quark Matter 2022" conference (online), Jun 15, 2022, Busan, South Korea
44. "Hadronic resonance production in a partial chemical equilibrium model"
Invited talk at ALICE Week, Jun 7, 2022
43. "Proton number cumulants and correlation functions from hydrodynamics and the QCD phase diagram"
Talk at "Quark Matter 2022" conference (online), Apr 6, 2018, Krakow, Poland
42. "QCD Phase Structure at Finite Baryon Density"
Invited talk at "The 1st workshop on Physics at High Baryon Density", Mar 19, 2022
41. "Off-equilibrium production of light nuclei in heavy-ion collisions"
Invited talk at MIAPP programme "Antinuclei in the Universe?" (online), Feb 11, 2022, MIAPP, Munich, Germany
40. "Charge fluctuations in isobar collisions and connections with lattice QCD"
Invited talk at "RBRC Workshop: Physics Opportunities from the RHIC Isobar Run" (online), Jan 27, 2022, Brookhaven National Laboratory, NY, USA
39. "QCD phase structure from fluctuations in heavy-ion collisions: Connecting theory to experiment"
Invited talk at "STAR Collaboration Meeting" (online), Sep 22, 2021, Rutgers, The State University of NJ, Piscataway, USA
38. "Proton Cumulants, Correlation Functions and Hydrodynamics"
Invited talk at "RHIC Beam Energy Scan and Beyond" workshop (online), Aug 17, 2021, Lawrence Berkeley National Laboratory, Berkeley, USA

37. "Fluctuation Measurements and Global Conservation Laws in the BES Program"
Invited talk at "RHIC & AGS Annual Users' Meeting 2021" conference (online), Jun 8, 2021, Brookhaven National Laboratory, Upton, USA
36. "Net-particle number fluctuations in a hydrodynamic description of heavy-ion collisions"
Talk at "Strangeness in Quark Matter 2021" conference (online), May 18, 2021, Brookhaven National Laboratory, Upton, USA
35. "Phenomenological developments for event-by-event fluctuations of conserved charges"
Plenary talk at "Critical Point and Onset of Deconfinement 2021" conference (online), Mar 16, 2021, Lawrence Berkeley National Laboratory, Berkeley, USA
34. "Probing the QCD equation of state with fluctuations of conserved charges"
Invited talk at XXXII International (ONLINE) Workshop on High Energy Physics "Hot problems of Strong Interactions", Nov 12, 2020, Protvino, Russia
33. "Connecting grand-canonical cumulants of conserved charges to experiment"
Invited talk at ALICE Workshop on Event-by-Event fluctuations (online), Sep 15, 2020, CERN, Switzerland
32. "Nuclear clusters in an off-equilibrium thermal model"
Invited talk at Mini-Workshop "Origin of nuclear clusters in hadronic collisions" (online), May 19, 2020, CERN, Switzerland
31. "Statistical-thermal model: Applications using Thermal-FIST"
Invited talk at "3rd EMMI Workshop: Anti-matter, hyper-matter and exotica production at the LHC", Dec 2, 2019, University of Wroclaw, Poland
30. "Statistical-thermal FIST package"
Talk at "ALICE Physics Week 2019", Jul 23, 2019, Czech Technical University, Prague, Czech Republic
29. "Equation of state of QCD matter within the Hagedorn bag-like model"
Talk at "Strangeness in Quark Matter 2019", Jun 13, 2019, Bari, Italy
28. "Towards the equation of state of hot QCD at finite baryon density"
Talk at "New Trends in High-Energy Physics 2019", May 13, 2019, Odessa, Ukraine
27. "Equations of state at finite baryon density"
Invited talk at EMMI Rapid Reaction Task Force "Dynamics of critical fluctuations: theory – phenomenology – HIC", April 8, 2019, GSI, Darmstadt, Germany
26. "Phase transition at finite density and the cluster expansion in fugacities"
Talk at EMMI Workshop "Probing the Phase Structure of Strongly Interacting Matter: Theory and Experiment", Mar 27, 2019, GSI, Darmstadt, Germany
25. "Multiplicity dependence of particle production at the LHC in (canonical) statistical model"
Talk at COST Workshop on "Interplay of hard and soft QCD probes for collectivity in heavy-ion collisions", Feb 27, 2019, Lund, Sweden

24. "Statistical thermal model"
Lecture at COST Workshop on "Interplay of hard and soft QCD probes for collectivity in heavy-ion collisions", Feb 26, 2019, Lund, Sweden
23. "Hadron gas and repulsive interactions"
 Invited talk at MIAPP Programme "Interface of effective field theories and lattice gauge theory", Oct 30, 2018, Garching bei München, Germany
22. "Recent thermal model developments: The(rmal-)FIST package"
 Invited talk at ECT* Workshop "Observables of Hadronization and the QCD Phase Diagram in the Cross-over Domain", Oct 16, 2018, Trento, Italy
21. "QCD equation of state at finite baryon density with fugacity expansion"
 Talk at "Critical Point and Onset of Deconfinement 2018" conference, Sep 28, 2018, Corfu Island, Greece
20. "Thermal model fits: an overview"
 Invited talk at "Light up 2018 – An ALICE and theory workshop", Jun 14, 2018, CERN, Meyrin, Switzerland
19. "QCD equation of state at finite baryon density with Cluster Expansion Model"
 Talk at "XQCD 2018" conference, May 21, 2018, Frankfurt Institute for Advanced Studies, Frankfurt am Main, Germany
18. "Lattice-based QCD equation of state at finite baryon density: Cluster Expansion Model"
 Talk at "Quark Matter 2018" conference, May 16, 2018, Palazzo del Casinó, Venice, Italy
17. "Exploring the QCD Phase Diagram with Fluctuation Observables"
 Invited talk at "3rd CBM - China Workshop", Apr 16, 2018, Yichang International Hotel, Yichang, China
16. "Critical point of nuclear matter and beam energy dependence of net proton number fluctuations"
 Invited talk at "NA61/SHINE Analysis/Software/Calibration Meeting", Feb 20, 2018, Monbachtal, Germany
15. "Baryon number fluctuations and singularities at real and complex baryochemical potential"
 Invited talk at EMMI Workshop "Constraining the QCD Phase Boundary with Data from Heavy Ion Collisions", Feb 12, 2018, GSI, Darmstadt, Germany
14. "Cluster expansion model for baryon number fluctuations in QCD"
 Talk at "Zimányi-COST Winter School on Heavy Ion Physics 2017", Dec 8, 2017, Budapest, Hungary
13. "Recent thermal model developments and connection of (anti-)nuclei to critical observables"
 Invited talk at "2nd EMMI Workshop: Anti-matter, hyper-matter and exotica production at the LHC", Nov 6, 2017, Turin, Italy
12. "Non-Gaussian moments of fluctuations of conserved charges: Applications for strongly interacting matter"
 Invited talk at "10th Bolyai-Gauss-Lobachevsky conference on Non-Euclidean Geometry and its Applications", Aug 24, 2017, Gyöngyös, Hungary

11. "van der Waals Interactions in Hadron Resonance Gas: From Nuclear Matter to Lattice QCD"
Talk at "Critical Point and Onset of Deconfinement 2017", Aug 7, 2017, Stony Brook, NY, USA
10. "van der Waals Interactions and Hadron Resonance Gas: From Nuclear Matter to Lattice QCD"
Talk at "Strangeness in Quark Matter 2017", Jul 14, 2017, Utrecht, the Netherlands
9. "Influence of Van der Waals interactions between hadrons on observables from heavy-ion collisions and lattice QCD"
Talk at "DPG Spring Meeting 2017", Mar 29, 2017, Münster, Germany
8. "Van der Waals interactions in Hadron Resonance Gas: From nuclear matter to lattice QCD"
Talk at "Zimanyi Winter School on Nuclear Physics 2016", Dec 7, 2016, Budapest, Hungary
7. "Role of van der Waals interactions in hadron systems: from nuclear matter to lattice QCD"
Talk at "38th International School of Nuclear Physics: Nuclear matter under extreme conditions – Relativistic heavy-ion collisions", Sep 19, 2016, Erice, Sicily, Italy
6. "Analysis of hadron yield data within HRG model with multi-component eigenvolume corrections"
Talk at "Strangeness in Quark Matter 2016", Jun 28, 2016, Berkeley, CA, USA
5. "Critical fluctuations in models with van der Waals interactions"
Talk at "Critical Point and Onset of Deconfinement 2016", May 30, 2016, Wroclaw, Poland
4. "Extraction of moments of net-particle event-by-event fluctuations in the CBM experiment"
Talk at "DPG Spring Meeting 2016", Mar 15, 2016, Darmstadt, Germany
3. "Event-by-event extraction of kinetic and chemical freeze-out properties in the CBM experiment"
Talk at DPG Spring Meeting 2015, Mar 23, 2015, Heidelberg, Germany
2. "Time dependence and fluctuations of partition into spectators and participants in heavy-ion collisions"
Talk at VI Young Scientists Conference "Problems of Theoretical Physics", Nov 25, 2014, Kyiv, Ukraine
1. "On-line Extraction of Model Parameters"
Talk at "Fifth International Workshop for Future Challenges in Tracking and Trigger Concepts", May 13, 2014, FIAS, Frankfurt am Main, Germany

Seminars at universities and institutes

35. "Strongly Interacting Matter under Extreme Conditions"
Invited talk at UL Lafayette Physics Seminar Series (Fall 2025), Oct 22, 2025, Lafayette, LA, USA
34. "Fluctuation Probes of QCD Matter in Heavy-Ion Collisions"
Invited talk at the Hadron Ion Tea (HIT) Seminar Series at Lawrence Berkeley National Laboratory, Mar 11, 2025, Berkeley, CA, USA
33. "Fluctuations as a probe of QCD critical point in light of RHIC BES-II"
Invited talk at Online seminar of series on "RHIC Beam Energy Scan: Theory and Experiment" 2024, Oct 22, 2024

32. "Fluctuations and correlations in heavy-ion collisions as a probe of the QCD phase structure"
Invited talk at Physics and Astronomy Seminar, September 6, 2024, Wayne State University, Detroit, MI, USA
31. "Quarkyonic or Baryquark matter of QCD?"
Talk at Frankfurt Institute for Advanced Studies, July 14, 2023, Frankfurt Institute for Advanced Studies, Frankfurt am Main, Germany
30. "Proton number cumulants in heavy-ion collisions and the search for the QCD critical point"
Invited talk at MIT Nuclear and Particle Theory Seminar, May 15, 2023, Cambridge, MA, USA
29. "Quarkyonic or baryquark matter? On the dynamical generation of momentum space shell structure"
Invited talk at Iowa State University Nuclear Seminar, May 11, 2023, Ames, IA, USA
28. "Probing the QCD phase structure with proton number fluctuations in heavy-ion collisions"
Talk at Nuclear Theory Lunch Seminar at LBNL, Sep 7, 2022, Lawrence Berkeley National Laboratory, Berkeley, USA
27. "QCD phase structure from fluctuations of conserved charges"
Colloquium at Theoretical Physics Colloquium, hosted by Prof. Igor Shovkovy at the Arizona State University (online), Jul 13, 2022
26. "QCD phase structure from fluctuations in heavy-ion collisions"
HFHF Nuclear Physics Colloquium, Jun 30, 2022, Frankfurt am Main, Germany
25. "Proton number cumulants in heavy-ion collisions from hydrodynamics and the search for the QCD critical point"
Invited talk at BITP seminar (online), Jun 22, 2022, Kyiv, Ukraine
24. "Critical point particle number fluctuations from molecular dynamics"
Invited talk at "BES-Tea Seminar Series" (online), Mar 11, 2022
23. "QCD phase structure at finite baryon density from heavy-ion collisions"
Invited talk at "Juniors Day at STAR 2022" (online), Feb 14, 2022
22. "Unveiling the Properties of Strongly Interacting Matter under Extreme Conditions"
Colloquium at "University of Houston", Feb 1, 2022, University of Houston, TX, USA
21. "Treatment of fluctuations for comparison with experiment"
Invited talk at Online seminar of series III on "RHIC Beam Energy Scan: Theory and Experiment" 2021, Nov 30, 2021
20. "Pion Condensation in the Early Universe at Nonvanishing Lepton Flavor Asymmetry"
Talk at LBNL NSD Staff Meeting (online), Jan 26, 2021, Lawrence Berkeley National Laboratory, Berkeley, USA
19. "Pion condensation in the early Universe at nonvanishing lepton flavor asymmetry"
Invited talk at CERN Heavy Ion Group Seminar (online), Oct 30, 2020, CERN, Switzerland

18. "Pion condensation in the early Universe at nonvanishing lepton flavor asymmetry"
Talk at Nuclear Theory Lunch Seminar at LBNL, Oct 29, 2020, Lawrence Berkeley National Laboratory, Berkeley, USA
17. "Recent results on light nuclei production in extended thermal model descriptions"
Invited talk at HENPIC seminar (online), Jun 25, 2020, Wuhan, China
16. "Connecting fluctuation measurements in heavy-ion collisions with the grand-canonical susceptibilities"
Invited talk (online) at NA61 theory seminar, May 7, 2020, CERN, Switzerland
15. "Connecting fluctuation measurements in heavy-ion collisions with the grand-canonical susceptibilities"
Invited seminar talk at UH Nuclear Theory journal club (online), May 4, 2020, University of Houston, Houston, USA
14. "Nucleosynthesis and resonance production via the Saha equation"
Talk at Nuclear Theory Lunch Seminar at LBNL, Mar 25, 2020, Lawrence Berkeley National Laboratory, Berkeley, USA
13. "(Anti-)Nucleosynthesis in the Little and the Big Bang"
Invited blackboard talk at "Collider Cross Talk", Aug 8, 2019, CERN, Switzerland
12. "Nucleosynthesis in heavy-ion collisions at the LHC via the Saha equation"
Talk at "Palaver", Jul 1, 2019, Institut für Theoretische Physik, Frankfurt am Main, Germany
11. "Towards the QCD equation of state at finite density"
Talk at Nuclear Theory Lunch Seminar at LBNL, May 2, 2019, Lawrence Berkeley National Laboratory, Berkeley, USA
10. "Quantum van der Waals equation and its applications"
Invited Physics Seminar @uni.lu, Jan 26, 2018, University of Luxembourg, Luxembourg City, Luxembourg
9. "Cluster expansion model for QCD baryon number fluctuations"
Talk at "Palaver", Nov 27, 2017, Institut für Theoretische Physik, Frankfurt am Main, Germany
8. "Baryonic excluded volume and its role in QCD equation of state at imaginary chemical potential"
Invited talk at BITP seminar, Aug 31, 2017, Bogolyubov Institute for Theoretical Physics, Kyiv, Ukraine
7. "van der Waals Interactions in Hadron Resonance Gas: From Nuclear Matter to Lattice QCD"
Invited talk at "NA61 Theory Seminar", Jun 1, 2017
6. "van der Waals Interactions in Hadron Resonance Gas: From Nuclear Matter to Lattice QCD"
Talk at Palaver, May 22, 2017, Institut für Theoretische Physik, Frankfurt am Main, Germany
5. "Electromagnetic probes of a pure-gluon initial state in nucleus-nucleus collisions at LHC"
Talk at "Transport Meeting", May 24, 2016, Institut für Theoretische Physik, Frankfurt am Main, Germany

4. "Sensitivity of thermal fits to heavy-ion yield data to the modeling of eigenvolume interactions"
Talk at "Palaver", May 2, 2016, Institut für Theoretische Physik, Frankfurt am Main, Germany
3. "Van der Waals equation on a nuclear scale"
Talk at "FIGSS Seminar", Apr 25, 2016, Frankfurt Institute for Advanced Studies, Frankfurt am Main, Germany
2. "Van der Waals equation: event-by-event fluctuations, quantum statistics and nuclear matter"
Talk at "Transport Meeting", Jun 10, 2015, Frankfurt Institute for Advanced Studies, Frankfurt am Main, Germany
1. " D^{*+} reconstruction in C-C collisions at 25A GeV in the CBM experiment"
Talk at "GSI Summer Student Program 2011", Sep 21, 2011, GSI, Darmstadt, Germany