Baiyang Zhang

Henan University
School of Mathematics and Statistics
Jin Ming Avenue, Kaifeng City
Henan Province, PRC

Phone: (+86) 15194622750
Email: byzhang@henu.edu.cn
Date of birth: Nov 18th, 1988

Education

Institute of Modern Physics, Chinese Academy of Sciences 2012 – 2018
Ph.D. in Theoretical Physics
Advisor: Pengming Zhang
Dissertation title: Effects of Quark-gluon Interactions Induced by Nontrivial Topological Structures in the QCD Vacuum

Lanzhou University 2007 – 2011
B.Sc in Physics

Current Position

September 2022 – current

Postdoctoral researcher in the group of Prof. Bjarke Gudnason, School of Mathematics and Statistics, Henan University.

Previous Employment

September 2019 – September 2022

Postdoctoral researcher in the group of Prof. Aleksey Cherman, School of Physics and Astronomy, University of Minnesota.

January 2018 – August 2019

Postdoctoral researcher in the group of Prof. Wolf György, Wigner Research Centre for Physics, Hungarian Academy of Sciences.

Conferences/Talks

2025 National Symposium on Frontiers and Interdisciplinary Topics in Theoretical Physics April 2025
Talk: A Passive Perspective of Linearized Soliton Perturbation Theory

Light-Cone 2024: Hadron Physics in the EIC era Nov 2024
Talk: Deconfinement in SU(N) gauge theory with a massive adjoint fermion

The 4th Symposium on Quantum Field Theory and Its Applications Nov 2024
Talk: Linearized Solitonic Perturbation Theory

Southwest–Northwest China Joint Symposium on Theoretical Physics Aug 2024
Talk: Topological Sectors in 2-4D Scalar Model

Invited Talk at Sun Yat-sen University June 2024
Talk: A Stacky Perspective of Topological Sectors in 2D Scalar Model

Instantons, Holography, Strong Interactions and Nuclear Physics June 2023
Talk: A Categorical Survey of Linearized Kink Perturbation Method

Invited Talk at Henan University August 2022
Talk: Deconfining Phase Transition Cased by Topological Effects

Nuclear Theory Group Seminar, University of Minnesota April 2022
Talk: Cut-off Kinks, a Hamiltonian Based Approach

Nuclear Theory Group Seminar, University of Minnesota May 2021
Talk: Deconfinement in SU(N) Gauge Theory with a Massive Adjoint Fermion

Balaton Workshop 2019 September 2019
Talk:Spin Formalism and the Hadronic Density Matrix in Dilepton Production

9th Workshop on Hadron physics in China and Opportunities Worldwide July 2017
Talk: The Pauli Form Factor Induced by Instanton Effects in QCD

The Sixth Workshop on Hadron Physics in China and Opportunities in US July 2014
Talk: Spin-flavor Study With EIC@HIAF

The 21st International Symposium on Spin Physics October 2014
Poster: Flavor Separation for Polarized Parton Distribution Functions

Research Projects Led

National Natural Science Foundation of China, Youth Fund Jan 2024 - Dec 2026
Non-perturbative Study of the Confinement of Mass Deformed SU(N) Super Yang-Mills Theory on $\mathbb{R}^3 \times S^1$ Manifold

Other Grants

Mid-China Talent Initiative, Special Program for Overseas Postdoctoral Researchers

Feb 2025

Publications

The author marked with an asterisk (*) is the corresponding author.

1. *On Emergent Directions in Weakly Coupled, Large N_c $\mathcal{N} = 1$ SYM*, Baiyang Zhang*, Aditya Dhumuntarao, JHEP 05 **(2025)** 012.
2. *Inhomogeneous and simultaneous Diophantine approximation in Cantor series expansions*, Zhipeng Shen, Baiyang Zhang*, Journal of Mathematical Analysis and Applications, Volume 550, **(2025)**, 129589.
3. *The Domain Wall Soliton's Tension*, J. Evslin*, H. Liu and Baiyang Zhang, **(2024)**, arXiv:2412.20814 [hep-th].
4. *A finite tension for the ϕ_4^4 domain wall*, J. Evslin*, H. Guo, H. Liu, Baiyang Zhang, Phys. Lett. B 864, 139457 **(2025)**.
5. *A (2+1)-Dimensional Domain Wall at One-Loop*, Jarah Evslin, Kehinde Ogundipe, Baiyang Zhang*, Hengyuan Guo, JHEP 05 **(2024)** 098.
6. *Meson production from kink-meson scattering*, Hui Liu, Jarah Evslin*, Baiyang Zhang, Phys. Rev. D 107 **(2023)** 025012.
7. *Cut-Off Kinks*, Jarah Evslin, Andrew B. Royston, Baiyang Zhang*, JHEP 01 **(2023)** 073.
8. *Flavor-dependent EMC effect from a nucleon swelling model*, Rong Wang*, Raphaël Dupre, Yin Huang, Baiyang Zhang, Silvia Niccolai, Phys. Rev. C 99 **(2019)** 035205.
9. *The Compactified Principal Chiral Model's Mass Gap*, Jarah Evslin*, Baiyang Zhang, Phys. Rev. D 98 **(2018)** 085016.
10. *Gluonic Distribution in the Constituent Quark and Nucleon Induced by the Instantons*, Baiyang Zhang*, Nikolai Kochelev, Hee-Jung Lee, Pengming Zhang, Phys. Part. Nuclei Lett. **(2018)** 15:371.
11. *The Pauli Form Factor of Quark and Nontrivial Topological Structure of the QCD*, Baiyang Zhang*, Andrey Radzhabov, Nikolai Kochelev, Pengming Zhang, Phys. Rev. D 96 **(2017)** 054030.
12. *Generalized Skyrme Model with the Loosely Bound Potential*, S. B. Gudnason*, Baiyang Zhang, N. Ma, Phys. Rev. D 94 **(2016)** 125004 .
13. *Gluonic Structure of the Constituent Quark*, N. Kochelev*, Hee-Jung Lee, Baiyang Zhang, Pengming Zhang, Phys. Lett. B 757 **(2016)** 420-425.
14. *Nonperturbative Collisional Energy Loss of Heavy Quarks in Quark-gluon Plasma*, N. Kochelev*, Hee-Jung Lee, Y. Oh, Baiyang Zhang, Pengming Zhang, Phys. Rev. C 93 **(2016)** 021901.
15. *Anomalous Pion Production Induced by Nontrivial Topological Structure of QCD Vacuum*, Kochelev*, Hee-Jung Lee, Baiyang Zhang, Pengming Zhang, Phys. Rev. D 92 **(2015)** 034025.

Professional Service

Co-organizer — Fall 2023
The 8th Workshop on Chiral Effective Field Theory

Co-organizer — Fall 2023
Instantons, Holography, Strong Interactions and Nuclear Physics

Co-organizer — Fall 2020
Nuclear Theory Seminar: University of Minnesota

Organizer — Spring 2021 – Fall 2021
Nuclear Theory Seminar: University of Minnesota

Organizer — Fall 2016 - Fall 2018
Graduate Student Quantum Field Theory Seminar
Institute of Modern Physics, Chinese Academy of Sciences

Teaching Experience

Mathematical Economics (English) — Fall 2023
Henan University, School of Economics

References

Prof. Pengming Zhang
School of Physics and Astronomy
Sun Yat-sen University
Zhuhai Campus of Sun Yat-Sen University
Tangjiawan, Zhuhai, Guangdong, China 519082
email: zhangpm5@mail.sysu.edu.cn

Prof. Jarah Evslin
Institute of Modern Physics, Chinese Academy of Sciences
509 Nanchang Road, Lanzhou, Gansu,
China 730000
email: jarah@impcas.ac.cn

Prof. Aleksey Cherman
School of Physics and Astronomy
University of Minnesota, The Twin Cities
116 Church Street SE., Rm. 375-12
Minneapolis, MN 55455
email: acherman@umn.edu
office phone: 1-612-624-6525

张柏阳

个人信息

性别	男	**出生年月**	1988年11月
籍贯	甘肃省兰州市	**婚姻状况**	未婚
电话号码	15194622750	**电子邮件**	byzhang@henu.edu.cn
技术职称	副高级	**个人主页**	https://www.mathlimbo.net
政治面貌	群众		

工作经历

博士后 2022.9至今
河南大学，数学与统计学院

博士后 *2019.9 – 2022.9*
明尼苏达大学，物理与天文学院

博士后 *2017.12 – 2019.9*
匈牙利科学院，魏格纳理论物理中心

教育背景

博士（硕博连读） *2012.8 – 2017.12*
中国科学院，近代物理研究所
研究方向：理论物理

本科 *2007.9 – 2011.8*
兰州大学，物理科学学院
研究方向：理论物理

研究兴趣

本人研究兴趣为高能理论物理和数学物理，主要包括如下方向：

- （拓扑）非微扰解的量子化问题。我们致力于发展一套适用于孤子背景的微扰理论，即线性孤子微扰论（Linearized Soliton Perturbation Theory, LSPT），以系统地研究扭折区（kink sector）物理量的高阶量子修正
- 复现理论（Resurgence Theory）在拓扑孤子区的应用。复现理论将渐进展开与非微扰效应解析地联系起来，与微扰孤子围绕方法相结合，提供了计算孤子区非微扰贡献的新思路
- SU(N)超对称Yang-Mills理论在不同流形（例如$\mathbb{R}^3 \times \mathbb{S}^1$）中的拓扑结构，特别是复合孤子（如双孤子解）及其对系统非微扰性质（如色禁闭）的贡献
- 非广延Tsallis熵在物理唯象理论及一般统计方法中的应用

主持基金项目

国家自然科学基金青年科学基金项目:

项目名称: 对质量形变SU(N)超对称Yang-Mills理论在$\mathbb{R}^3 \times \mathbb{S}^1$流形上禁闭性质的非微扰研究

资助金额: 30.00万元/三年

资助时间: 2024年1月 – 2026年12月

其它基金:

项目名称: 河南省中原英才计划 （博士后海外引才专项）

资助金额: 60.00万元/三年

获得时间: 2025年2月

文章发表情况

备注：（1）星号（*）标明通讯作者；（2）遵循研究方向惯例，国际合作文章中署名按照姓氏字母排列

1. *On Emergent Directions in Weakly Coupled, Large N_c $\mathcal{N} = 1$ SYM*, Baiyang Zhang*, Aditya Dhumuntarao, JHEP 05 **(2025)** 012.
2. *Inhomogeneous and simultaneous Diophantine approximation in Cantor series expansions*, Zhipeng Shen, Baiyang Zhang*, Journal of Mathematical Analysis and Applications, Volume 550, **(2025)**, 129589.
3. *The Domain Wall Soliton's Tension*, J. Evslin*, H. Liu and Baiyang Zhang, **(2024)**, arXiv:2412.20814 [hep-th].
4. *A finite tension for the ϕ_4^4 domain wall*, J. Evslin*, H. Guo, H. Liu, Baiyang Zhang, Phys. Lett. B 864, 139457 **(2025)**.
5. *A (2+1)-Dimensional Domain Wall at One-Loop*, Jarah Evslin, Kehinde Ogundipe, Baiyang Zhang*, Hengyuan Guo, JHEP 05 **(2024)** 098.
6. *Meson production from kink-meson scattering*, Hui Liu, Jarah Evslin*, Baiyang Zhang, Phys. Rev. D 107 **(2023)** 025012.
7. *Cut-Off Kinks*, Jarah Evslin, Andrew B. Royston, Baiyang Zhang*, JHEP 01 **(2023)** 073.
8. *Flavor-dependent EMC effect from a nucleon swelling model*, Rong Wang*, Raphaël Dupre, Yin Huang, Baiyang Zhang, Silvia Niccolai, Phys. Rev. C 99 **(2019)** 035205.
9. *The Compactified Principal Chiral Model's Mass Gap*, Jarah Evslin*, Baiyang Zhang, Phys. Rev. D 98 **(2018)** 085016.
10. *Gluonic Distribution in the Constituent Quark and Nucleon Induced by the Instantons*, Baiyang Zhang*, Nikolai Kochelev, Hee-Jung Lee, Pengming Zhang, Phys. Part. Nuclei Lett. **(2018)** 15:371.
11. *The Pauli Form Factor of Quark and Nontrivial Topological Structure of the QCD*, Baiyang Zhang*, Andrey Radzhabov, Nikolai Kochelev, Pengming Zhang, Phys. Rev. D 96 **(2017)** 054030.

12. *Generalized Skyrme Model with the Loosely Bound Potential*, S. B. Gudnason*, Baiyang Zhang, N. Ma, Phys. Rev. D 94 **(2016)** 125004 .

13. *Gluonic Structure of the Constituent Quark*, N. Kochelev*, Hee-Jung Lee, Baiyang Zhang, Pengming Zhang, Phys. Lett. B 757 **(2016)** 420-425.

14. *Nonperturbative Collisional Energy Loss of Heavy Quarks in Quark-gluon Plasma*, N. Kochelev*, Hee-Jung Lee, Y. Oh, Baiyang Zhang, Pengming Zhang, Phys. Rev. C 93 **(2016)** 021901.

15. *Anomalous Pion Production Induced by Nontrivial Topological Structure of QCD Vacuum*, Kochelev*, Hee-Jung Lee, Baiyang Zhang, Pengming Zhang, Phys. Rev. D 92 **(2015)** 034025.

参加学术会议及交流访问

学术会议报告:

2025年全国理论物理前沿与交叉科学研讨会（长沙） 2025.4
报告题目: A Passive Perspective of Linearized Soliton Perturbation Theory

Light-Cone 2024: Hadron Physics in the EIC era（惠州） 2024.11
报告题目: Deconfinement in SU(N) gauge theory with a massive adjoint fermion

第四届量子场论及应用研讨会（广州） 2024.11
报告题目: Introduction to Lineared Solitonic Perturbation Theory

西南西北理论物理联合研讨会（昆明） 2024.6
报告题目: A Stacky Perspective of Topological Sectors in ϕ^4 Scalar Model

Instantons, Holography, Strong Interactions and Nuclear Physics（开封） 2023.6
报告题目: A Categorical Survey of Linearized Kink Perturbation Method

Balaton Workshop 2019（蒂豪尼,匈牙利） 2019.9
报告题目: Spin Formalism and the Hadronic Density Matrix in Dilepton Production

9th Workshop on Hadron physics in China and Opportunities Worldwide（南京） 2017.7
报告题目: The Pauli Form Factor Induced by Instanton Effects in QCD

The 21st International Symposium on Spin Physics（北京） 2014.10
海报展示: Flavor Separation for Polarized Parton Distribution Functions

The Sixth Workshop on Hadron Physics in China and Opportunities in US（兰州） 2014.7
报告题目: Spin-flavor Study With EIC@HIAF

其它邀请报告:

郑州大学，邀请报告 2025.1
报告题目: Introduction to Linearized Soliton Perturbation Theory

西安交通大学，邀请报告 2024.10
报告题目: Perturbation Theory in Non-perturbative Sectors

西南交通大学，邀请报告 2024.10
报告题目: Quantization of One-kink Sector

烟台大学，邀请报告 2024.9
报告题目: Quantization of One-kink Sector

中山大学，邀请报告 2024.6
报告题目: A Stacky Perspective of Topological Sectors in 2D Scalar Model

河南大学，邀请报告 2022.8
报告题目: Deconfining Phase Transition Cased by Topological Effects

明尼苏达大学，学术报告 2022.4
报告题目: Cut-off Kinks, a Hamiltonian Based Approach

明尼苏达大学，学术报告 2021.5
报告题目: Deconfinement in SU(N) Gauge Theory with a Massive Adjoint Fermion

学术活动

（参与）组织会议:

1. 参与组织学术会议：**第七届强子谱和强子结构研讨会**
   地点：河南大学
   时间：2023年10月27日 – 10月31日
2. 参与组织学术会议：**瞬子、全息、强相互作用与核物理**
   地点：河南大学
   时间：2023年6月9日 – 6月11日
3. 组织明尼苏达大学理论核物理组学术报告
   地点：明尼苏达大学双城校区
   时间：2020年秋季学期、2021年春季学期，每周一次报告 + 讨论

教学经历

- **Mathematical Economics(数学经济学)** *2023*年秋季
  授课对象：国际交流生（本科）
  主要职责：课程主讲人
  授课语言：英文
  授课内容：经济学中的数学方法，包括数学分析、线性代数及概率论等

推荐人

张鹏鸣 教授
物理与天文学院，中山大学
通讯地址：广东省珠海市香洲区唐家湾
中山大学珠海校区
电子邮件: zhangpm5@mail.sysu.edu.cn

Prof. Jarah Evslin
中国科学院，近代物理研究所
通讯地址：甘肃省兰州市南昌路509号
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Prof. Aleksey Cherman
物理与天文学院，明尼苏达大学，双城校区
通讯地址：116 Church Street SE., Rm. 375-12
Minneapolis, MN 55455
电子邮件: acherman@umn.edu
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