Yuanjing Ji

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Employment

University of Chinese Academy of Sciences *04/2026 - now*
Tenure track assistant professor

GSI Helmholtzzentrum für Schwerionenforschung GmbH *09/2024 - 03/2026*
Postdoc at ALICE department

Lawrence Berkeley National Laboratory (LBNL) *11/2020 - 09/2024*
Postdoc at Relativistic Nuclear Collision (RNC) group

Education

University of Science and Technology of China (USTC) *09/2015 - 10/2020*
Ph.D. in Particle and Nuclear Physics
- Supervisor: Ming Shao (USTC), Xin Dong (LBNL), Zebo Tang (USTC)
- Thesis: "Measurements of elliptic flow of heavy flavor electrons and D^{*+} production in Au+Au collisions at RHIC"

Lawrence Berkeley National Laboratory (LBNL) *09/2018 - 10/2020*
Visiting student at Relativistic Nuclear Collision (RNC) group

Lanzhou University, China (LZU) *09/2011 - 07/2015*
B.S. in Applied Physics
- Thesis: "R & D of a novel scintillator detector for beam loss monitor"

Research interest

1) Probing hot QCD medium properties utilizing the collectivity and production of heavy flavor hadrons; hadronization mechanism of heavy flavor hadrons; as well as heavy flavor production in EIC.

2) Hypernuclei formation in heavy ion collisions and their intrinsic properties; Y-N interaction.

3) R&D of detector utilizing SiPM.

Research Experience

1) **Heavy flavor production in heavy ion collisions** *2017.06 - now*
- Take the leading role in using femtoscopy techniques to investigate interaction between proton and J/ψ at ALICE experiment utilizing datasets collected during LHC Run 3. The interaction between the J/ψ and nucleon (J/ψ-N) provides valuable insights into the gluon structure inside the nucleon, as the interaction is dominantly through multiple-gluon exchanges at low energies.
- Take the leading role in measuring the elliptic flow of heavy-flavor decay electrons in Au+Au collisions at $\sqrt{s_{\rm NN}} = 27$ and 54.4 GeV at the STAR experiment. I was responsible for the whole physics analysis and paper wrap-up.
- Take the leading role in measuring D^{*+} production and D^{*+}/D^0 yields ratio in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV at the STAR utilizing Heavy Flavor Tracker (HFT). Responsible for the whole data analysis.

- Contribute to the measurements of Λ_c^+ production in Au + Au collisions at $\sqrt{s_{NN}} =$ 200 GeV in the STAR. To better understand the data and hadronization mechanism in heavy ion collisions and smaller collision systems, I study a series of charmed hadrons to D^0 ratios in p+p collisions as a function of momentum and multiplicity with PYTHIA8 under different color reconnection frameworks.
- Contribution to the simulation of heavy flavor hadrons production in the sPHENIX experiment. I was responsible for the physics simulations and projections of Λ_c^+ production in the sPHENIX.
- Contribution to production yields measurements of heavy flavor decayed electrons in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200\,{\rm GeV}/c$.

2) **Hypernuclei production in heavy ion collisions** *2021.05 - now*
- Take the leading role in hypertriton measurements via ${}^3_\Lambda{\rm H} \to {\rm d}p\pi$ decay channel in the STAR experiment. I am responsible for the whole analysis and developing the method to separate real hypertriton signal and correlated d-Λ backgrounds in ${}^3_\Lambda{\rm H} \to {\rm d}p\pi$ channel. This method was also applied in the ${}^3_\Lambda{\rm H}$ directed flow measurements, an important part of hypernuclei directed flow measurements. The paper on the production of hypernuclei and hypertriton decay branching ratio is being prepared.
- Lead the undergoing measurements on the energy and source size dependence of hypernuclei production using the STAR BES II datasets.

3) **ALICE TPC drift velocity calibration** *2025.7 - now*
- Contribute to the calibration of ALICE TPC drift velocity.

4) **Simulation of EIC detector** *2020.05 - 2022*
- Contribute to the physics simulation in the future EIC detector using open heavy flavor hadrons as probes. I worked on the physics projection of the production of charm baryons in ep and eA collisions which is to investigate the charm hadronization and, more generally, the baryon formation mechanism. I also worked on the physics projection of near-threshold Υ production cross section in ep(γp) collisions in the future EIC detector. Near-threshold heavy-flavor quarkonium production was proposed to be connected with the gravitational form factor of nucleons which are defined as the lowest moments of the spin-independent gluon GPDs. I led the physics simulation for the ATHENA detector proposal Fig. 26, 40(left), and 49.

5) **PYTHIA8 tuning for RHIC physics** *2020.11 - 2021.06*
- Contribute to the tuning of PYTHIA8.3 parameters at RHIC energies. The goal is to have a usable PYTHIA8 tuning with an improved description of the underlying events in jet measurements at RHIC and predict the forward physics at STAR. The tuning utilized the Professor toolkit and a series of RIVET analyses on available STAR jets and identified particle spectra measurements. I wrote the RIVET analysis for identified particle spectra measurements at STAR, an important component of this project.

6) **R&D of the scintillator detector using SiPM** *2015.03 - 2017*

- Take the leading role in the R & D of a fast response and radiation resistant detector. I designed the read-out circuit of the SiPM and a fast scintillator detector for beam loss monitor using SiPM coupled with LYSO scintillator. I set up the whole system for testing the performance of the detector in the laboratory and in the Hefei Light Source at Anhui, China. I also carried out the GEANT4 simulation for a better understanding of the beam test results. Details of this work can be found in JINST 2017, 12(07):C07042.

Selected Publications

1) *Elliptic Flow of Heavy-Flavor Decay Electrons in Au+Au Collisions at $\sqrt{s_{\rm NN}}$= 27 and 54.4 GeV at RHIC* STAR Collaboration, Yuanjing Ji (Princple Author), Physics Letters B (2023):138071

2) *First Observation of Directed Flow of Hypernuclei ${}^{3}_{\Lambda}H$ and ${}^{4}_{\Lambda}H$ in $\sqrt{s_{\rm NN}}$ = 3 GeV Au+Au Collisions at RHIC* STAR Collaboration, Yuanjing Ji (Princple Author), Phys. Rev. Lett. 130 (2023) 21, 212301

3) *First Measurement of Λ_c Baryon Production in Au + Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV* STAR Collaboration, Yuanjing Ji (Princple Author), Phys. Rev. Lett. 2020, 124(17):172301

4) *Measurement of electrons from open heavy-flavor hadron decays in Au+Au collisions at $\sqrt{s_{\rm NN}}$ = 200 GeV with the STAR detector* STAR Collaboration, Yuanjing Ji (Princple Author), JHEP 06 (2023) 176

5) *Measurement of inclusive J/ψ production in Au+Au collisions at $\sqrt{s_{\rm NN}}$ = 54.4 GeV at STAR* STAR Collaboration, Yuanjing Ji (Princple Author), arxiv:2506.20962

6) *First observation of deuteron-Λ correlations at RHIC* STAR Collaboration, Yuanjing Ji (Princple Author), arxiv:2511.15493

7) *Contribution of coherent electron production to measurements of heavy-flavor decayed electrons in heavy-ion collisions* EPJC 2024, 84(7):674
Authors: Shenghui Zhang, Rongrong Ma, Yuanjing Ji, Zebo Tang, Qian Yang, Yifei Zhang, Wangwei Zha

8) *PYTHIA8 Underlying Event Tune for RHIC Energies* Phys. Rev. D 105 (2022) 1, 016011
Authors: Manny Rosales Aguilar, Zilong Chang, Raghav Kunnawalkam Elayavalli, Renee Fatemi, Yang He, Yuanjing Ji, Dmitry Kalinkin, Matthew Kelsey, Isaac Mooney, Veronica Verkest

9) *Constraints on gluon distribution functions in the nucleon and nucleus from open charm hadron production at the Electron-Ion Collider* Phys. Rev. D 104 (2021) 5, 054002
Authors: Matthew Kelsey, Reynier Cruz-Torres, Xin Dong, Yuanjing Ji, Sooraj Radhakrishnan, Ernst Sichtermann

10) *Probing gluon TMDs with reconstructed and tagged heavy flavor hadron pairs at EIC Phys. Rev. D 107 (2023) 7, 074022*
Authors: Xin Dong, Yuanjing Ji, Matthew Kelsey, Sooraj Radhakrishnan, Ernst Sichtermann, Yuxiang Zhao

11) *Backward-angle (u-channel) production at an electron-ion collider Phys. Rev. C 106 (2022) 1, 015204*
Authors: Zachary Sweger, Daniel Cebra, Xin Dong, Yuanjing Ji, Spencer R. Klein

12) *Modeling backward-angle (u-channel) virtual Compton scattering at the future Electron-Ion Collider Phys. Rev. C 108 (2023) 5, 055205*
Authors: Zachary Sweger, Saeahram Yoo, Ziyuan Zeng, Daniel Cebra, Spencer R. Klein, Yuanjing Ji, Minjung Kim

13) *Measurements on the production and properties of light hypernuclei at STAR EPJ Web Conf. 276 (2023) 04003*
Author: Yuanjing Ji

14) *Heavy flavor physics with the sPHENIX MAPS vertex tracker upgrade Nucl. Phys. A 1005 (2021) 121792*
Author: Yuanjing Ji

15) *A novel fast response and radiation-resistant scintillator detector for beam loss monitor JINST, 2017, 12(07):C07042*
Authors: Yuanjing Ji, Zebo Tang, Chen Li, Xin Li, Ming Shao

16) And other STAR, ALICE, sPHENIX collaboration publications.

Public notes

1) *EIC Physics from An All-Silicon Tracking Detector arxiv:2102.08337*
Authors: John Arrington, Reynier Cruz-Torres, Winston DeGraw, Xin Dong, Leo Greiner, Samuel Heppelmann, Barbara Jacak, Yuanjing Ji, Matthew Kelsey, Spencer R. Klein, Yue Shi Lai, Grazyna Odyniec, Sooraj Radhakrishnan, Ernst Sichtermann, Youqi Song, Fernando Torales Acosta, Lei Xia, Nu Xu, Feng Yuan, Yuxiang Zhao

2) *ATHENA detector proposal — a totally hermetic electron nucleus apparatus proposed for IP6 at the Electron-Ion Collider Journal of Instrumentation 2022, 17 P10019*
Authors: J. Adam et al (The ATHENA collaboration)

3) *Snowmass 2021 White Paper: Electron Ion Collider for High Energy Physics FERMILAB-PUB-22-125-QIS-SCD-T, arxiv: 2203.13199*
Authors: R. Abdul Khalek et al.

4) Λ_c^+ *production in Au+Au collisions at 200 GeV at sPHENIX sPH-HF-2019-001*
Authors: Yuanjing Ji, Xiaolong Chen, Xin Dong

Selected Presentations

1) *Hypernuclei production at RHIC and their properties* (Invited plenary talk)
Strangeness in Quark Matter, Jun 3-7, 2024, Strasbourg, France

2) *Measurements of Hypernuclei Production and Properties in Au+Au Collisions in the STAR experiment* (Invited talk)
DNP APS-JPS 2023, Hawaii, Nov 25-Dec 1, 2023

3) *Hypertriton Production in Au+Au Collisions from Beam Energy Scan-II* (Flash & Plenary talk)
Quark Matter 2023, Sept. 3-9, 2023, Houston, United States

4) *Measurements on the production and properties of light hypernuclei at STAR*
Strangeness in Quark Matter 2022, Jun. 13-17, 2022, Busan, Korea (Hybrid)

5) *Hypernuclei production at STAR* (Invited talk)
The 37th Winter Workshop on Nuclear Dynamics (WWND), Feb. 27 - Mar. 5, 2022, Mexico (Hybrid)

6) Λ_c^+ *baryon production at future EIC*
2021 EIC UG Meeting Early Career Workshop, Jul 29-30, 2021

7) *Recent Open Heavy Flavor and Quarkonia Measurements from STAR* (Invited talk)
RHIC/AGS Annual Users' Meeting, Jun. 8-11, 2021

8) Λ_c^+ *baryon production at future EIC*
APS April Meeting, Apr. 17–20, 2021, online.

9) Λ_c^+ *baryon production at future EIC*
APS DNP Meeting, Oct. 29-Nov. 1, 2020, online.

10) Λ_c^+ *baryon production at future EIC*
EIC opportunities for Snowmass, Jan. 25-29, 2021, online.

11) *Elliptic flow of electrons from heavy-flavor decays in 54.4 and 27 GeV Au+Au collisions from the STAR*
Hard Probes 2020, Jun. 1-5, 2020, Texas, US (online).

12) *Heavy flavor physics with the sPHENIX MAPS vertex tracker upgrade*
Quark Matter 2019, Nov. 4-9, 2019, Wuhan, China.

13) *Future Heavy Flavor and Quarkonia Measurements from sPHENIX* (Invited talk)
RHIC & AGS Annual User Meeting, Jun. 4-7, 2019, Upton (BNL), US.

14) *Simulation of Λ_c^+ production at sPHENIX*
APS April Meeting, Apr. 12-14, 2019, Denver, US.

15) *D^{*+} production at Au+Au 200 GeV in STAR experiment* (poster)
Quark Matter 2018, May 13-18 2018, Italy.

16) *D^{*+} production at Au+Au 200 GeV in STAR experiment*
China High Energy Physics Conference, Jun. 20-40, 2018, Shanghai, China.

17) *A novel fast response and radiation-resistant scintillator detector for beam loss monitor* (poster)
International Conference on Instrumentation for Colliding Beam Physics 2017 (INSTR17), Feb 27-Mar 3, 2017.

Awards and Fellowships

1) **Outstanding Poster & Flash Talk Presentation Award** *Sept. 2023*
Rewarded by Quark Matter 2023 committee (10 out of 320 posters)

2) **National Awards for Graduate Students** *Oct. 2017*
Rewarded by Ministry of Education of the People's Republic of China (7 recipients among around 270 graduate students)

3) **Excellent Academic Scholarship for Master (Doctoral) Students** *2015-2020*
Rewarded by University of Science and Technology of China, Hefei, China

4) **Best Talk Award in Annual Conference of School of Physics** *Dec. 2017*
School of Physics, University of Science and Technology of China, Hefei, China

5) **Technical Innovation Award for Graduate Students** *Dec 2016*
Rewarded by State Key Laboratory of Particle Detection and Electronics, Hefei, China (6 recipients among around 250 graduate students)

Other synergetic activities

1) 2025.12 - now, Reviewer for Physics Letters B

2) 2025 - now, Quantified DCS for ALICE Collaboration

3) 2025.09, FSP Quarkonium session convener

4) 2024.03, DPG Nuclear session convener

5) 2024 - now, Quantified shift leader for sPHENIX Collaboration

6) 2023 - now, Quantified detector operator for sPHENIX Collaboration

7) 2022.06-2023, Served as GPC member for STAR Collaboration

8) 2022 - now, Quantified shift leader for STAR Collaboration

9) 2020.11 - 2021.06, Member of the PYTHIA tune task force of STAR Collaboration

10) 2019 - now, Quantified detector operator for STAR Collaboration

11) 2018.11 - 2021, Embedding helper (Heavy Flavor PWG) of STAR Collaboration