

ROLI ESHA

Department of Physics and Astronomy, Stony Brook University, Stony Brook, NY 11795

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EDUCATION

Doctor of Philosophy in Physics

University of California, Los Angeles

March 2019

Advisor: Prof. Huan Zhong Huang

Thesis: *Exploring the critical phenomenon in the QCD phase diagram at STAR*

Integrated Master of Science in Physics

National Institute of Science Education and Research, India

June 2013

Advisor: Prof. Bedangadas Mohanty

Thesis: *Glauber modeling of high-energy heavy-ion collision*

APPOINTMENTS

Stony Brook University, Stony Brook

Feb 2024 –

Research Assistant Professor, Department of Physics and Astronomy

Stony Brook University, Stony Brook

2019 – Jan 2024

Postdoctoral Associate, Department of Physics and Astronomy

Supervisor: Prof. Axel Drees

University of California, Los Angeles

2014 – 2019

Graduate Student Researcher, Nuclear Physics Group

Teaching Fellow, Department of Physics and Astronomy

LEADERSHIP ROLES

PHENIX Collaboration

Convener of the Photon, Lepton, Hadron and

Flow Physics Working group

March 2023 –

Student/Postdoc representative in the Executive Committee

2021 – 2022

RHIC/AGS Users' Executive Committee

Student/Postdoc representative

June 2020 – August 2023

STAR Collaboration

L2 Pedestal monitor for Electromagnetic Calorimeter

2015

National Institute of Science Education and Research

2011–2013

Student representative in Undergraduate Committee for Institute

Student representative in Undergraduate Committee for School of Physical Sciences

RESEARCH

- Probing the evolution of relativistic heavy-ion collisions through measurement of direct photons and dileptons
- Systematic study of collisions of small systems to look for onset of the Quark-Gluon Plasma phase
- Search for the QCD critical point through fluctuation of conserved quantities

SELECTED PUBLICATIONS

- Azimuthal anisotropy of direct photons in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV
PHENIX Collaboration, arXiv:2504.02955[nucl-ex]
- Jet substructure of light and heavy flavor jets at RHIC
Z. Yang, O. Fedkevych and R. Esha, arXiv:2412.08682[hep-ph]
- Methodology for analyzing proton multiplicity fluctuations with azimuthal partitions in heavy-ion collisions
D. Neff, Z. Ji, R. Esha, G. Wang and H. Z. Huang, Phys. Rev. C 110 (2024) 064905
- Disentangling centrality bias and final-state effects in the production of high- p_T π^0 using direct γ in d +Au collisions at $\sqrt{s_{NN}} = 200$ GeV
PHENIX Collaboration, Phys. Rev. Lett. 134 (2025) 2, 022302
- Nonprompt direct-photon production in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV
PHENIX Collaboration, Phys. Rev. C 109 (2024) 4, 044912
- Low- p_T direct-photon production in Au+Au collisions at $s_{NN}=39$ and 62.4 GeV
PHENIX Collaboration, Phys. Rev. C 107 (2023) 2, 024914
- Study of ϕ -meson production in p +Al, p +Au, d +Au, and ^3He +Au collisions at $\sqrt{s_{NN}} = 200$ GeV
PHENIX Collaboration, Phys.Rev.C 106 (2022) 1, 014908
- Science Requirements and Detector Concepts for the Electron-Ion Collider :
EIC Yellow Report
Nucl. Phys. A 1026 (2022), 122447
- Measurement of the Sixth-Order Cumulant of Net-Proton Multiplicity Distributions in Au + Au Collisions at $\sqrt{s_{NN}} = 27, 54.4, \text{ and } 200$ GeV at RHIC
STAR Collaboration, Phys. Rev. Lett. 127 (2021) 262301

PROCEEDINGS

- Thermal photon measurements at PHENIX
arXiv:2309.04993 [Hard Probes 2023]
- Low- p_T Direct Photon Production at RHIC Measured with PHENIX
Acta Phys. Polon. Supp. 16 (2023) 1, 128 [Quark Matter 2022]
- Jet azimuthal anisotropy in ep collisions
Zenodo (2022) 7193209 [DIS2021]
- Measurement of the cumulants of net-proton multiplicity distributions by STAR
PoS CPOD **2017**, 003 (2018) [Critical Point Onset and Dynamics (CPOD) 2017]
- Measurement of the cumulants of net-proton multiplicity distribution in Au+Au collisions at $\sqrt{s_{NN}} = 7.7 - 200$ GeV from the STAR experiment
Nucl. Phys. A **967**, 457 (2017) [Quark Matter 2017]

A complete list of all publications can be found [here](#)

SELECTED TALKS AND POSTERS

- **Quark Matter 2025**, Frankfurt, Germany
Experiment overview : PHENIX
 Poster : *Jet Substructure and Non-Perturbative Effects at RHIC Energies*
 Poster : *Target jet substructure and correlation*
- **Physics Opportunities at an Electron-Ion Collider XI**, Miami, Florida, USA
Target jet substructure and correlation
- **10th Asian Triangle Heavy-Ion Conference**, Berhampur, Odisha, India
 Invited : *Electromagnetic probes of QGP*
- **CFNS Seminar**, Stony Brook University, Stony Brook, USA
Thermal radiations from relativistic heavy-ion collisions
- **Quark Matter 2023**, Houston, Texas, USA
 Poster : *PHENIX prompt e^+e^- continuum in $p + p$ collisions*
 Poster : *Target jet substructure and correlation*
- **EMMI workshop on Direct Photon Puzzle 2023**, Heidelberg, Germany
 Invited : *Overview of direct photon measurements at RHIC*
- **PHENIX School 2023**, Online
 Invited : *Direct and Thermal Photon Measurements at PHENIX*
- **Hard Probes 2023**, Aschaffenberg, Germany
Thermal photon measurements at PHENIX
 Poster : *Suppression of leading particles and flavor correlation modifications in heavy ion collisions*
- **8th International Conference on High Energy Physics in the LHC Era**, Valparaiso, Chile
 Invited : *PHENIX overview*
- **XXV DAE-BRNS High Energy Physics Symposium 2022**, Mohali, India
 Invited : *RHIC, BNL and CBM, GSI Heavy-ion physics overview*
- **Hot Quarks 2022**, Estes Park, Colorado, USA
Thermal photon measurements at PHENIX
- **Quark Matter 2022**, Warsaw, Poland
Low p_T direct photon production at RHIC measured with PHENIX
- **Initial Stages 2021**, Online
Probing the initial stages of heavy ion collisions with direct photons at PHENIX
- **Fall Meeting of Division of Nuclear Physics of the American Physical Society 2019**, Arlington, USA
 Invited: *Measurement of Critical Fluctuations at RHIC*
PHENIX measurement of system size dependence of low momentum direct photons
- **RHIC-AGS Users' meeting 2019**, Brookhaven National Lab, Upton, USA
 Invited: *Measurement of Net-particle Fluctuations at RHIC*
- **Conference on the Intersection of Particle and Nuclear Physics 2018**, Indian Wells, USA
 Invited: *Searching for the QCD Critical Point Through Fluctuations at RHIC*

- **Critical Point Onset and Deconfinement 2017**, Stony Brook, USA
Invited: *Measurement of the cumulants of net-proton multiplicity distribution by STAR*
- **Quark Matter 2017**, Chicago, USA
Measurement of the cumulants of net-proton multiplicity distribution in Au+Au collisions at $\sqrt{s_{NN}} = 7.7 - 200$ GeV from the STAR experiment

TEACHING EXPERIENCE

Teaching Associate

Held discussions, graded and supervised labs for introductory physics courses for undergraduate students – some of which are

- Introduction to Nuclear and Particle Physics
- Nuclear Physics Lab
- Physics for Scientists and Engineers - Mechanics Lab
- Physics for Life Sciences Major - Thermodynamics, Fluids, Waves, Light, and Optics Lab
- Physics for Life Science Major - Light, Fluids, Thermodynamics, Modern Physics Lab
- Physics for Life Science Major - Mechanics

AWARDS & HONORS

University of California, Los Angeles

Dissertation Year Fellowship (2018 – 2019)

Graduate Division Fellowship (2013 – 2019)

National Institute of Science Education and Research

Topper in Physics in the School of Physical Sciences (2013)

“Sarat-Chandra Annapurna Maharana” Medal for Academic Excellence in the School of Physical Sciences (2013)

Best Thesis Award for Master’s thesis in the School of Physical Sciences (2013)

Department of Science and Technology, Govt. of India

Kishore Vaigyanik Protsahan Yojna Fellowship (2009 – 2013)

INSPIRE Student Fellowship (2008 – 2009)

OTHER SERVICE WORK

Served in the thesis committee of graduate students at Stony Brook University.

Referee for peer-reviewed journals like PRL, SciPost, and EPJ.

Organize bi-weekly seminars at the Center for Frontiers in Nuclear Science (CFNS) at Stony Brook University (2023-)

Organize and convene PHENIX Summer School (2021-2022)

Convener for small system workshop in RHIC/AGS Users’ meeting (2021)

Organizer for the poster session during RHIC/AGS Users’ meeting (2021-2023)

Member of the Quality of Life working group for RHIC/AGS Users (2021-2023)

Local organization of major conferences and CFNS workshops

Supervise (under)graduate students