

Sharang Rav Sharma

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PERSONAL DETAILS

- Date of birth: 28/01/1999
- Gender: Male
- Nationality: Indian

EDUCATION

- Integrated Ph.D. Programme (Physics), SGPA: 9.2, Rank- 1**
IISER Tirupati, Andhra Pradesh (2019-Present)
- B.SC.(Hons.) Physics, SGPA: 8.78, Rank- 2**
Kirori Mal College, University of Delhi (2016-2019)
- Senior School Certificate Examination (SSCE, CBSE), Percentage: 93.8, Rank- 2**
D.A.V Public School, Faridabad, Haryana (2016)
- Secondary School Examination (SSE, CBSE), CGPA: 9.6, Rank- 3**
Gita Niketan Awasiya Vidhalya, Kurukshetra, Haryana (2014)

SKILLS

Software in High-Energy Physics

- Data analysis framework - ROOT, STAR analysis framework - StROOT, Monte Carlo Event generator: THERMINATOR, PYTHIA

Programming

- C++, Shell Script (command line interpreter), Scilab, Origin, FORTRAN, Python, Mathematica

Documentation

- Latex, MS-office

Designing Software

- Corel, MS Publisher

Social front

- Event management, leadership, blogger

ACHIEVEMENTS

- Prime Ministers Research Fellowship (PMRF), Govt. of India
- Academic excellence award for Integrated Ph.D. Programme in Physics (2019-2021) at IISER Tirupati
- Member of the STAR collaboration at RHIC in Brookhaven National Laboratory (BNL), USA (2021 - till now)
- Qualified BARC exam 2021
- Qualified AFCAT 2021
- Qualified IIT-JAM Physics 2019 with percentile of 94.62
- Qualified JEST 2019 with a percentile of 96.51
- Qualified JNU EE 2019

- Participated in University Rover Challenge, Mars Desert Research Station, Hanksville, Utah in 2016
- Academic excellence award for SSCE (2016) at D.A.V School

PROJECTS

(May-2021- Till now)

- Project on “Study of transverse momentum spectra and flow of identified hadrons in Au+Au collisions for fixed target energies at RHIC.” under the guidance of Dr. Chitrasen Jena, Associate Professor, Department of Physics, IISER Tirupati.

We study the systematic measurements of bulk properties of the system created in Au+Au collisions in fixed target energies $\sqrt{s_{NN}} = 3.2 - 7.7$ GeV recorded by the STAR detector at the Relativistic Heavy Ion Collider (RHIC). The directed flow (v_1) and triangular flow (v_3) are studied for identified hadrons and their corresponding slopes at mid-rapidity are calculated and studied as a function of collision energy.

(Dec-2020-May-2021)

- Project on “Study of kinetic freeze-out parameters in high multiplicity proton-proton collisions at $\sqrt{s} = 7$ and 13 TeV.” under the guidance of Dr. Chitrasen Jena, Assistant Professor, Department of Physics, IISER Tirupati.

The observables like hadron yield and transverse momentum spectra are utilised to highlight freeze-out dynamics of the system. The spectra of identified hadrons in d+Au collisions at $\sqrt{s_{NN}} = 200$ GeV, high multiplicity pp collisions at $\sqrt{s} = 7$ and 13 TeV are studied making use of THERMINATOR 2.0 event generator. The freeze-out parameters are studied using three freeze-out schemes. For the d+Au system, 1FO+ γ_s scheme seems to give a better description. In high multiplicity pp collisions, 1FO+ γ_s scheme gives a better description of the experimental data.

(May-2020 to Dec-2020)

- Project on “Study of freeze-out dynamics in p+Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV and Pb+Pb collision at $\sqrt{s_{NN}} = 2.76$ TeV for various freeze-out schemes using transverse momentum spectra of hadrons.” under Dr. Chitrasen Jena, Assistant Professor, Department of Physics, IISER Tirupati.

The transverse momentum spectra of identified hadrons in p+Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV and Pb+Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV is studied using THERMINATOR (Thermal Heavy Ion Generator) assuming a single freeze-out surface. The freeze-out parameters are extracted using three schemes mainly differing in the way strangeness is being treated. Strange hadrons freeze-out along with the non-strange hadrons in complete equilibrium (1FO), strange hadrons freeze-out along with non-strange hadrons with an additional parameter γ_s (1FO+ γ_s), and strange hadrons freeze-out earlier than non-strange hadrons and in thermal equilibrium (2FO). In heavy-ion (Pb+Pb) collisions, 2FO performs best in describing the transverse momentum spectra. On the other hand, for a smaller (p+Pb) system, 1FO+ γ_s with fewer parameters than 2FO performs better. This confirms a system size dependence in the freeze-out schemes.

(Dec-2019 to May-2020)

- Project on “Study of freeze-out parameters from transverse momentum spectra of hadrons in p+Pb system at $\sqrt{s_{NN}} = 5.02$ TeV” under the guidance of Dr. Chitrasen Jena, Assistant Professor, Department of Physics, IISER Tirupati.

The standard observables like hadron yield and transverse momentum spectra are exploited to highlight the freeze-out dynamics of the system. The spectra of identified hadrons in p+Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV is studied using THERMINATOR (Thermal Heavy Ion Generator), which includes the simultaneous freeze-out for both yield and spectra at a single surface. The freeze-out parameters are studied in this project using a unified freeze-out scheme for all hadrons at complete thermal equilibrium (1FO).

PRESENTATIONS

- ALICE-STAR India collaboration meeting at VECC Kolkata [5-8 September 2022]
- STAR collaboration FCV PWG meeting [28 September 2022]

TEACHING ASSISTANTSHIP

- Mechanics (PHY111): Physics, Undergraduate Course, IISER Tirupati
Conducted tutorials, involved in conducting and evaluating quizzes and examinations.
- Electricity and Magnetism (PHY211): Physics, Undergraduate Course, IISER Tirupati
Conducted tutorials, involved in conducting and evaluating quizzes and examinations.

External TEACHING ASSISTANTSHIP

- Wave and Optics: Sri Venkateshwara College of Engineering, Tirupati

MENTORSHIP

- Preet Bhanjan – BS-MS 2018 student IISER Tirupati (Spring, 2022)
Semester project on - Resonance production in proton-proton collisions at 7 TeV using PYTHIA
- Swarada Deshpande – BS-MS 2020 student IISER Tirupati (May-July 2022)
Summer Project on - Glauber modeling in high energy nuclear collisions
- Meenakshi V – BS-MS 2020 student IISER Tirupati (May-July 2022)
Summer Project on - Spin alignment of vector mesons

CONFERENCES/WORKSHOPS ATTENDED

- ALICE-STAR India school at IOP Bhubaneswar [1-12 November 2022]
- ALICE-STAR India Collaboration meeting at VECC Kolkata [5-8 September, 2002].
- ALICE-STAR India Collaboration meeting at Jammu University [Virtual, 25-28 April 2022].
- IV ALICE-India School on Quark-Gluon Plasma 2021 at Bose Institute [Virtual, 8-20 Nov 2021].
- The 8th Asian Triangle Heavy-Ion Conference (ATHIC2021) at South Korea [Virtual, 5-9 Nov 2021].
- Symposium on QCD and Nuclei by Hadronic Physics Group (HPG) at the MIT Laboratory for Nuclear Science 2021 [Virtual, 10 October 2021].
- Workshop on Quantum Field Theory at the Boundary at Mainz, Germany [Virtual, 27 Sep -08 Oct 2021].
- UniDay virtual publishing workshop for researchers 2021 by Wiley India [Virtual, 24 Aug 2021].
- SSI 2021 - SLAC Summer Institute 2021 at Stanford University [Virtual, 16-27 Aug 2021].
- International workshop on High-Performance Computing 2021 at IISER TVM [Virtual, 16-17 August 2021].
- European Physical Society (EPS) conference on high energy physics 2021 by Universität Hamburg and by the research center DESY. [Virtual, 26-30 July 2021].
- Online High-End Workshop (Karyashala) on Software Tools and Techniques used in EHEP and its Applications 2021 by MNIT [12-19 July, 2021].
- Online School and Discussion Meeting on Trapped Atoms, Molecules and Ions 2021 by TIFR.

VOLUNTEERING & EXTRA CURRICULAR

- Member of “Lakshya mission” working for higher education of girl students.
- Working with “HUMANA”, under project “KADAM” for education and upliftment of children

from slums and backward sections of society.

- Member of KMC Robophysicist society guiding undergraduate students about rover operations.
- Served as Vice-President of the Physics Department of Delhi university.
- Served as Editor-in-Chief for Delhi University College's Annual magazine.
- Wrote multiple articles for Competition Success Review magazine and won a commendable article award.
- District level Squash player.
- Multiple prizes and recognition science and math model presentations.

REFERNCES

Dr. Chitrasen Jena

- Associate professor,
Department of Physics,
IISER Tirupati.
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Prof. Bedangadas Mohanty

- Professor,
School of Physical Sciences,
National Institute of Science Education and Research (NISER Bhubaneswar).
✉ bedanga@niser.ac.in/ bedanga@gmail.com.

Dr. S Sunil Kumar

- Assistant professor,
Department of Physics,
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