



# **SCHOOL ON FUNDAMENTAL CRYSTALLOGRAPHY AND WORKSHOP ON RIETVELD REFINEMENT ANALYSIS (SFCWRRRA-2023)**

**10<sup>th</sup> to 14<sup>th</sup> July, 2023**

**DEPARTMENT OF PHYSICS  
& ASTRONOMY**

**National Institute of Technology Rourkela**  
Sundargarh, Odisha-769008, India

**Dr. Dillip K. Pradhan**  
Coordinator

## About the School/Workshop:

The main focus of the event is the understanding of the fundamentals of crystallography, and implementation of Rietveld refinement analysis of powder diffraction data of functional materials like ferroics and multiferroics. The first two and half days would cover fundamental crystallographic topics starting from point symmetry operations and their notations, classification of seven crystal systems based on point symmetry operations, basic group theory, development of 32 crystallographic point groups, brief introduction to space group and finally on the reading and understanding of the Volume A of the International Tables for Crystallography. The last two and half days would be devoted for the discussion on X-ray and neutron powder diffraction fundamentals, theoretical basis as well as strategy of Rietveld refinement analysis. The workshop is based on intensive hands-on sessions using the computer programs of the Fullprof Suite. We will use the Fullprof software as the platform for Rietveld refinement which is freely available at (<https://www.ill.eu/sites/fullprof/>).

## Speakers:

- **Dr. Akhilesh Kumar Singh**, IIT, BHU, Varanasi, India.
- **Dr. Sudhindra Rayaprol**, UGC DAE CSR Mumbai Center, Mumbai, India.
- **Dr. Anup Kumar Bera**, Solid State Physics Division, Bhabha Atomic Research Centre, Mumbai, India.
- **Dr. Dillip K. Pradhan**, NIT, Rourkela, Odisha, India.
- **Dr. Ranjana R. Das**, Government Autonomous College, Rourkela, Odisha (Tutor).

## Advisory Committee:

**Prof. Mois Ilia Aroyo**, Universidad del País Vasco, Bilbao, Spain.

**Prof. Dhananjai Pandey**, Indian Institute of Technology (IIT), BHU, India.

**Prof. Leopoldo Suescun**, University of Uruguay, Montevideo, Uruguay.

**Prof. R. N. P. Choudhary**, ITER, SOA University, Bhubaneswar, Odisha, India.

**Prof. Rajeev Ranjan**, Indian Institute of Science (IISc.), Bangalore, India.

## Local Organizing Committee:

**Prof. K. Umamaheshwar Rao**, Director, NIT Rourkela, Patron.

**Prof. P. N. Vishwakarma**, HOD, Department of Physics & Astronomy, NIT Rourkela, Chairman.

**Prof. Dillip K. Pradhan**, Department of Physics & Astronomy, NIT Rourkela, Coordinator.

**Prof. A. K. Singh**, Department of Physics & Astronomy, NIT Rourkela, Secretary.

**Prof. P. Mahanandia**, Department of Physics & Astronomy, NIT Rourkela, Treasurer.

**Prof. B. Ganguli**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. S. S. Jena**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. P. Kumar**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. D. K. Bisoyi**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. J. P. Kar**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. S. N. Dash**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. A. C. Pradhan**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. S. Mishra**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. S. Datta**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. S. C. Mahapatra**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Mithun Biswas**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Indrani Banerjee**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Bharat Kumar**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Abhay Pratap Yadav**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Susanta Kumar Bisoi**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Gopi Nath Daptary**, Department of Physics & Astronomy, NIT Rourkela, Member.

**Prof. Soudamini Sahoo**, Department of Physics & Astronomy, NIT Rourkela, Member.

## Target Participants:

The school is intended primarily for Ph. D. scholars, Postdoctoral researchers, young faculties, and R & D scientists with a strong interest in the fundamental crystallography and its use for Rietveld refinement analysis of ferroelectric and multiferroic systems. Applicants from all parts of India are invited to participate in the crystallography school. We are expecting nearly 50 young crystallographers for this workshop. The aim of the school is to acquire both practical skills and theoretical knowledge in the crystallography. Therefore some elementary knowledge in Vector algebra, Matrix, Fundamental crystallography, Solid state physics and Group theory would be highly desirable prerequisite required for clear understanding of advanced topic planned for this school. Prospective participants are encouraged to participate in poster presentation.

## Application Procedure:

The application form duly filled by the participants, and after forwarded through current research adviser / supervisor / employer should be sent through e-mail (scanned copy) as well as post to the workshop coordinator. The application must be accompanied by a letter of support from the current research adviser / supervisor / employer. The letter of support should mention the potential benefits by attending the workshop, and the sources of funding available to the applicant to attend this workshop.

Workshop Home Page: <http://www.nitrkl.ac.in>  
→Research→Workshop

For updates, please visit the web site: <https://website.nitrkl.ac.in/Academics/Events/Workshops/>

The application form can be downloaded from the website.

## Registration Fee:

Industry professionals : **INR 9000** (Before 25th June, 2023 and **INR 10000** there after)

Faculties/Scientists : **INR 9000** (Before 25th June, 2023 and **INR 10000** there after)

Research students : **INR 5000** (Before 25th June, 2023 and **INR 6000** there after)

\*Registration fee includes Conference Kit, Food (Breakfast, Lunch, and Dinner) during the workshop days. The registration fee is non-refundable.

## Accommodation:

Limited availability of campus accommodation on twin sharing basis would be arranged in the institute guest houses, subject to availability/advance payment. Participants are advised to stay on campus to attend the workshop on time.

### Room tariff of Institute Guest House: South Block

Single occupancy per day. **950.00 + 12% GST**

Twin sharing per day. **1250.00 + 12% GST**

### North Block

Single occupancy per day. **600.00 + 12% GST**

Twin sharing per day. **800.00 + 12% GST**

Tariffs are subject to change without prior notice. Kindly visit the website for further details; <https://guesthouse.nitrkl.ac.in/Users/HomePage.aspx>

There are many budget hotels available in Rourkela for accommodations who are interested in staying at hotels. They can make their own arrangement directly by contacting the respective hotels. The participants have also to make their own arrangement to reach the workshop venue from hotels.

Some hotels in Rourkela are:

- **Hotel Mayfair** (Panposh Road, Rourkela)  
([www.mayfairhotels.com](http://www.mayfairhotels.com))
- **Radhika Regency** (Bisra, Rourkela)  
([www.hotelradhikaregency.com](http://www.hotelradhikaregency.com))

- **The Regency Inn** (Main Road, Rourkela)  
([www.regencyinn.in](http://www.regencyinn.in))
- **The Central Park Boutique Hotel** (Main Road, Rourkela) ([www.thecentralpark.in](http://www.thecentralpark.in))
- **Hotel Brindaban** (Main Road, Rourkela)  
([www.hotelbrindaban.com](http://www.hotelbrindaban.com))

## Important Dates:

Last date for receiving applications : **20th June, 2023**  
Selection of applicants : **25th June, 2023**  
Early bird registration : **30th June, 2023**  
Request for campus : **30th June, 2023**  
accommodation (latest by)

## Contact:

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## About Us:

Founded in 1961 as Regional Engineering College, National Institute of Technology (NIT), Rourkela is a prestigious Institute with a reputation for excellence at both undergraduate and postgraduate levels. Since its inception, it has been fostering the spirit of national integration among the students, a close interaction with industry and a strong emphasis on both basic and applied research. Department of Physics & Astronomy, formerly Department of Physics (established in 1961), was rechristened in 2013, has the well-earned reputation of being one of the best department for imparting graduation and post-graduation levels courses as well as M. Tech. and Ph.D. programmes. At present, various research activities of this department are conducted in the area of Ferroelectrics & Dielectrics, Multiferroics, Low Temperature Physics, Natural & Synthetic Polymers, Soft Condensed Matter, Semiconductors, Nanotubes & Graphene, Superconductivity, Magnetic Materials, Theoretical Condensed Matter Physics, Theoretical High Energy Physics, Quantum Optics and Astronomy & Astrophysics etc.