

Dr. Aman Phogat

CONTACT INFORMATION

70-D, Humayunpur,
S. J. Enclave,
New Delhi-110029, India.

Mobile: +91-9643365323
E-mail:
amanphogat@hrc.du.ac.in

CURRENT POSITION

Assistant Professor, Department of Physics & Electronics, Hans Raj College, University of Delhi, Delhi-110007

TEACHING EXPERIENCE

Assistant Professor, Hans Raj College, University of Delhi, Delhi, India, *Permanent*, November 2022- Present

- Subjects Taught: Mechanics, Electricity & Magnetism, Mathematical Physics-II
- Experimental Lab: Mechanics, Electricity & Magnetism, Mathematical Phys-III

Assistant Professor, Acharya Narendra Dev College, University of Delhi, *Ad-hoc*, February 2022- August 2022

- Subjects Taught: Mechanics, Solid State Physics
- Experimental Lab: Waves & Optics, Thermal Physics, Electricity & Magnetism

Assistant Professor, Dyal Singh College, University of Delhi, New-Delhi, India, *Guest-Faculty*, February 2021- January 2022

- Subjects Taught: Mechanics, Mathematical Physics-I
- Experimental Lab: Waves & Optics, Mathematical Physics-I Lab

PH.D.

Experimental High Energy Physics
(February 2015 - October 2021)

- **India-based Neutrino Observatory (INO) Experiment**
- **Thesis Title:** Development of Resistive Plate Chambers and front-end electronics for ICAL Experiment.
- **Supervisor:** Prof. Md. Naimuddin
- **Institute:** Department of Physics & Astrophysics, University of Delhi, Delhi, India.

RESEARCH INTERESTS

- Particle Detectors for High Energy Physics
- Detector Hardware and Instrumentation
- Integration and commissioning of Front-end Electronics with Detectors
- Gaseous Detector for Medical Imaging

EDUCATIONAL BACKGROUND

Master of Science (M.Sc.), *Physics*, 2010-2012

- Institute: Kirori Mal College, University of Delhi, Delhi, India.
- *Ist* Division.

Bachelor of Science (B.Sc.), *Physics*, 2007-2010

- Institute: Atma Ram Sanatan Dharma College, University of Delhi, Delhi, India.
- *Ist* Division.

Senior Secondary, 2007

- Institute: Kendriya Vidyalaya Sec-II R.K.Puram, C.B.S.E Board, Delhi, India.
- *Ist* Division.

Matriculation, 2005

- Institute: Sarvodaya Boys SSS No-I Sarojini Nagar, C.B.S.E Board, Delhi, India.
- *Ist* Division.

ACADEMIC ACHIEVEMENTS, AWARDS & HONORS

- Qualified the **Joint CSIR-UGC National Eligibility Test (NET)** for Lectureship in Physical Sciences conducted by the CSIR-UGC, India held in June 2013 and Secured 87 rank.
- **Senior Research Fellowship:** DST funded Project , Government of India: February 2017-2020.
- **Junior Research Fellowship:** DST funded Project, Government of India: February 2015-2017.

PUBLICATIONS

- **Papers in Peer Reviewed Journals**
 - **Uniformity study of large size glass RPC detector using an alternative front-end electronics for INO-ICAL experiment**
DOI: 10.1016/j.nima.2020.164336
Aman Phogat, Moh Rafik, Ashok Kumar, Md. Naimuddin
Nucl.Instrum.Meth. A 978 (2020) 164336.
 - **Outgassing and leak test of INO-ICAL RPC detectors**
DOI: 10.1088/1748-0221/15/10/T10006
Aman Phogat, Rizwan Ahmad, Hemant Kumar, Ashok Kumar, Asar Ahmed, Md. Naimuddin
Journal of Instrumentation (JINST) 15 (2020) T10006.
 - **New front-end electronics for INO-ICAL experiment**
DOI: 10.1016/j.nima.2018.07.070
Aman Phogat, Ankit Gaur, Moh Rafik, Ashok Kumar, Md. Naimuddin
Nucl.Instrum.Meth. A 905 (2018) 193-198.
 - **Testing and Integration of Front End Electronics for INO-ICAL RPCs**
DOI: 10.1016/j.nima.2018.10.003
Ankit Gaur, **Aman Phogat**, Moh. Rafik, Ankit Gaur, Ashok Kumar, Md. Naimuddin.
Nucl.Instrum.Meth. A 936 (2019) 366-367.

- **Conference Proceedings**

- **RPC performance with HARDROC based readout**

DOI: 10.1088/1748-0221/15/06/C06036

Aman Phogat, Ashok Kumar, Moh Rafik, Md. Naimuddin
Journal of Instrumentation (JINST) **15** C06036, (2020)

- **Development and commissioning of the HARDROC based readout for the INO-ICAL experiment**

DOI: 10.1088/1748-0221-11/10/C10004

Ashok Kumar, Ankit Gaur, **Aman Phogat**, Md Rafik, Md. Naimuddin
Journal of Instrumentation (JINST) **11** C10004, (2016)

- **HARDROC2B: A Readout ASIC for INO-ICAL RPCs**

DOI: 10.1007/978-981-33-4408-2-99

Aman Phogat, Moh. Rafik, Ashok Kumar, Md. Naimuddin.
Springer Proc.Phys. 261 (2021) 719-724

- **Performance study of large size RPC detector for INO-ICAL experiment**

DOI: 10.1007/978-3-319-73171-1_181

Aman Phogat, Ankit Gaur, Ashok Kumar, Moh Rafik, Md. Naimuddin.
Springer Proc.Phys. 203 (2018) 755-757

- **Timing and induced charge profile of large size RPC detector for INO-ICAL experiment**

DOI: 10.1007/978-3-319-73171-1_85

Ankit Gaur, **Aman Phogat**, Ashok Kumar, Moh Rafik, Md. Naimuddin.
Springer Proc.Phys. 203 (2018) 369-371

- **Front-end readout for INO-ICAL GRPC**

DOI: 10.1007/978-3-319-73171-1_195

Moh Rafik, **Aman Phogat**, Ankit Gaur, Ashok Kumar, Md. Naimuddin.
Springer Proc.Phys. 203 (2018) 805-807

- **Development of Resistive Plate Chambers and front-end electronics for INO-ICAL experiment**

Ankit Gaur, **Aman Phogat**, Moh. Rafik, Ankit Gaur, Ashok Kumar, Md. Naimuddin.

DAE Symp.Nucl.Phys.63 (2018) 1138-1139

INTERNATIONAL
CONFERENCES

- **Conference** entitled “RPC2020 - XV Conference on Resistive Plate Chambers and Related Detectors”, **Rome, Italy**, 10 - 14 February 2020, presented talks titled “Uniformity study of large-size glass RPC detector using an alternative front-end electronics for INO-ICAL Experiment” and “Outgassing and Leak Test Studies in INO RPC Detectors”.
- **Conference** entitled “The XXIII International Scientific Conference of Young Scientists and Specialists”, **Dubna, Russia**, 15 - 19 April 2019, presented talk titled “Study of RPC detector with different gas mixture compositions using HARDROC front-end ASIC”.

NATIONAL
CONFERENCES

- **Conference** entitled “XXIII DAE-BRNS High Energy Physics Symposium”, **IIT Madras, Chennai, Tamil Nadu**, 10 - 14 December 2018, presented talk titled “HARDROC2B: A Readout ASIC for ICAL-RPCs”.
- **Conference** entitled “XXII DAE-BRNS High Energy Physics Symposium”, **University of Delhi, Delhi**, 12 - 16 December 2016, presented poster titled “Performance study of large size RPC detector for INO-ICAL experiment”.

SCHOOL

- **School** entitled “ X SERC School on Experimental High Energy Physics”, **University of Delhi, Delhi, India**, April 19 - May 09, 2016.

WORKSHOP

- **International Workshop on Frontiers in Electroweak Interactions of Leptons and Hadrons (EILH 2016)** held at the Department of Physics, Aligarh Muslim University, Aligarh, India.
- **LabVIEW Augmented Experimentation** held at the Department of Physics, **Maharaja Institute of Technology, Mysore, India**.

EXCHANGE
PROGRAM

- **Course of Japan-Asia Youth Exchange program in Science (SAKURA Exchange Program in Science)** administered by Japan Science and Technology Agency, **Osaka University** ran the course from November 29 to December 5 in 2015.

RESEARCH
EXPERIENCE:

- **R & D on RPC Detector:**
Worked on the assembly and development of small (30 cm X 30 cm) and large-size (100 cm X 100 cm) Resistive Plate Chamber (RPC) detectors. The RPC detectors assembled in the lab are characterized in the framework of the Iron Calorimeter (ICAL) experiment. The RPCs are tested for performance in terms of efficiency, count rate, dark current, and cluster size. These detectors’ time and charge spectra have also been investigated. The dependence of these detector parameters has been monitored with different gas compositions under cosmic muons. The detectors are thoroughly tested and improved according to experimental requirements.
- **Outgassing and Leak Rate Study in Gaseous Detectors:**
The materials used in the assembly of RPC detectors such as glues, button spacers, frames, gas pipes etc. are checked for any outgassing or contamination. Gas chromatography (GC) analysis with ppm sensitivity is used to qualify the construction materials. This work involves assessing the presence of pollutants in the gas mixture, the purity of the gases, and the cleanliness of the gas mixing unit. Also, a leak station has been developed that can give a quantitative estimate of the leakage in a sealed chamber and exclude the effects of ambient temperature and pressure. On assembled ICAL RPCs, a proper leak test using the overpressure method has been carried out using this arrangement.

- **Electronics Development for ICAL RPCs:**

In order to read-out a huge 3.6 million electronic channels of the future ICAL experiment, a new front-end electronics named HARDROC has been probed as an alternative readout for RPCs. This chip allows us to read 64 channels simultaneously and facilitates amplification, shaping, digitization, and multi-level threshold at a low power consumption. To better understand the various parameters and working readout modes of the ASIC, HARDROC was calibrated with various tests that included noise level assessment, pre-amplifier gain correction, and the DAC to charge conversion of each channel. Before integrating it with the prototype ICAL detector, neighboring channels' time jitter and cross-talk were also studied. Later, the ASIC-Detector set-up was calibrated with cosmic muons, and the pre-amplifier gain and DAC threshold were optimized. The performance of RPC detectors with HARDROC-based read-out electronics and a known CAEN-VME based custom electronics was then compared in an experiment. The results of HARDROC studies were quite encouraging as the detector efficiency at plateau voltages with HARDROC ASIC was observed above 95 %.

- **Uniformity Study in Large Size RPC Detector:**

Uniformity in efficiency, count rate and cluster size of large size RPC detector has been studied by dividing the detector in 32 zones and to better study its granularity. The detector assembled by our group found to be uniform within 5 % in cluster size as well as efficiency over 32 strips. I have successfully demonstrated the response uniformity in a large-size RPC detector similar to those foreseen in the future ICAL experiment.

PERSONAL
DETAILS

- Gender: Male
- Date of Birth: 15 August, 1989
- Age: 33 years
- Citizenship: Indian
- Languages known: English, Hindi.

Date: 17/04/2023