

# NAFIS REZWAN KHAN CHOWDHURY

Visiting Postdoctoral Researcher  
Department of Astronomy and Astrophysics  
Tata Institute of Fundamental Research, Mumbai  
[nrkhanchowdhury.github.io](https://nrkhanchowdhury.github.io)

## RESEARCH INTERESTS

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Neutrino Oscillations, Non-standard Neutrino Interactions, Neutrino Flavour Transitions Beyond the Standard Model (BSM), BSM searches at neutrino telescopes, Deployment of machine learning techniques in the exploration of fundamental physics at neutrino experiments.

## APPOINTMENTS

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- Visiting Postdoctoral Researcher 2022 - present  
Department of Astronomy and Astrophysics  
Tata Institute of Fundamental Research (TIFR)  
Mumbai, India
- Postdoctoral Research Associate 2022 — 2022  
GSI Helmholtzzentrum für Schwerionenforschung GmbH  
Darmstadt, Germany
- Postdoctoral Research Associate 2021 — 2021  
Department of Physics and Astronomy  
University of Utah  
Salt Lake City, Utah, USA

## EDUCATION

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- Instituto de Fisica Corpuscular (IFIC) - University of Valencia 2017 — 2021  
Ph.D. in Physics [Magna Cum Laude]  
Thesis: Search for Non-standard Interactions with ANTARES and KM3NeT/ORCA  
Advisor: Juande Dios Zornoza (IFIC, Valencia)  
Co-advisor: Sergio Navas (University of Granada, Granada)
- Tata Institute of Fundamental Research (TIFR), Mumbai, India 2015 — 2017  
Ph.D. Candidate in Physics
- Indian Institute of Technology (IIT), Madras, India 2013 — 2015  
M.Sc. in Physics  
Thesis: Precision measurements of neutrino oscillations parameters at ICal@INO  
Advisor: Jim Libby
- Jadavpur University (JU), Kolkata, India 2010 — 2013  
B.Sc. in Physics

## VISITING RESEARCH

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- Physical Research Laboratory, Ahmedabad, India Feb — March 2021  
Host: Srubabati Goswami
- INFN Genova, Italy May — June 2019  
Host: Marco Agnolfi
- Department of Physics, University of Delhi, India May — June 2014  
Host: Debajyoti Choudhary

## AWARDS

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- FPI Ph.D. grant for training of predoctoral candidates funded by Govt. of Spain (2017 - 2021).  
[Application supported by Valencia Experimental Group of Astroparticles (VEGA) ]
- Secured All India Rank (AIR) 19 in JEST 2015 in Physics.  
[All-India exam for interview shortlisting at various research institutes in India.]
- INSA-IASc-NASI Summer Research Fellowship (May - June 2014).  
[Competitive call for grants for master research applications.]
- Qualified CSIR-UGC-NET JRF with AIR104 (Roll:514855).  
[Pan-India exam for grant of Ph.D. fellowships by Govt. of India.]
- Recipient of Scholarship for Higher Education (SHE) funded by the Department of Science and Technology, Govt. of India (2010 - 2015). [Awarded to the top 1% in the state.]

## PUBLICATIONS

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An exhaustive list of publications can be found on iNSPIRE. Ones with significant contributions are listed below leaf.

### JOURNAL PAPERS

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3. N. Fiza, N. R. Khan Chowdhury, M. Mehedi, *Investigating Lorentz Invariance Violation (LIV) effects on neutrino oscillations in a doubly magic baseline of the Protvino to ORCA (P2O)*, JHEP01 (2023) 076 [2206.14018]
2. KM3NeT Collaboration, *Determination of the Neutrino Mass Ordering and Oscillation Parameters with KM3NeT-ORCA*, EPJC 82 26 (2022) [2103.09885]
1. ANTARES Collaboration, *A search for Neutrino Non-standard Interactions with 10 years of ANTARES data*, JHEP07 (2022) 048 [2112.14517]



## CONFERENCE PROCEEDINGS

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5. J. J. Hernandez Rey et al., *Latest results on neutrino non-standard interactions with ANTARES and ORCA Phase 1*, Proceedings of the 37th International Cosmic Ray (ICRC2021).
4. N. R. Khan Chowdhury, *Search for neutrino non-standard interactions with ANTARES and KM3NeT-ORCA*. XIX International Workshop on Neutrino Telescopes (NuTel 2021).
3. J. J. Hernandez-Rey et al., *Search for neutrino non-standard interactions with ANTARES and KM3NeT-ORCA*. JINST 16 (2021) 09, C09016 (VLVnT2021).
2. N. R. Khan Chowdhury, *Neutrino Oscillations and Non-Standard Interactions with KM3NeT-ORCA*. Prospects in Neutrino Physics [2004.05004] (NuPhys2019).
1. N. R. Khan Chowdhury et al., *Sensitivity to Non-Standard Interactions (NSI) with KM3NeT-ORCA*. Proceedings of the 36th International Cosmic Ray (ICRC2019).

## PREPRINTS

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1. D. Kaur, N. R. Khan Chowdhury, U. Rahman, *Effect of non-unitary mixing on the mass hierarchy and CP violation determination at the Protvino to Orca experiment*, [2110.02917]

## CONTRIBUTED TALKS

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11. *Search for non-standard neutrino interactions with ANTARES and KM3NeT/ORCA*  
Very Large Volume Neutrino Telescopes Workshop, Valencia, Spain, May 2021 (Virtual)
10. *Search for NSIs with 10 years of ANTARES data and perspectives for KM3NeT/ORCA*  
The XIX International Workshop on Neutrino Telescopes, Venice, Italy, Feb 2021 (Virtual)
9. *Tests of Lorentz symmetry with atmospheric neutrinos in KM3NeT/ORCA*  
KM3NeT Oscillation Meeting, Jan 2021 (Virtual)
8. *Sensitivity update on the neutrino non-standard interactions with new ORCA115 20m MC*  
ANTARES & KM3NeT Collaboration Meeting, Amsterdam, Netherlands, June 2020 (Virtual)
7. *Non-standard Interactions with atmospheric neutrinos in ANTARES*  
ANTARES & KM3NeT Collaboration Meeting, Genova, Italy, Feb 2020
6. *Neutrino Oscillations and Non-standard Interactions at KM3NeT/ORCA*  
NuPhys 2019: Prospects in Neutrino Physics, London, UK, Dec 2019
5. *Impact of non-standard interactions on the NMO sensitivity at KM3NeT/ORCA*  
ANTARES & KM3NeT Collaboration Meeting, Warsaw, Poland, Oct 2019
4. *Sensitivity to Neutrino non-standard interactions at ANTARES and KM3NeT/ORCA*  
ANTARES & KM3NeT Collaboration Meeting, Tbilisi, Georgia, Feb 2018

3. *Neutrino Non-standard Interactions at KM3NeT/ORCA*  
ANTARES & KM3NeT Collaboration Meeting, Caserta, Italy, Oct 2018
2. *Time Calibration with downing atmospheric muons in KM3NeT*  
ANTARES & KM3NeT Collaboration Meeting, Granada, Spain, May 2018
1. *Preliminary Studies of neutrino Mass Ordering at IFIC*  
ANTARES & KM3NeT Collaboration Meeting, Rabat, Morocco, Feb 2018

## SEMINARS

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2. *Neutrinos beneath the waves: In quest for Non-Standard Neutrino Interactions*  
High Energy Physics Seminars, Department of High Energy Physics  
Tata Institute of Fundamental Research (TIFR), Mumbai, India, Feb 2022
1. *Neutrinos beneath the waves: In search for Non-Standard Interactions.*  
High Energy and Astrophysics Seminar Series, Dept. of Physics and Astronomy,  
University of Utah, Salt Lake City, USA, Jan 2021

## POSTERS

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4. *Testing the violations of Lorentz Invariance with accelerator neutrinos in P2O and DUNE*  
Neutrino 2022, Seoul, Korea, June 2022 (Hybrid)
3. *Latest results on neutrino non-standard interactions with ANTARES and ORCA Phase 1*  
37th International Cosmic Ray Conference, Berlin, Germany, July 2021
2. *Search for Non-Standard Interaction at Mediterranean Neutrino Telescopes*  
Neutrino 2020, Chicago, Illinois, USA, June 2020
1. *Sensitivity to non-standard neutrino interactions with KM3NeT/ORCA*  
36th International Cosmic Ray Conference, Madison, Wisconsin, USA, July 2019

## SOFTWARE SKILLS

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### PROGRAMMING

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Python, C++, Bash

### TYPESETTING

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LaTeX, HTML

### VERSION CONTROL

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Git

### HEP SOFTWARE

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ROOT, GLoBES

### MACHINE LEARNING

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Scikit-Learn, TensorFlow, Keras

## PERSONAL DETAILS

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