

# Curriculum Vitae

**Anil Kumar**

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<b>Contact Information</b>	DESY Zeuthen, Platanenallee 6, 15738 Zeuthen, Germany	E-mail: anil.kumar@desy.de, anilak41@gmail.com ORCID: <a href="https://orcid.org/0000-0002-8367-8401">0000-0002-8367-8401</a>
<b>Personal Information</b>	Date of birth : 29th, March 1993 Marital status : Unmarried Nationality : Indian	
<b>Experience</b>	<b>Deutsches Elektronen-Synchrotron (DESY),</b> Zeuthen, Germany Post-Doctoral Researcher under the IceCube Collaboration	June 2022 – Present
<b>Education</b>	<b>Homi Bhabha National Institute (HBNI),</b> Mumbai, Maharashtra, India Ph.D. under India-based Neutrino Observatory (INO)	August 2016 – May 2022
	<b>Indian Institute of Technology (IIT) Roorkee,</b> Roorkee, Uttarakhand, India M.Sc. Physics	July 2014 – May 2016 (CGPA 8.310)
	<b>St. Stephen's College, University of Delhi,</b> Delhi, India. B.Sc. Physics	July 2011 – May 2014 (Percentage 81.19 %)
	<b>Rajkiya Pratibha Vikas Vidyalaya,</b> Dwarka, New Delhi, India Senior Secondary School Secondary School	July 2004 - March 2011 (Percentage 90.6 %) (Percentage 90.83 %)
<b>Leadership</b>	Astrophysics Seminar Organizer at DESY, Zeuthen	Sep 2023 - Current
<b>National Level Exams</b>	<ul style="list-style-type: none"><li>• Tata Institute of Fundamental Research graduate school entrance exam, 2016 (Qualified)</li><li>• Graduate Aptitude Test in Engineering (GATE), 2016 (72 Rank)</li><li>• Joint Entrance Screening Test (JEST), 2016 (481 Rank)</li><li>• Junior Research Fellowship (JRF) and Eligibility for Assistant Professorship, Dec 2015 (57 Rank)</li><li>• Indian Institute of Astrophysics Screening Test (IIAST), 2015 (Qualified)</li><li>• Joint Admission test for Masters (JAM), 2014 (234 Rank)</li><li>• Joint Entrance Screening Test (JEST), 2014 (59 Rank)</li></ul>	

## Awards

- 2022: Second position in best talk on National Science Day at Tezpur University, Tezpur, Assam, India.
- 2018: Second position in best poster in the XXIII DAE-BRNS High Energy Physics (HEP) Symposium, IIT Madras, India
- 2009: Indira Award for highest marks in Mathematics in CBSE 10th by Delhi Govt

## Research Interest

Neutrino physics, neutrino oscillations, atmospheric neutrinos, Beyond the Standard Model (BSM) of particle physics, neutrino oscillation tomography of Earth, astrophysical neutrinos, IceCube, INO-ICAL, experimental aspect of ICAL, Resistive Plate Chambers (RPCs), resistivity of graphite layer, electronics and instrumentation

## Skills

**Experiments experience:** RPC fabrication and characterization, Surface resistivity of graphite in RPC, Plastic scintillators, Silicon Photo-multiplier, NIM logic units, data acquisition (DAQ) systems, Muon decay, Gamma Spectroscopy, HPGe, Cosmic muon veto, Neutron absorption, field-programmable gate array (FPGA), Arduino micro-controller

**Programming and Scripting Languages:** C++, C, Python, Fortran, ROOT, Matlab, GEANT4, GENIE, Microprocessor Programing (8085), HTML, PHP

**Tools:** Git, Jupyter Notebook, Latex, MS Word, Excel, Powerpoint, Inkscape, Kdenlive

**OS :** Linux (Ubuntu, CentOS, Scientific Linux, and Fedora), Windows

## List of Publications\*

- Papers published in International Refereed Journals (9)
- Papers communicated to International Refereed Journals (1)
- Conference Proceedings (8)

## Talks

1. **Latest muon neutrino disappearance results from IceCube DeepCore**  
The European Physical Society Conference on High Energy Physics (EPS-HEP 2023), University of Hamburg, Germany, Aug 21 - 25, 2023
2. **Probing interiors of Earth using magnetized neutrino detector**  
International Workshop on Multi-messenger Tomography of the Earth (MMTE 2023), APC-Université Paris Cité, Paris, France, Jul 4 - 7, 2023
3. **Neutrino Oscillation Tomography of Earth with a Magnetized Detector having Charge-identification Capability**  
Multi-Messenger Tomography of Earth (MMTE 2022) Workshop - online, Jul 30 - 31, 2022
4. **Validating the Earth's Core using Atmospheric Neutrinos with ICAL at INO**  
National Science Day, Tezpur University, Tezpur, Assam, India - online, Mar 1, 2022
5. **A New Approach to Probe Non-Standard Interactions in Atmospheric Neutrino Experiments**
  - The 23rd International Workshop on Neutrinos from Accelerators (NuFact 2022, online), Jul 31 to Aug 6, 2022
  - The 22nd International Workshop on Neutrinos from Accelerators (NuFact 2021, online), Sep 6 to 11, 2021
  - Virtual School on Flavor Structure of the Standard Model, HEP-PHENO School (Online), Aug 31 to Sep 12, 2021
  - 17th International Conference on Topics in Astroparticle and Underground Physics, (TAUP 2021, online), Aug 26 - Sep 3, 2021

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\* See details in the full list of publications

- American Physical Society (APS) April Meeting 2021 - online, Apr 17 - 20, 2021
  - The XIX International Workshop on Neutrino Telescopes (Neutel 21), Padova (Italy) – online, Feb 18-26, 2021
  - The XXIV DAE-BRNS High Energy Physics (HEP) Symposium (held online), NISER, Bhubaneswar, India, Dec 14 - 18, 2020
6. **Exploring Oscillation Dip and Valley, NSI, and Earth's Core using Atmospheric Neutrinos at INO-ICAL**
    - HEP Seminar, Department of Physics, University of Alberta, Canada, Jul 7, 2021
    - Journal Club, Neutrino Astroparticle Physics Lab. Sungkyunkwan University (SKKU), Republic of Korea (South Korea) and Department of Physics and Astronomy, University of Utah, USA , May 28, 2021
  7. **From Oscillation Dip to Oscillation Valley in Atmospheric Neutrino Experiments**  
Insitute of Physics (IOP), Bhubaneswar, HEP Journal Club, Mar 11, 2021
  8. **From oscillation dip to oscillation valley in atmospheric neutrino experiments**  
Virtual Neutrino Theory mini-workshop, Sep 21 - 23, 2020
  9. **Characterization of Scintillator Detector**  
The XII SERB School on Experimental High-Energy Physics at TIFR, Mumbai, India, Jan 7-27, 2019
  10. **Effect of Variation of Surface Resistivity of Graphite Layer in RPC**  
The XXIII DAE-BRNS High Energy Physics (HEP) Symposium 2018 held at IIT Madras, India, Dec 10-14, 2018
  11. **Sensitivity Studies for Signal Discovery**  
International Neutrino Summer School 2018 at Schloss Waldthausen near Mainz, Germany, May 21 to Jun 1, 2018
  12. **Proportional Counter**  
the XI SERC School on Experimental High-Energy Physics at NISER, Bhubaneswar, India, Nov 07 - 27, 2017

## Poster Presentations

1. **Probing the interior of Earth using oscillating neutrinos at INO-ICAL**  
The European Physical Society Conference on High Energy Physics (EPS-HEP 2023), University of Hamburg, Germany, Aug 21 - 25, 2023
2. **Validating the Earth's Core using Atmospheric Neutrinos with ICAL at INO**  
The 22nd International Workshop on Neutrinos from Accelerators (NuFact 2021, online), Sep 6 to 11, 2021
3. **A New Approach to Probe Non-Standard Interactions in Atmospheric Neutrino Experiments**
  - The XXX International Conference on Neutrino Physics and Astrophysics (Neutrino 2022), online, May 30 - Jun 4, 2022
  - The 30th International Symposium on Lepton Photon Interactions at High Energies, online, Jan 10 - 14, 2022
  - The 28th International Workshop on Weak Interactions and Neutrinos (WIN 2021, online), Jun 7 - 12, 2021
  - Invisibles virtual Workshop, May 31 to Jun 4, 2021
4. **Neutrino tomography of Earth using ICAL@INO**  
The XXIV DAE-BRNS High Energy Physics (HEP) Symposium (held online), NISER, Bhubaneswar, India, Dec 14 - 18, 2020

5. **From oscillation dip to oscillation valley in atmospheric neutrino experiments**  
The XXIX International Conference on Neutrino Physics and Astrophysics (Neutrino 2020) (held online), Jun 22 - Jul 2, 2020
6. **India-based Neutrino Observatory: A Mega Science Project**  
National Science Day at Institute of Physics (IOP), Bhubaneswar, India on Feb 28, 2020
7. **Effect of Variation of Surface Resistivity of Graphite layer in RPC**  
The XXIII DAE-BRNS High Energy Physics (HEP) Symposium 2018 held at IIT Madras, India, Dec 10-14, 2018
8. **Exploring Neutrino Properties using Atmospheric Neutrinos at ICAL**  
International Neutrino Summer School 2018 at Schloss Waldthausen near Mainz, Germany, May 21 to Jun 1, 2018

**Conferences &  
Workshop  
attended**

1. The European Physical Society Conference on High Energy Physics (EPS-HEP 2023), University of Hamburg, Germany, Aug 21 - 25, 2023
2. International Workshop on Multi-messenger Tomography of the Earth (MMTE 2023), APC-Université Paris Cité, Paris, France, Jul 4 - 7, 2022
3. Multi-Messenger Tomography of Earth (MMTE 2022) Workshop - online, Jul 30 - 31, 2022
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12. The XIX International Workshop on Neutrino Telescopes (Neutel 21), Padova (Italy) – online, Feb 18-26, 2021
13. Virtual Neutrino Theory mini-workshop, Sep 21-23, 2020
14. The XXIV DAE-BRNS High Energy Physics (HEP) Symposium (held online), NISER, Bhubaneswar, India, Dec 14 - 18, 2020
15. The XXIX International Conference on Neutrino Physics and Astrophysics (Neutrino 2020) (held online), Jun 22 - Jul 2, 2020
16. The XXIII DAE-BRNS High Energy Physics (HEP) Symposium 2018 held at IIT Madras, India, Dec 10-14, 2018

<b>School attended</b>	1. Virtual School on Flavor Structure of the Standard Model, HEP-PHENO School (Online), Aug 31 to Sep 12, 2021	
	2. Invisibles 2021 School, Apr 12 - May 7, 2021	
	3. XII SERB School on Experimental High-Energy Physics at TIFR, Mumbai, India, Jan 7-27, 2019	
	4. International Neutrino Summer School 2018 at Schloss Waldthausen near Mainz, Germany, May 21 to Jun 1, 2018	
	5. XI SERC School on Experimental High-Energy Physics at NISER, Bhubaneswar, India, Nov 07 - 27, 2017	
<b>Projects and Activities</b>	Project on Study of Resistive Plate Chamber and Scintillators.	2016
	M.Sc. Thesis Project on Solving Coupled Channel Differential Equation with the R-Matrix Method Embedded on a Lagrange Mesh: An Application on $^{37}\text{Mg}$ .	2015 - 2016
	Organised 2 workshops on “Basics of Electronics” and “Designing Power Supply” in Electronics Society in St. Stephen’s College.	2014
	<b>Delhi University Innovation Project</b>	2012 – 2013
	“Delhi University Innovation Project: On the Energy, Light Characteristics and Economic Feasibility of LED Luminaires” aimed for feasibility of replacing current Luminaries by the LED Luminaires in the offices, colleges and homes.	
	Participated in Phoenix workshop at IUAC	2012
	Participated in organising Science Games in NSF 2012 at St. Stephen’s College.	2012