

Curriculum Vitae

Anil Kumar

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

- Joint Entrance Screening Test (JEST), 2014 (59 Rank)

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 (10)
- Papers communicated to International Refereed Journals (1)
- Conference Proceedings (12)

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 - Aug 6, 2022
 - The 22nd International Workshop on Neutrinos from Accelerators (NuFact 2021, online), Sep 6 - 11, 2021
 - Virtual School on Flavor Structure of the Standard Model, HEP-PHENO School (Online), Aug 31 - Sep 12, 2021

* See details in the full list of publications

- 17th International Conference on Topics in Astroparticle and Underground Physics, (TAUP 2021, online), Aug 26 - Sep 3, 2021
 - 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 - 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 Invisible Neutrino Decay using Oscillations of Atmospheric Neutrinos at IceCube DeepCore**
The XXXI International Conference on Neutrino Physics and Astrophysics (Neutrino 2024), Milano, Italy, Jun 16 - 22, 2024
2. **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
3. **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 - 11, 2021
4. **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 - Jun 4, 2021
5. **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
 6. **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
 7. **India-based Neutrino Observatory: A Mega Science Project**
National Science Day at Institute of Physics (IOP), Bhubaneswar, India on Feb 28, 2020
 8. **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
 9. **Exploring Neutrino Properties using Atmospheric Neutrinos at ICAL**
International Neutrino Summer School 2018 at Schloss Waldthausen near Mainz, Germany, May 21 - Jun 1, 2018

Conferences & Workshop attended

1. The XXXI International Conference on Neutrino Physics and Astrophysics (Neutrino 2024), Milano, Italy, Jun 16 - 22, 2024
2. The European Physical Society Conference on High Energy Physics (EPS-HEP 2023), University of Hamburg, Germany, Aug 21 - 25, 2023
3. International Workshop on Multi-messenger Tomography of the Earth (MMTE 2023), APC-Université Paris Cité, Paris, France, Jul 4 - 7, 2022
4. Multi-Messenger Tomography of Earth (MMTE 2022) Workshop - online, Jul 30 - 31, 2022
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7. The 30th International Symposium on Lepton Photon Interactions at High Energies, online, Jan 10 - 14, 2022
8. The 22nd International Workshop on Neutrinos from Accelerators (NuFact 2021, online), Sep 6 - 11, 2021
9. The 17th International Conference on Topics in Astroparticle and Underground Physics, (TAUP 2021, online), Aug 26 - Sep 3, 2021
10. The 28th International Workshop on Weak Interactions and Neutrinos (WIN 2021, online), Jun 7 - 12, 2021
11. Invisibles virtual Workshop, May 31 - Jun 4, 2021
12. American Physical Society (APS) April Meeting 2021 - online, Apr 17-20, 2021
13. The XIX International Workshop on Neutrino Telescopes (Neutel 21), Padova (Italy) - online, Feb 18-26, 2021
14. Virtual Neutrino Theory mini-workshop, Sep 21-23, 2020
15. The XXIV DAE-BRNS High Energy Physics (HEP) Symposium (held online), NISER, Bhubaneswar, India, Dec 14 - 18, 2020
16. The XXIX International Conference on Neutrino Physics and Astrophysics (Neutrino 2020) (held online), Jun 22 - Jul 2, 2020

17. The XXIII DAE-BRNS High Energy Physics (HEP) Symposium 2018 held at IIT Madras, India, Dec 10-14, 2018

School attended

1. Virtual School on Flavor Structure of the Standard Model, HEP-PHENO School (Online), Aug 31 - 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 - Jun 1, 2018
5. XI SERC School on Experimental High-Energy Physics at NISER, Bhubaneswar, India, Nov 07 - 27, 2017

Projects and Activities

Project on Neutron Absorption and Background Suppression due to Cosmic Veto. 2017

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}Mg . 2015 - 2016

Organised 2 workshops on “Basics of Electronics” and “Designing Power Supply” in Electronics Society in St. Stephen’s College. 2014

Delhi University Innovation Project 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 National Science Fest (NSF) 2012 at St. Stephen’s College. 2012