

K. KUMAR AKHIL

PERSONAL DATA

PLACE AND DATE OF BIRTH: Kakinada, India | 11th November 1995
ADDRESS: Campus Groenenborger, 2020, Antwerp, Belgium (current)
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ONGOING RESEARCH

FROM DEC'21	PhD in Gravitational Wave instrumentation , University of Antwerpen, Belgium Thesis: Research & development of position sensors and actuators in for seismic attenuation systems of Gravitational Wave detectors Advisor: HANS VAN HAEVERMEAT
DEC'24-FEB'25	Part time research Intern for a four qubit chip designing project at Sillicofeller, a quantum chip manufacturing startup.

EDUCATION

OCT 2021	Master degree in MATHEMATICAL PHYSICS , Eberhard Karls Universität Tübingen, Germany Thesis: Quasi normal modes of Black holes in extended scalar tensor theories of gravity Advisor: Daniela DONEVA
FEB 2020	Master Degree in PHYSICS , National Institute of Technology(N.I.T), India. Thesis: A brief discussion on negative logarithms Advisor: Debjit DUTTA
MAY 2017	Bachelor Degree in MECHANICAL ENGINEERING (specialization in energy),Vellore Institute of Technology, India. Thesis: Magnetic Active Suspension System Advisor: Denis ASHOK
MAY 2013 GPA	Higher Secondary School at Narayana Junior College, India. 9.55/10

RESEARCH INTERESTS

INSTRUMENTATION: Position sensing and control, Actuator optimization, Seismic attenuation systems
QUANTUM PHYSICS: Quantum computing, Quantum photonics

PUBLICATIONS

- Utina, A, [...]Kumar Akhil Kukkadapu [...], et al. **ETpathfinder: A Cryogenic Testbed for Interferometric Gravitational-Wave Detectors**. Classical and Quantum Gravity, vol. 39, no. 21, Nov. 2022, p. 215008. DOI.org (Crossref), <https://doi.org/10.1088/1361-6382/ac8fdb>.

In preparation

- **Title** - Design and optimization of Linear Variable Differential Transformers (LVDTs) and Voice coils using Finite Element Analysis: A Methodical Approach to Enhancing Sensitivity and actuation force.
Authors - Kumar Akhil, Hans Van Havermaet
- **Title** - Characterisation of a combined LVDT sensor and voice coil actuator for gravitational wave detectors.
Authors - Kumar Akhil, Pengbo Li, Hans Van Havermaet

SUPERVISION

Supervised two Master degree theses

JUNE'24-JUNE'25	Background sensitivity studies of reversed LVDTs and their potential shielding options
JUNE'22-JUNE'23	Measurement of transverse displacement effects in LVDT position sensors used in ETpathfinder

SKILLS AND EXPERIENCE

- **Certified Clean Room employee** – Trained and experienced in operating in cleanroom environments with full protocol adherence.
- **sensor development** - Experience in modeling, designing, prototyping, production, and testing of position sensors and actuators tailored for ultra-sensitive seismic isolation.
- **ETpathfinder Onsite Involvement** – Contributed to the ETpathfinder, research facility for 3rd gen gravitational wave detector, from its early phases, including hands on lab work, integration, and testing.
- **Precision instrumentation** - Hands on development and calibration of electromechanical systems for gravitational wave detector suspensions.
- **Control systems** - Active involvement in the design and tuning of feedback control loops for seismic attenuation systems in ETpathfinder.
- **Team and Individual Researcher** – Proven ability to work independently and within international research teams.
- **Large-Scale Scientific Collaboration** – Experience with the dynamics of large collaborations, including documentation, planning, scheduling, and effective communication.
- **System integration** - Cross disciplinary collaboration for integrating sensor and actuator subsystems into complex experimental infrastructures like ETpathfinder.

COMPUTER SKILLS

Basic : ANSYS, KI CAD
Intermediate : QISKIT, LATEX, MS OFFICE, TINA, MATLAB, STELLARIUM, AUTOCAD, ADOBE PREMIERE PRO
Fluent : PYTHON, POWER POINT, SOLID WORKS 2D

PROJECTS AND PRESENTATIONS

Oct 2023	Presentation on position sensors for seismic isolation in GW detectors at Belgian-Dutch GW meeting at Maastricht University, Netherlands
Feb 2023	Poster presentation on position sensors for seismic isolation in GW detectors at University of Antwerp, Belgium
Sep 2022	Poster presentation on attenuation systems of GW detectors at fAmaldi research centre, Italy
March 2021	Delivered a talk on twistor theory at Tübingen Theoretical Astrophysics group, Germany
June-July 2019	Review on causality condition for <i>wave propagation in a dispersive medium</i> Supervisor : Dr. Kazuyuki Furuuchi
Oct-Dec 2018	Presentation titled mysticism and modern physics detailing the philosophy of ancient Indian sciences, NIT Arunachal Pradesh
Feb-April 2017	M.A.S.S Developed concept and designed a technical model to replace existing suspension system with <i>magnetic active suspension system</i>
Sep-October 2016	B.H.E.L, Hyderabad Presentation on steam turbine assembly clearances Advisor: Dr. Sanjay Mondal
Mar-May 2015	Developed a concept and theoretical design that generates power by modifying brake mechanism (in automobiles) and by DJ floors using piezoelectric materials.

LANGUAGES

TELUGU: Mother tongue

HINDI: Fluent

ENGLISH: Fluent

TAMIZH: Basic

AWARDS AND APPRECIATIONS

1. Inter club badminton champion
2. Writer in Dramatics club, VIT
3. Writer and director for a short film
4. Tutor at SEDS VIT, a student organization promotes space education

OTHER ACTIVITIES

1. Poetry
2. Cinema
3. Travelling
4. Trekking
5. Badminton

INTERNSHIPS AND SCHOOLS

- Nov 2023 | 2nd Einstein Telescope annual meeting in Orsay, France.
- OCT 2023 | Belgian-Dutch Gravitational Wave meeting in Maastricht University, Netherlands.
- FEB 2023 | ETpathfinder planning workshop in Maastricht University, Netherlands.
- SEP 2022 | Attended Amaldi Summer school in Paestum, Italy.
- JUNE 2019 | Summer Research Internship in Manipal university.
- JAN 2019 | Participated in **Jagriti Yatra**, a 15 day train journey travelling 8000 kms across the boundary of India by combining young minds of all streams to discuss the ideas.
- JULY 2018 | Attended research program in GEOMETRIC STRUCTURES, SPACES AND GROUPS in Harish-Chandra Research Institute , Prayagraj.
- DEC 2016 | Student at research program funded by NBHM in ALGEBRA, GEOMETRY AND DIFFERENTIAL EQUATIONS at Central University of TamilNadu , India.
- DEC 2015 | Former Intern at **Bharat Heavy Electronics Limited** in the department of STEAM TURBINE ASSEMBLY CLEARANCES.

REFERENCES

- Prof. Hans Van Haevermaet** | University of Antwerp, Belgium
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- Prof. Carla Cederbaum** | University of Tübingen, Germany
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