

# Paritosh Verma

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Nationality: Indian

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## Short summary

I am a Ph.D. physics graduate with a strong interest in quantitative subjects. Primary contributions of my Ph.D. are to establish a new statistic ( $\mathcal{D}$ -statistic: a non-central  $\chi^2$  distribution with 2 degrees of freedom) to detect gravitational waves scalar mode in Jordan-Brans-Dicke theory of gravity and develop codes in Python for Monte Carlo simulations as well as data analysis. During the initial years of my Ph.D., I studied parameter estimation for the case of a monochromatic signal when different parameters are unknown and worked with the Fisher matrix. In 2022, I was also part of a YouTube webinar (<https://www.youtube.com/watch?v=0QomwKeWbws>) on behalf of the LIGO-Virgo-Kagra Collaboration, where I explained pulsars, as well as results of data analysis for the general audience. In the past, I worked on gravitational waves, astrophysics, data analysis, and black hole physics. My current interests include quantum and classical optics, quantum field theory, Einstein-Cartan theory, and quantum gravity. I have extensive experience in conducting seminars at various international conferences and institutions along with delivering lectures in analytical mechanics, quantum mechanics, electromagnetism, and classical field theory.

## Positions

**Organization:** Maria Curie-Skłodowska University, Lublin, Poland

**Duration:** January 2024 - December 2025

**Position :** Postdoctoral researcher (Assistant professor) working on the physics of black holes and dark-photons

## Education

### *Ph.D. Physics*

**Duration:** Dec 21, 2017 to March 06, 2023

**Institution:** National Centre for Nuclear Research (NCBJ), Poland

Awarded generous stipend from NCBJ and Polish NCN grant after qualifying PhD entrance exam.

### *M.S Physics*

**Duration:** Sept 2013- June 2016 (3 semesters)

**Institution:** University of Massachusetts, USA

**I was on an official leave from Sept 2014 to Jan 2016.**

**I was a research assistant during the first year.**

**I was a teaching assistant during the second year.**

Awarded scholarship of 30,000 USD + tuition fee waiver

### *M.Sc Astrophysics*

**Duration:** Sept 2010- Sept 2012

**Institution:** Università di Roma Tor Vergata, Italia & Universität Innsbruck, Austria

**Joint European Erasmus Mundus Program**

Awarded scholarship of 32,000 euros + tuition fee waiver

## Research Visits

*Tata Institute of Fundamental Research, Mumbai, India*

*Università degli Studi di Torino, Italia*

*Istituto Internazionale per gli Alti Studi Scientifici, Vietri sul Mare, Italia*

*Max Planck-Institut für Astrophysik, Garching, Germany*

*Indian Institute of Astrophysics*

*Centre d' Etude Spatiale des Rayonnements, Toulouse, France*

## Skills

- **Programming Languages:** C, IDL & Python
- **Software Tools:** L<sup>A</sup>T<sub>E</sub>X, Mathematica
- **Operating Systems:** Mac OS and Linux

## Membership

- LIGO-Virgo-KAGRA collaboration during my Ph.D. studies.

## Academic Honors

- Selected for Prospects in Theoretical Physics 2025 on Gravitational waves at Institute for Advanced Study, Princeton (Offer declined).
- Outstanding achievements 2022 from NCBJ.
- The Onassis foundation award to attend physics lectures in Crete, July 2022.
- Best PhD students award 2021 by NCBJ.
- Young scientist award in October 2018 by NCBJ for researchers under 35 to carry out a project on r-modes oscillations.
- Awarded full scholarship to pursue MS Physics at University of Massachusetts.
- Selected among 5 students to carry out 8 weeks summer internship at IASS with full scholarship.
- Awarded DAAD scholarship to carry out summer internship at MPA, Garching during July- Aug 2011.
- Awarded Erasmus Mundus Category A scholarship for 2 years to pursue Masters in Astrophysics.
- Recipient of CNRS Indo- French Astronomy Network 2008 (IFAN) grant to carry out summer internship at CESR, Toulouse.
- Semifinalist of student sponsorship program for International Astronautical Congress 2007 organized by ISRO. In semifinal round I presented my original ideas on “ Mining and Manufacturing on Moon” and was selected among 60 Undergraduate students from India.

## Extra Co curricular

- Participated in 1800 km cycle ride in India to raise funds for Cancer and girl child education during Oct 01- Oct 18, 2014.
- Completed Vipassana meditation course successfully during 13-24 March 2013 in Dhamma Pushkar, India.
- Awarded Black belt in Shotokan Karate International in year 2001.
- Awarded Sports championship in school in year 2000.

## Languages skills

Hindi (native), English (fluent), Italian (beginner), Polish (beginner)

# Publications

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1. Rogatko, M. and Verma, P. Influence of dark photon on magnetized and charged particle orbits around static spherically symmetric black hole. [Phys. Rev. D 111, 084042.](#)
2. Rogatko, M. and Verma, P. Can synchrotron radiation reveal the presence of dark sector around black hole? [Eur. Phys. J. C 85, 205 \(2025\).](#)
3. Verma, P. and Bhattacharyya, S. Multiple mountains on a pulsar: implications for gravitational waves and the spin-down rate. [arXiv:2512.15200](#) **Paper submitted to a journal.**
4. Verma, P. Probing Gravitational Waves from Pulsars in Brans-Dicke Theory [Universe 2021, 7\(7\), 235](#)
5. R. Abbott et al, Searches for Gravitational Waves from Known Pulsars at Two Harmonics in the Second and Third LIGO-Virgo Observing Runs [ApJ 2022 , 935, 1](#)
6. Krolak, A and Verma, P. Recent Observations of Gravitational Waves by LIGO and Virgo Detectors [Universe 2021, 7\(5\), 137](#)
7. Verma, P. A swinging rod in Brans-Dicke Theory, Annalen der Physik . [andp.202100600](#)
8. First simultaneous microlensing observations by two space telescopes: Spitzer & Swift reveal a brown dwarf in event OGLE-2015-BLG-1319 [Y. Shvartzvald et al 2016 ApJ 831 183](#)
9. Spitzer Parallax of OGLE-2015-BLG-0966: A Cold Neptune in the Galactic Disk [R. A. Street et al 2016 ApJ 819 93](#)
10. Spitzer Microlens Measurement of a Massive Remnant in a Well-Separated Binary [Y. Shvartzvald et al 2015 ApJ 814 111](#)