

SATYABRATA MAHAPATRA

✉ satyabrata.mahapatra02@gmail.com

✉ satyabrata@g.skku.edu

☎ +82-1043354412

☎ +91-7205501437

🏠 101, 16-18, Seobu-ro 2105beon-gil, Jangan-gu, Suwon-si, Gyeonggi-do, PIN-16362, Korea

iN [Satyabrata.Mahapatra.1](#)

ID [0000-0002-4000-5071](#)

ℹ [Satyabrata-Mahapatra](#)

CURRENT AFFILIATION

May 2023 – Present

📖 **Postdoctoral Research Fellow,**
Department of Physics and Institute of Basic Science,
Sungkyunkwan University, Suwon 16419, South Korea.

Mentor: Prof. Ki-Young Choi

PREVIOUS POSITION

September 2022 – February 2023

📖 **Research Associate,**
Department of Physics, IIT Hyderabad.

RESEARCH INTEREST

- 📖 • Beyond Standard Model Physics
- 📖 • Neutrino Physics
- 📖 • Dark Matter Phenomenology
- 📖 • Leptogenesis and Baryogenesis
- 📖 • Primordial Black Holes and Gravitational Waves

EDUCATION



August 2018 – November 2022

📖 **Ph.D., Indian Institute of Technology, Hyderabad**
Thesis : [Phenomenological Study of Abelian Gauge Extensions of the Standard Model in Light of Neutrino mass, Dark Matter and \(g-2\) Anomalies.](#)
Supervisor : Prof. Narendra Sahu
SGPA in Ph.D. Coursework: 9.20/10.00
🔗 [Certificate](#) and 🔗 [Gradesheet](#)




August 2016 – July 2018

📖 **M.Sc. Physics, School of Physics, Sambalpur University.**
Overall Grade Point Average: 9.09/10.00
🔗 [Gradesheet](#) and 🔗 [Certificate](#)







EDUCATION (continued)

- July 2013 – May 2016  **B.Sc. (Physics Hons.), College of Basic Science and Humanities, OUAT.**
Overall Percentage: 81.67 %.
Percentage of marks in Physics: 90.00%.
[↗ Marksheet](#) and [↗ Certificate](#)
- July 2011 – May 2013  **Intermediate (+2 Science), College of Basic Science and Humanities, (Board- CHSE, Odisha)**
Percentage of Marks: 86.67 %.
[↗ Marksheet](#) and [↗ Certificate](#)






PERSONAL INFORMATION

-  Born : April 12, 1996, Paradeep, Jagatsinghpur, Odisha, India.
-  Nationality : Indian
-  Languages : Odia (Mother tongue), English, Hindi



ACHIEVEMENTS AND AWARDS

-  Recipient of University Gold Medal for securing the First position in First class at the Master of Science(Physics) exam, 2018
[↗ Certificate](#)
-  Qualified national level exam, GATE in PHYSICS in the year 2018.
-  Recipient of INSPIRE Scholarship sponsored by Department of Science and Technology (DST), Govt. of India for excellence in academics (2013-2018).
-  Secured Second position in the University in Bachelor of Science examination, 2016.
-  Recipient of Pathani Samanta scholarship sponsored by Govt. of Odisha for excellence in Mathematics.
-  Recipient of Pratibha Poshak scholarship from INFOSYS, Bhubaneswar (2011-2016).

TECHNICAL STRENGTHS

| | |
|----------------------|--|
| Languages |  Fortran, C, Python, Shell scripts, \LaTeX . |
| Technical Computaion |  Mathematica |
| Plotting Software |  Veusz, Xmgrace, Gnuplot, OriginLab |
| Operating Systems |  Linux, Windows |
| HEP Softwares |  FeynRules, LanHEP, CalcHEP, micrOMEGAs |

TEACHING EXPERIENCE

-  Teaching Assistant of Astrophysics course(PH6120) for M.Sc and PhD students during the Spring Semester 2021 at IIT Hyderabad.
-  Teaching Assistant of Classical Physics course(PH7010) for PhD students during Autumn Semester 2020 at IIT Hyderabad.

TEACHING EXPERIENCE (continued)

- Teaching Assistant of Quantum Physics course(PH7020) for PhD students during Autumn Semester 2019 at IIT Hyderabad.
- Teaching Assistant of Quantum Mechanics course (EP2027) for undergraduate students during Spring Semester 2019 and 2020 at IIT Hyderabad.
- Teaching assistant in B.Tech Physics Laboratory for the course EP1031 during Autumn Semester 2018 at IIT Hyderabad.

WORKSHOPS ATTENDED

- *Anomalies 2019 INDO-US Workshop* (18-20 July 2019), IIT Hyderabad.
- *International Workshop on Frontiers in High Energy Physics, FHEP 2019* (14-17 October 2019) organised by University of Hyderabad and IIT Hyderabad.

SCHOOLS ATTENDED

- ICTP Summer School on Particle Physics organised by the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste during May 31 to June 11 2021. [Online]
- Virtual School on Flavor Structure of the Standard Model during August 31 to 12 September 2021. [Online]
- SERB preparatory school in Theoretical High Energy Physics during October 14 to November 9, 2019 organised at Tezpur University, Assam, India.

CONFERENCE PRESENTATIONS






















- Oral Presentation at **IBS CTPU-CGA workshop for particle physics and cosmology-2024**, Muju, South Korea (July 22-26, 2024) on *Gravitational Wave Sourced by Decay of Massive Particle from Primordial Black Hole evaporation..*
- Invited talk at '**Focus program: the origin and evolution of the Universe**', APCTP, Pohang, Korea (June 17-21, 2024) on *Gravitational Wave Sourced by Decay of Massive Particle from Primordial Black Hole evaporation.*
- Oral Presentation at **6th CUBES Workshop**, Gurye, South Korea (April 26-29 2024) on *Light thermal dark matter via type-I seesaw.*
- Oral Presentation at **2024 CAU-PNU BSM Workshop**, Chung-Ang University, South Korea (February 19-23, 2024) on *Light thermal dark matter via type-I seesaw.*
- Oral Presentation at **20th Rencontres du Vietnam: BSM in particle physics and cosmology - 50 years later**, ICISE, Quy Nhon, Vietnam (January 7-13, 2024) on *Possible realizations of light thermal self interacting dark matter and GRB221009A events.*
- Oral Presentation at **3rd International Joint Workshop on the Standard Model and Beyond and 11th KIAS Workshop on Particle Physics and Cosmology**, Jeju, Korea (November 12-17, 2023) on *Self-interacting dark matter and the GRB221009A event.*
- Oral Presentation at **BROOKHAVEN FORUM 2023**, Brookhaven National Laboratory, New York, USA (October 4-6, 2023) on *A new realisation of light thermal self-interacting dark matter and detection prospects.*















CONFERENCE PRESENTATIONS (continued)

- Invited talk at ‘**Focus program: the origin and evolution of the Universe**’, APCTP, Pohang, Korea (June 19-23, 2023) on *Possible realisations of self-interacting dark matter and connection to neutrino mass and leptogenesis*.
- Invited talk at ‘Korea - Japan joint workshop on Particle Physics, Cosmology, and Gravity’ (**KJPCG 2023**), Jeonbuk National University, Korea (May 17-20, 2023) on *Possible realisations of self-interacting dark matter and connection to neutrino mass and leptogenesis*.
- Oral Presentation at **IMHEP-II 2023**, IOP Bhubaneswar, India (February 16-12, 2023) on *Unified origin of dark matter self interactions and low scale leptogenesis*.
- Poster Presentation at **DAE-HEP Symposium 2022**, IISER Mohali, India (December 12-16, 2022) on *Singlet-doublet fermion origin of dark matter, neutrino mass and W -mass anomaly*.
- Oral Presentation at **ANOMALIES 2021**, IIT Hyderabad, India (November 12-16, 2021) on *Lepton Anomalous Magnetic Moment with Singlet-Doublet Fermion Dark Matter in Scotogenic $U(1)_{L_\mu-L_\tau}$ Model*.
- Oral Presentation at **BROOKHAVEN FORUM 2021**, Brookhaven National Laboratory, New York, USA (November 3-5, 2021) on *Lepton Anomalous Magnetic Moment with Singlet-Doublet Fermion Dark Matter in Scotogenic $U(1)_{L_\mu-L_\tau}$ Model*.
- Oral Presentation at **COSMO’21**, University of Illinois, Urbana, USA (August 2-6, 2021) on *Muon $(g-2)$ and XENON1T Excess with Dark Matter in $L_\mu - L_\tau$ Model*.
- Oral Presentation at **PASCOS 2021**, Center for Theoretical Physics of the Universe, Institute for Basic Science, Daejeon, Korea (June 14-18, 2021) on *Muon $(g-2)$ and XENON1T Excess with Dark Matter in $L_\mu - L_\tau$ Model*.
- Oral Presentation at **PHENO 2021**, University of Pittsburgh (May 24-26, 2021) on *Muon $(g-2)$ and XENON1T Excess with Dark Matter in $L_\mu - L_\tau$ Model*.
- Oral Presentation at **ANOMALIES 2020**, IIT Hyderabad (September 11-13, 2020) on *Low scale seesaw models in the light of possible inelastic DM-electron scattering at XENON1T*.
- Poster presentation at **XXIV DAE-BRNS High Energy Physics Symposium 2020**, NISER, Bhubaneswar (December 14-18 2020) on *Connecting low scale seesaw for neutrino mass to inelastic sub-GeV dark matter with Abelian gauge symmetry*.
- Poster presentation at **XXIV DAE-BRNS High Energy Physics Symposium 2020**, NISER, Bhubaneswar (December 14-18, 2020) on *Inelastic fermion dark matter origin of XENON1T excess with muon $(g-2)$ and light neutrino mass*.

RESEARCH PUBLICATIONS

1. *Reconciling cosmological tensions with inelastic dark matter and dark radiation in a $U(1)_D$ framework*,
Wonsub Cho, Ki-Young Choi, and **Satyabrata Mahapatra**.
[JCAP 09 \(2024\) 065](#), [arXiv: 2403.15269](#)
2. *Discrete dark matter with light Dirac neutrinos*,
Debasish Borah, Pritam Das, Biswajit Karmakar, **Satyabrata Mahapatra**.
[arXiv: 2406.17861](#)
3. *Rescuing thermally under-abundant dark matter with a first-order phase transition*,
Amit Adhikary, Debasish Borah, **Satyabrata Mahapatra**, Indrajit Saha, Narendra Sahu, Vicky Thounaojam. [arXiv: 2405.17564](#)

4. *Asymmetric self-interacting dark matter with canonical seesaw*,
Debasish Borah, **Satyabrata Mahapatra**, Partha K. Paul, Narendra Sahu.
 [Physical Review D 110 \(2024\) 3, 035033](#),  [arXiv: 2404.14912](#)
5. *Gravitational Wave Sourced by Decay of Massive Particle from Primordial Black Hole evaporation*,
Ki-Young Choi, Erdenebulgan Lkhagvadorj and **Satyabrata Mahapatra**.
 [JCAP07\(2024\)064](#),  [arXiv: 2403.15269](#)
6. *Mini-review on self-interacting dark matter*,
Manoranjan Dutta and **Satyabrata Mahapatra**
 [Eur. Phys. J. Spec. Top](#)
7. *Light thermal dark matter via type-I seesaw portal*,
Debasish Borah, Pritam Das, **Satyabrata Mahapatra**, Narendra Sahu.
 [arXiv: 2401.01639](#)
8. *Self Interacting Dark Matter and Dirac neutrinos via Lepton Quarticity*,
Satyabrata Mahapatra, Sujit Kumar Sahoo, Narendra Sahu, Vicky Singh Thounaojam.
 [Physical Review D 109 \(2024\) 5, 055036](#),  [arXiv: 2312.12322](#)
9. *Phenomenology of the flavor symmetric scoto-seesaw model with dark matter and TM_1 mixing*,
Joy Ganguly, Janusz Gluza, Biswajit Karmakar, **Satyabrata Mahapatra**.
 [Physical Review D 110 \(2024\) 3, 035012](#),  [arXiv: 2311.15997](#)
10. *Scotogenic $U(1)_{L_\mu-L_\tau}$ origin of $(g-2)_\mu$, W -mass anomaly and 95-GeV excess*,
Debasish Borah, **Satyabrata Mahapatra**, Partha K. Paul, Narendra Sahu.
 [Physical Review D 109 \(2024\) 5, 055021](#),  [arXiv: 2310.11953](#)
11. *Singlet-doublet fermion dark matter with Dirac neutrino mass, $(g-2)_\mu$ and ΔN_{eff}* ,
Debasish Borah, **Satyabrata Mahapatra**, Dibyendu Nanda, Sujit K. Sahoo, Narendra Sahu.
 [J. High Energ. Phys. 2024, 96 \(2024\).](#),  [arXiv: 2305.11138](#)
12. *Self-interacting dark matter and the GRB221009A event*,
Debasish Borah, **Satyabrata Mahapatra**, Narendra Sahu, Vicky Singh Thounaojam
 [Physical Review D 108 \(2023\) 8, 083038](#),  [arXiv: 2308.06172](#)
13. *Cogenesis of matter and dark matter from triplet fermion seesaw*,
Satyabrata Mahapatra, Partha K. Paul, Narendra Sahu, Prashant Shukla.
 [arXiv: 2305.11138](#)
14. *Gauged $L_e - L_\mu - L_\tau$ symmetry, fourth generation, neutrino mass and dark matter*,
Satyabrata Mahapatra, Rabindra N. Mohapatra, Narendra Sahu.
 [Physics Letters B 843 \(2023\) 138011](#),  [arXiv: 2302.01784](#)
15. *New realisation of light thermal self-interacting dark matter and detection prospects*,
Debasish Borah, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physical Review D\(Letter\) 108 \(2023\) 9, L091702](#),  [arXiv: 2211.15703](#)
16. *Singlet-Doublet Fermion Origin of Dark Matter, Neutrino Mass and W -Mass Anomaly*,
Debasish Borah, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physics Letters B 831 \(2022\) 137196](#),  [arXiv:2204.09671](#)

17. *Type II Dirac Seesaw with Observable ΔN_{eff} in the light of W-mass Anomaly .,*
Debasish Borah, **Satyabrata Mahapatra**, Dibyendu Nanda, Narendra Sahu.
 [Physics Letters B 833 \(2022\) 137297](#),  [arXiv:2204.08266](#)
18. *Unified Origin of Dark Matter Self-Interactions and Low Scale Leptogenesis.,*
Debasish Borah, Arnab Dasgupta, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physical Review D 106, 095028 \(2022\)](#)  [arXiv:2112.14786](#)
19. *Singlet-Doublet Self-interacting Dark Matter and Radiative Neutrino Mass,*
Debasish Borah, Manoranjan Dutta, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physical Review D 105, 075019 \(2022\)](#)  [arXiv:2112.06847](#)
20. *Self-interacting Dark Matter via Right Handed Neutrino Portal,*
Debasish Borah, Manoranjan Dutta, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physical Review D 105, 015004 \(2022\)](#),  [arXiv:2110.00021](#)
21. *Lepton Anomalous Magnetic Moment with Singlet-Doublet Fermion Dark Matter in Scotogenic $U(1)_{L_\mu-L_\tau}$ Model,* Debasish Borah, Manoranjan Dutta, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physical Review D 105, 015029 \(2022\)](#),  [arXiv:2109.02699](#)
22. *Boosted Self Interacting Dark Matter and XENON1T Excess,*
Debasish Borah, Manoranjan Dutta, **Satyabrata Mahapatra**, Narendra Sahu.
 [Nuclear Physics B, Volume 979, 115787 \(2022\)](#)  [arXiv:2107.13176](#)
23. *TeV scale modified type-II seesaw mechanism and dark matter in a gauged $U(1)_{B-L}$ symmetric model,* Purusottam Ghosh, **Satyabrata Mahapatra**, Nimmala Narendra, Narendra Sahu.
 [Physical Review D 106 \(2022\) 1, 015001](#)  [arXiv:2107.11951](#)
24. *Muon $(g - 2)$ and XENON1T Excess with Boosted Dark Matter in $L_\mu - L_\tau$ Model,*
Debasish Borah, Manoranjan Dutta, **Satyabrata Mahapatra**, Narendra Sahu.
 [Physics Letters B 820 \(2021\) 136577](#)  [arXiv:2104.05656](#).
25. *Self-interacting inelastic dark matter in the light of XENON1T excess,*
Manoranjan Dutta, **Satyabrata Mahapatra**, Debasish Borah, Narendra Sahu,
 [Physical Review D 103, 095018 \(2021\)](#),  [arXiv:2101.06472](#)
26. *Connecting low scale seesaw for neutrino mass to inelastic sub-GeV dark matter with Abelian gauge symmetry,* Debasish Borah, **Satyabrata Mahapatra**, Narendra Sahu,
 [Nuclear Physics B, Volume 968, 115407 \(2021\)](#),  [arXiv:2009.06294](#)
27. *Inelastic fermion dark matter origin of XENON1T excess with muon $(g - 2)$ and light neutrino mass,*
Debasish Borah, **Satyabrata Mahapatra**, Dibyendu Nanda, Narendra Sahu,
 [Physics Letters B, Volume 811, 135933 \(2020\)](#),  [arXiv:2007.10754](#)

REFERENCES

Prof. Narendra Sahu

Professor

Department of Physics,

IIT Hyderabad

Kandi, Sangareddy,

Telangana-502285, India

✉ nsahu@phy.iith.ac.in

☎ (+91)9494425086

🌐 [Homepage](#)

Prof. Rabindra N. Mohapatra

Distinguished University Professor Emeritus

Department of Physics,

3156 Physical Sciences Complex,

University of Maryland,

College Park, MD 20742-4111,

✉ rmohapat@umd.edu

☎ 3014056022

🌐 [Homepage](#)

Dr. Ki-Young Choi

Associate Professor

Department of Physics,

Natural Sciences Campus,

Sungkyunkwan University,

31301, Natural Sciences 1,

2066, Seobu-ro, Jangan-gu,

Suwon-si, Gyeonggi-do, Korea-16419

✉ ckysky@gmail.com

☎ +82-31-290-5907

🌐 [Homepage](#)

Dr. Debasish Borah

Associate Professor

Department of Physics,

IIT Guwahati,

Assam 781039, India

✉ dborah@iitg.ac.in

☎ +91-0361-2583563

🌐 [Homepage](#)