SATYABRATA MAHAPATRA

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CURRENT AFFILIATION

May 2023 – Present

Postdoctoral Research Fellow,
Department of Physics and Institute for 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

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
May 2010 – May 2011	**Matriculation (High School), S.B.G. Vidyamandir, (Board- BSE,Odisha)** Percentage of Marks: 91.00 . 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`, `SARAH`

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 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 Hydearabad.
  Certificate

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*.

- 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 Hydearabad, 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, Koria (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 TM1 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 $\Delta N_{\rm eff}$*,

    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 $\Delta N_{\rm eff}$ 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 $U(1)_{\rm B-L}$ 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

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