Susobhan Chattopadhyay

Department of Theoretical Physics,
Tata Institute of Fundamental Research (TIFR), Mumbai, India

Personal Details

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– D.O.B.: 12 August 1998

– Nationality: Indian

Education

Ph.D. 2020—2026 (expected)
Department of Theoretical Physics,
Tata Institute of Fundamental Research (TIFR), Mumbai, India
Advisors: Amol S. Dighe, Rick S. Gupta

B.Tech. 2016—2020
Electrical Engineering,
Indian Institute of Technology, Kharagpur, India
CGPA: 9.39/10

All India Senior School Certificate Examination 2016
Central Board of Secondary Examination
Percentage: 95.8%

Research Interests

– Effective Field Theories

– Model Building

– Light new physics and Ultralight Dark Matter

Awards & Fellowships

– *Professor Sukumar Biswas Ph.D. Student Award for Excellence in Physics 2021*: For the highest grades obtained during the first year of the course work in the Physics Int. Ph.D. program in TIFR.

– *KVPY*: Shortlisted for the Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship 2015 (SX).

– *Physics and Chemistry Olympiad*: Cleared National Standard Examination in Physics (NSEP) (securing National Top 1%) and National Standard Examination in Chemistry (NSEC) (securing State Top 1%).

Publications

Inspire Profile link: Click here

1. **Susobhan Chattopadhyay**, Yuber F. Perez-Gonzalez, Manibrata Sen, "*Emergent Large Lepton Mixing from Neutrino Refraction in Dark Matter*", [arXiv:2601.14386]
2. Sourav Bera, Debsubhra Chakraborty, **Susobhan Chattopadhyay**, Rick S. Gupta, "*Differential observables for Higgs-strahlung process to all orders in EFT*", [arXiv:2601.08821]
3. Rodrigo Alonso, **Susobhan Chattopadhyay**, James Ingoldby, "*The Potential of HEFT and the scale of New Physics*", [arXiv:2512.13612]
4. **Susobhan Chattopadhyay**, Amol Dighe "*Refractive neutrino masses in the solar DM halo: Can the dark-LMA solution be revived?*", [arXiv:2511.19420]
5. Debsubhra Chakraborty, **Susobhan Chattopadhyay**, Rick S. Gupta, "*Complete set of positivity constraints on the HEFT at NLO.*" [Phys. Rev. D 113 (2026) 5, 053007]
6. **Susobhan Chattopadhyay**, Dibya S. Chattopadhyay, Rick S. Gupta, "*Cosmological Selection of a Small Weak Scale from Large Vacuum Energy: A Minimal Approach.*", [Phys. Rev. Lett. 134 (2025) 24, 241803]
7. Siddhartha Karmakar, **Susobhan Chattopadhyay**, Amol Dighe, "*Identifying physics beyond SMEFT in the angular distribution of* $\Lambda_b \to \Lambda_c(\to \Lambda\pi)\tau\bar{\nu}_\tau$ *decay*", [Phys. Rev. D 110 (2024) 1, 015010]

Teaching Experience

– **Quantum Field Theory-I**, Teaching Assistant , TIFR, Mumbai [2023]

– **Classical Electrodynamics-II**, Teaching Assistant , TIFR, Mumbai [2022]

Presentations & Talks

– "*The Potential of HEFT and the scale of New Physics*", 9th General Meeting of the LHC EFT Working Group, CERN, Geneva, Dec 1 – 3, 2025

– "*Towards the HEFT-hedron: the complete set of positivity constraints at NLO*", HEFT 2025: Higgs and Effective Field Theory, CERN, Geneva, Jun 2 – 6, 2025

– "*Cosmological selection of a small weak scale from large vacuum energy: a minimal approach*", PLANCK 2025: The 27th International Conference From the Planck Scale to the Electroweak Scale, Padova, Italy, May 26 – 30, 2025

– "*A Minimal model for Cosmological Selection of the Electroweak scale*", PPC 2024: XVII International Conference on Interconnections between Particle Physics and Cosmology, IIT Hyderabad, India, Oct 14 – 18, 2024

– "*Positivity Bounds on HEFT Operators*", TAPP: Trends in Astro-particle and Particle Physics, IMSc, Chennai, India, Sep 25-27, 2024