

Date of birth	August 19, 1980
Gender	Female
Nationality	Indian
Contact Information	Email: shamayita.ray@gmail.com Phone: +91-8918034441, +91-9072390472(alternative)

Education

Exam. passed	Year of passing	University/Board	Institution	Class	% of marks	Remarks
Secondary (+10)	1997	West Bengal Board of Secondary Education	R.K.S.M. Sister Nivedita Girls' School	1	89.25	Rank in the board: 43
Higher Secondary (+12)	1999	West Bengal Council of Higher Secondary Education	Scottish Church College, Kolkata	1	92.00	Rank in the board: 15
B.Sc. (Physics Hons.)	2002	University of Calcutta	Presidency College, Kolkata	I	76.88	Rank in University: 1
M.Sc. in Physics	2004	University of Calcutta	Dept. of Physics, University of Calcutta	I	88.90	Rank in University: 1

PhD thesis

Title	Title: <i>Neutrino oscillation phenomenology with fermions beyond the standard model</i>
Date	July, 2010
Advisor	Prof. Amol Dighe [Email: amol@theory.tifr.res.in]
Institute	Tata Institute of Fundamental Research, Mumbai, India

Academic positions

DST-INSPIRE Faculty Fellow	Jan. 2014 – Dec. 2018 Dept. of Physics, University of Calcutta, Kolkata.
Visiting Fellow	Jan. 2010 – Nov. 2013 Laboratory for Elementary-Particle Physics (LEPP), Cornell University, Ithaca, NY, USA. PI: Prof. Yuval Grossman
Post Doctoral Fellow	Nov. 2009 - Dec. 2009 Division Prof. Lindner/ Group Dr. Rodejohann, Particle and Astroparticle Physics, Max-Planck-Institute for Nuclear Physics, Heidelberg, Germany. PI: Dr. Werner Rodejohann

Honours & Awards

- INSA INSPIRE faculty fellowship, December 2012.
- Assistant Professor position at the Department of Physics, Presidency University, Kolkata, November 2013 (declined).
- Honorable Mention in the Geeta Udgaonkar Award for the best Ph.D. Thesis in Physics at Tata Institute, Mumbai, India (2011).
- EUROnu postdoctoral fellowship, IPPP, Durham, UK in 2009 (declined).
- University Gold Medal for Rank-1 in M.Sc. (Physics), Calcutta Univ., 2004 (to be received).
- Merit Scholarship during 2002 {2004, for Rank-1 in Physics Honours, B.Sc, Calcutta University.
- Rank-15 in the Joint Entrance Screening Test (JEST), 2004.
- Selected for the SPM test in the National Eligibility Test (NET) in Physical Sciences, 2003.
- IISc Young Fellowship, Indian Institute of Science, Bangalore, India, during 1999-2002.
- Merit Award for ranking 15th in the state level 10+2 examination, 1999.
- National Scholarship for Rank-43 in the state level 10th grade examination, 1997.

Research Interest

- **Studying the surface characteristics of planetary bodies using bistatic radar experiments:**
Bistatic radar experiments enable us to study the surface characteristics of the planetary bodies. For a typical bistatic radar experiment, the radio signal is transmitted from the spacecraft's High Gain Antenna towards the surface of the planetary object and the scattered signals are detected at the Earth-station. During the scattering process, the signal undergoes a lot of changes due to (i) roughness of the planetary surface, (ii) dielectric constant of the surface, and (iii) motion of the spacecraft that emits the signal. So a detailed study of the echo signal will give us information about the surface it has been scattered of.
We will develop our algorithm to study the surface characteristics of Mars and Venus from the existing data from Venus and Mars missions' Radio Science experiments. This will have the benefit of cross-checking out results with the existing ones.
The orbiter of Chandrayaan-2 will have a payload called Dual Frequency Radio Science (DFRS) experiment, which will transmit X-band and S-band signals, simultaneously. We will use this payload to work in the bistatic mode to study the surface characteristics of Moon. It should be possible to get a complete 3D profile of the surface characteristics of the Moon for the very first time, with the bistatic data from DFRS.

- As a research associate of SPL, VSSC I will be working on the above project only. However, during my PhD and as a post-doctoral researcher I have worked in the field of high-energy physics phenomenology. My research interests related to that field are
 - **Studying Earth's tomography with Neutrinos**
 - **The India-based Neutrino Observatory (INO)**
 - **Neutrino physics at IceCube & Earth's tomography**
 - **$H - \bar{H}$ oscillations in the InterStellar Medium**
 - **Neutrino physics phenomenology**
 - **Collider physics**
 - **Neutrino phenomenology beyond the standard scenario**
 - **RG evolution in the neutrino sector and high energy neutrino mass models**
 - **Flavor physics**
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Computational Skill

- Extensive knowledge of Fortran 95, Mathematica and Matlab. Have developed extensive, elaborate and efficient codes for personal research work.
- Efficient in shell-script and C.
- Efficient in FeynRules, MadGraph and GLOBES (General Long-Baseline Experiment Simulator for simulating neutrino oscillation experiments).
- Working knowledge of FeynHiggs, SusHi and MicrOMEGAS.

Teaching Experience

- Given a course in Numerical Analysis to 2nd semester, M.Sc. students in 2015
- Given a course in Neutrino Physics to 4th semester, M.Sc. students in 2015
- Given a course in Fortran Programming to 1st semester, M.Sc. students in 2014
- Given a course in Fortran Programming to 2nd semester, M.Sc. students in 2014
- Given a course in Neutrino Physics to 4th semester, M.Sc. students in 2014

Schools, Workshops & Conferences

- **CTPPR - 2014**, Kalyani University, India (March 13-15, 2014),
Invited plenary talk: Neutrino oscillations - a non-exhaustive overview
- **WHEPP-XII**, Mahabaleshwar, India (January 08 - 15, 2012),
Invited talk: Low energy neutrino factory and the bimagic baseline
- **7th IDS-NF Plenary Meeting**, Virginia Tech Research Center, VA (Oct, 2011)
Invited talk: Is bimagic baseline the optimal baseline for measurement of neutrino parameters at low energy neutrino factory?
- **Pheno 2009 Symposium**, University of Wisconsin, Madison (May, 2009)
Invited talk: RG evolution of neutrino masses and mixing: Type-III seesaw.

- **NuGoa09, “Aspects of Neutrinos”**, Goa, India (April 8 -15, 2009)
Talk: RG evolution of neutrino masses and mixing: Type-III seesaw
- **Nu-HoRIZons**, HRI, Allahabad, India (January 7 - 9, 2009)
Invited talk: RG evolution of neutrino masses and mixing: Type-III seesaw.
- **Neutrino 08**, Christchurch, New Zealand (May 25 - 31, 2008)
Poster: New physics signals at LBL experiments (Poster with a flash talk).
- **Nu-HoRIZons**, HRI, Allahabad, India (February 13 - 16, 2008)
Invited talk: Signatures of heavy sterile neutrinos at LBL experiments.
- **WHEPP-X**, IISc, Chennai, India (January 02 - 13, 2008)
- **NuFact-07**, Okayama, Japan (August 06 - 11, 2007).
- **BCSPIN07**, Beijing, China (June 18 - 26, 2007).
- **JIGSAW'07**, TIFR, Mumbai, India (February 16 - 23, 2007)
- **WIN07**, SINP, Kolkata, India (January 15 - 20, 2007)
- **SERC School** on High energy Physics, PRL, Ahmedabad, India (Feb, 2006)

Visits

- Department of Earth & Space Science, Indian Institute of Space Science & Technology, Valiyamala, Kerala, India (20 June, 2018 - present)
- Laboratory for Elementary-Particle Physics (LEPP) (as a part of the INSPIRE Faculty Fellowship), Cornell University, Ithaca, NY, USA (2015).
- Department of Physics, BNL and given theoretical physics seminar on “2540 km: The bimagic baseline” (Feb, 2011).
- LEPP, Cornell University and delivered the LEPP Theory Seminar on “RG evolution of neutrino masses and mixing: Type-III seesaw”(Jan, 2009).
- Theoretical Physics Dept, FermiLab and delivered the New Phenomena Talk (Jan, 2009).
- Phenomenology Institute, University of Wisconsin, Madison and delivered the Phenomenology Seminar (Feb, 2009).
- Department of Physics, University of Maryland and delivered the Elementary Particle Theory Seminar (Feb, 2009).
- Harish Chandra Research Institute, Allahabad. (Feb, 2008)

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- It should be noted that the standard practice for particle physics is to quote all authors alphabetically, irrespective of designation and contribution.
1. “Current status of MSSM Higgs sector with LHC 13 TeV data”, R. K. Barman, B. Bhattacharjee, A. Choudhury, D. Chowdhury, J. Lahiri, S. Ray, Eur. Phys. J. Plus 134 (2019) no.4, 150 [arXiv:1608.02573 [hep-ph]].
 2. “Re-visiting the bounds on hydrogen-antihydrogen oscillations from diffuse γ -ray surveys”, Y. Grossman, W. H. Ng, S. Ray, Phys. Rev. D 98, no. 3, 035020 (2018) [arXiv: 1806.08233 [hep-ph]].
 3. “On the potential of a singlet scalar enhanced Standard Model”, S. Ghosh, A. Kundu, S. Ray, Phys. Rev. D 93, no. 11, 115034 (2016) [arXiv:1512.05786 [hep-ph]].
 4. “Rare Z Decays and Neutrino Flavor Universality”, G. Duriex, Y. Grossman, M. Kronig, E. Kuik, S. Ray, Phys. Rev. D 93, no. 9, 093005 (2016) [arXiv:1512.03071 [hep-ph]].
 5. “Momentum asymmetries as CP violating observables”, J. Berger, M. Blanke, Y. Grossman, S. Ray, JHEP 1210, 181 (2012) [arXiv:1206.1651 [hep-ph]].
 6. “2540-km: Bimagic baseline for neutrino oscillation parameters”, A. Dighe, S. Goswami and S. Ray, AIP Conf. Proc. 1382, 127 (2011).
 7. “Optimization of the baseline and the parent muon energy for a low energy neutrino factory”, A. Dighe, S. Goswami, S. Ray, Phys. Rev. D 86, 073001 (2012) [arXiv:1110.3289 [hep-ph]].
 8. “Minimal Lepton Flavor Violation and Renormalization Group Evolution of Lepton Masses and Mixing”, Y. Grossman, S. Ray, JHEP 1110, 019 (2011) [arXiv:1106.4020 [hep-ph]].
 9. “Lower bounds on the smallest lepton mixing angle”, S. Ray, W. Rodejohann and M. A. Schmidt, Phys. Rev. D83, 033002 (2011) [arXiv:1010.1206 [hep-ph]].
 10. “2540 km: Bimagic baseline for neutrino oscillation parameters”, A. Dighe, S. Goswami and S. Ray, Phys. Rev. Lett. 105, 261802 (2010) [arXiv:1009.1093 [hep-ph]].
 11. “Renormalization group evolution of neutrino masses and mixing in seesaw models”, S. Ray, Int. J. Mod. Phys. A 25, 4339 (2010) [arXiv:1005.1938 [hep-ph]].
 12. “Large $|U_{e3}|$ and Tri-bimaximal Mixing”, S. Goswami, S. T. Petcov, S. Ray and W. Rodejohann, Phys. Rev. D 80, 053013 (2009) [arXiv:0907.2869 [hep-ph]].

13. "Renormalization group evolution of neutrino masses and mixing in the Type-III seesaw mechanism", J. Chakraborty, A. Dighe, S. Goswami and S. Ray, Nucl. Phys. B 820, 116 (2009) [arXiv:0812.2776 [hep-ph]].
 14. "CP asymmetry in the decays $B \rightarrow (X_s, X_d)\mu^+\mu^-$ with four generations", A. K. Alok, A. Dighe and S. Ray, Phys. Rev. D 79, 034017 (2009) [arXiv:0811.1186 [hep-ph]].
 15. "Renormalization group evolution of neutrino mixing parameters near $\theta_{13} = 0$ and models with vanishing θ_{13} at the high scale", A. Dighe, S. Goswami and S. Ray, Phys. Rev. D 79, 076006 (2009) [arXiv:0810.5680 [hep-ph]].
 16. "Working group report: Neutrino physics", S. Choubey, D. Indumathi, S. Agarwalla, A. Bandyopadhyay, G. Bhattacharyya, E. J. Chun, B. Dasgupta and A. Dighe et al., Pramana 72, 269 (2009).
 17. "CPT violation in long baseline neutrino experiments: a three flavor analysis", A. Dighe and S. Ray, Phys. Rev. D 78, 036002 (2008) [arXiv:0802.0121 [hep-ph]].
 18. "New physics signals at long baseline experiments", A. Dighe and S. Ray, J. Phys. Conf. Ser. 136 (2008) 042038.
 19. "Signatures of heavy sterile neutrinos at long baseline experiments", A. Dighe and S. Ray, Phys. Rev. D 76, 113001 (2007) [arXiv:0709.0383 [hep-ph]].
- My list of publications can also be found at <https://tinyurl.com/SRay-publication-2018>