Samudra Roy

Contact Information

Associate Professor
Indian Institute of Technology- Kharagpur
Department of Physics
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Education

B.Sc. Physics 1st Class (2001), Calcutta University
M.Sc. Physics 1st Class(2003), Calcutta University
Ph.D Physics (2009), CGCRI-CSIR-Kolkata

employment

Post-doctoral Researcher (2009-2011), Hokkaido University, Japan
Post-doctoral Scientist (2011-2013), Max Planck Institute for the Science of Light, Germany.
Assistant Professor (2013-2021), Department of Physics, IIT-Kharagpur, India
Associate Professor (2021-), Department of Physics, IIT-Kharagpur, India

Awards and Fellowships

National Scholarship: Government of India. (2001)
National Eligibility Test (NET) among the top 20% in merit list(2004)
GCOE (Global Center of Excellence) fellowship, Japan (2010-2012)
CSIR Technology Award (2015)
Early Carrier Research Award, SERB (2015-2018).

PHD guidance

Completed:
1. Dr. Ambaresh Sahoo (2014-2019)
Thesis Title: *Temporal Dissipative Solitons in Active and Passive Waveguides: Model, Dynamics and Perturbative analysis*
2. Dr. Maitrayee Saha (2015-2021)
Thesis Title: *Nonlinear Dynamics of Temporal Cavity Solitons in Passive Resonator Systems*
3. Dr. Aritra Banerjee (2015-2021)
Thesis Title: *Dynamics and Trajectory Manipulation of a Finite Energy Airy Pulse*
Ongoing:
4. Anuj P. Lara (2016-)
5. Ashis Paul (2019-)
6. Shamaem Khushali (2020-)

MSC project guidance

Completed: 18
Ongoing: 02

research grants

1. *Study of phase matched solitonic radiation in silicon based waveguide for IR laser applications.* , YSS/2014/000444 , Funding Agency: SERB, DST, India. (2015-2018) Grant-18 Lakhs
2. *Study of novel nonlinear phenomenon in Si based nano-structured waveguides.* IIT/SRIC/PHY/PNS/2014-15/51, Funding Agency: SRIC, IIT Kharagpur, India.(2013-2016) Grant-7 Lakhs

book chapters

1. *Guided Wave Optics and Photonics Devices* CRC Press (Taylor and Francis Group) (Edited by S.K. Bhadra and A.K. Ghatak), **Chapter 15:** Microstructured Optical Fiber (Photonic Crystal Fiber): Basic Principles of Light Guidance, Fabrication process and Application. ISBN: 13:978-1-4665-0613-8, May 2013.

2. *Odyssey of Light in Nonlinear Optical Fiber* CRC Press (Taylor and Francis Group) (Edited by K. Porsezian and R. Ganapathy), **Chapter 15**: Suspended core photonic crystal fiber and generation of dual radiation. ISBN: 978-1-48-223613-2, November 2015,

TEACHING RESPONSIBILITIES

1^{st} year Physics Course: (2018,2019)
Mathematical Methods 1 (2014,2015,2016-Autumn)- PG Core Course
Electrodynamics 1 (2020,2021-Autumn)– UG Core Course
Optical Fiber Technology (2013,2014,2018,2019,2020-Spring)–Elective Course
Nonlinear Optics (2015,2016,2017-Spring)-Elective Course
Advanced Mathematical Technique (2017-Autumn)-Elective Course
EM and Optics Lab
1st Year Physics Lab

NPTEL Course

1. Mathamatical Methods for Physics 1
2. Introduction to Nonlinear Optics
3. Physics of Linear and Nonlinear Optical Waveguides

ADMINISTRATIVE RESPONSIBILITIES

2016-Present-Faculty Advisor of the MSc students
2020-Present-PhD coordinator
2016-Present-Departmental UG committee member
2018-2020- Assistant Warden of VS hostel

PEER REVIEW REFEREE

Optics and Laser Technology (Elsevier)
Journal of Optical Society of America B (OSA)
Optical Fiber Technology (Elsevier)
Optics Express (OSA)
Optics Letters (OSA)
Optics Communication (Elsevier)

RESEARCH INTEREST

Ultrafast Optics, Optical bullet, Spatio-temporal soliton, Optical similaritons, Soliton in periodic waveguide array: Gap soliton, Silicon Photonics, Photonic Crystal Fibers, Supercontinuum generation, Fiber Bragg Grating , Nano-structured waveguides, Nano-photonics, Nonlinear optics in periodic structure: Slow light, Plasmonics, Airy pulse, Transformation Optics,

JOURNAL PUBLICATIONS

2022

1. Ashis Paul, Andrea Marini and **Samudra Roy**, *Spatial dissipative solitons in graphene-based active random metamaterials*, Phys. Rev. Appl. **17**, 044036 (2022)

2021

2. Ambaresh Sahoo, Andrea Marini and **Samudra Roy**, *Free-carrier induced nonlinear dynamics in hybrid graphene-based photonic waveguides*, Phys. Rev. A, **104** 063501 (2021)
3. Maitrayee Saha, **Samudra Roy** and Shailendra K. Varshney, *Intracavity field dynamics near avoided mode crossing in concentric silicon nitride ring resonator*, Phys. Rev. A, **104** 033514 (2021).

2020

4. Aritra Bannerjee and **Samudra Roy**, *Dynamics and selective temporal focusing of a time truncated Airy pulse in varying dispersive media*, Journal of the Optical Society of America B, **37**, 3819-3828 (2020).
5. Surajit Bose, P. H. Reddy, Jinto Fan, Ayhan Demircan, Axel Ruehl,Uwe Morgner, **Samudra Roy**, Mrinmay Pal, Shyamal K.Bhadra and Debashree Ghosh, *Manipulation of infrared dispersive wave in customized microstructured optical fibers for 1.7 and 2.0 μm light sources*, Applied Optics, **59**, 9015-9022 (2020).
6. Anuj P. Lara and **Samudra Roy**, *Dynamic diffractive resonant radiation in a linearly chirped nonlinear waveguide array*, Phys. Rev. A, **102**, 033512 (2020).
7. Maitrayee Saha, **Samudra Roy** and Shailendra K. Varshney, *Polarization dynamics of a vector cavity soliton in a birefringent fiber resonator*, Phys. Rev. A, **101**, 033826 (2020).

2019

8. Aritra Banerjee and **Samudra Roy**, *Trajectory manipulation of an Airy pulse near zero-dispersion wavelength under a free-carrier-generated linear potential*, Phys. Rev. A **100**, 053816 (2019).
9. Ambaresh Sahoo and **Samudra Roy**, *Stability and variational analysis of cavity solitons under various perturbations*, Phys. Rev. A, **100**, 053814 (2019).
10. Maitrayee Saha, **Samudra Roy** and Shailendra K. Varshney, *Variational approach to study soliton dynamics in a passive fiber loop resonator with coherently driven phase-modulated external field*, Phys. Rev. E, **100**, 022201 (2019).
11. Ambaresh Sahoo and **Samudra Roy**, *Dynamics of dissipative solitons near zero-nonlinearity frequency under higher order perturbations*, Journal of the Optical Society of America B , **36**, 2352 (2019).
12. Ambaresh Sahoo, Andrea Marini and **Samudra Roy**, *Heat-induced soliton self-frequency redshift in the ultrafast nonlinear dynamics of active plasmonic waveguides*, Phys. Rev. A, **100**, 013848 (2019).

2018

13. Aritra Banerjee and **Samudra Roy**, *Collision-mediated radiation due to Airy-soliton interaction in a nonlinear Kerr medium*, Phys. Rev. A, **98**, 033806 (2018).
14. Ambaresh Sahoo and **Samudra Roy**, *Dissipative soliton mediated radiations in active silicon-based waveguides*, Journal of the Optical Society of America B , **35**, 257 (2018).
15. Aritra Banerjee and **Samudra Roy**, *Self-healing dynamics and absolute temporal focusing of a truncated Airy pulse under higher-order phase modulations*, Journal of the Optical Society of America B , **35**, 878 (2018).

2017

16. Ambaresh Sahoo , **Samudra Roy**, Govind P. Agrawal, *Perturbed dissipative solitons: A variational approach*, Phys. Rev. A, **96**, 013838 (2017).

2016

17. Surajit Bose, Ambaresh Sahoo Rik Chattopadhyay, **Samudra Roy**, Shyamal K. Bhadra, and Govind P. Agrawal *Implications of a zero-nonlinearity wavelength in photonic crystal fibers doped with silver nanoparticles*, Phys. Rev. A, **94**, 043835 (2016).
18. Surajit Bose, Rik Chattopadhyay, **Samudra Roy** and Shyamal K. Bhadra, *Study of nonlinear dynamics in silvernanoparticle- doped photonic crystal fiber*, Journal of the Optical Society of America B , **33**, 1014 (2016).

2015

19. Surajit Bose, **Samudra Roy**, Rik Chattopadhyay and Shyamal K. Bhadra, *Experimental and theoretical study of red-shifted solitonic resonant radiation in photonic crystal fibers and generation of radiation seeded Raman soliton*, Journal of Optics (IOP), **17**, 105506 (2015).
20. Andrea Marini, **Samudra Roy**, Ajit Kumar and Fabio Biancalana, *Loss-compensated nonlinear modes and symmetry breaking in amplifying metal-dielectric-metal plasmonic couplers*, Phys. Rev. A, **91**, 043815 (2015).
21. Debashri Ghosh, Surajit Bose, **Samudra Roy** and Shyamal K. Bhadra, *Design and fabrication of microstructured optical fibers with optimized core suspension for enhanced supercontinuum generation*, IEEE- Journal of Lightwave Technology, **33**, 4156 (2015).

2014

22. **Samudra Roy**, Andrea Marini and Fabio Biancalana, *Free-carrier-driven spatiotemporal dynamics in amplifying silicon waveguides*, Phys. Rev. A, **89**, 053827 (2014).
23. Debashri Ghosh, **Samudra Roy** and Shyamal K. Bhadra, *Efficient supercontinuum sources based on suspended core microstructured fibers*, IEEE- Journal of Selected Topics in Quantum Electronics, **20**, 7600108 (2014).
24. Andrea Marini, T. Tran, **Samudra Roy**, Stefano Longhi, and Fabio Biancalana, *Optical analog of spontaneous symmetry breaking induced by tachyon condensation in amplifying plasmonic arrays*, Phys. Rev. A, **89**, 023840 (2014).

2013

25. Thomas Roger, Mohammed F. Saleh, **Samudra Roy**, Fabio Biancalana, Chunyong Li, and Daniele Faccio1 *High-energy, shock-front-assisted resonant radiation in the normal dispersion regime*, Phys. Rev. A, **88**, 051801(R) (2013).
26. **Samudra Roy**, Andrea Marini and Fabio Biancalana, *Self-frequency blueshift of dissipative solitons in silicon-based waveguides*, Phys. Rev. A, **87**, 065803 (2013).
27. **Samudra Roy** and Fabio Biancalana, *Formation of quartic solitons and a localized continuum in silicon-based slot waveguides*, Phys. Rev. A, **87**, 025801 (2013).

2011

28. **Samudra Roy**, Debashri Ghosh, Shyamal K. Bhadra, Kunimasa Saitoh and Masanori Koshiba, *Strong infrared radiation through passive dispersive wave generation and its control*, Applied Optics (OSA), **50**, 3475 (2011).
29. **Samudra Roy**, Shyamal K. Bhadra, Kunimasa Saitoh, Masanori Koshiba and Govind P. Agrawal, *Dynamics of Raman soliton during supercontinuum generation near the zero-dispersion wavelength of optical fibers*, Optics Express, **19**, 10443 (2011).

30. **Samudra Roy**, Shyamal K. Bhadra, and Govind P. Agrawal, *Dispersive wave generation in supercontinuum process inside nonlinear microstructured fibre*, Current Science (Review Article), **100**, 321 (2011).

31. Debashri Ghosh, **Samudra Roy** Mrinmay Pal, Philippe Leproux, Pierre Viale, Vincent Tombelaine and Shyamal K. Bhadra, *Blue-Extended Sub-Nanosecond Supercontinuum Generation in Simply Designed Nonlinear Microstructured Optical Fibers*, IEEE- Journal of Lightwave Technology, **29**, 146 (2011).

2010

32. Debashri Ghosh, **Samudra Roy** and Shyamal K. Bhadra, *Supercontinuum Generation in Nonlinear Microstructured Fiber and Recent Advances*, International Journal of Microwave and Optical Technology (Invited Article), **5**, 464 (2010).

33. **Samudra Roy**, Debashri Ghosh and Shyamal K. Bhadra, *Supercontinuum generation in microstructured silica optical fiber : The formation of white light*, Trns. Ind. Ceram. Soc. (Topical Review), **69**, 65 (2010).

34. Debashri Ghosh, **Samudra Roy** and Shyamal K. Bhadra, *Determination of modal effective indices and dispersion of microstructured fibers with different configurations: a variational approach*, Journal of Modern Optics, **57**, 607 (2010).

35. **Samudra Roy**, Debashri Ghosh, Shyamal K. Bhadra and Govin P. Agrawal, *Role of dispersion profile in controlling emission of dispersive waves by solitons in supercontinuum generation*, Optics Communications, **283**, 3081 (2010).

2009

36. Debashri Ghosh, **Samudra Roy**, Mrinmay Pal, Atasi Pal, Shyamal K. Bhadra, John McCarthy, Henry Bookey, and Ajoy Kar *Generation of supercontinuum and its theoretical study in three-ring silica microstructured optical fibers*, Applied Optics (OSA), **48**, G12 (2009).

37. **Samudra Roy**, Shyamal K. Bhadra and Govind P. Agrawal, *Dispersive waves emitted by solitons perturbed by third-order dispersion inside optical fibers*, Phys. Rev. A, **79**, 023824 (2009).

38. **Samudra Roy**, Shyamal K. Bhadra and Govind P. Agrawal, *Perturbation of higher-order solitons by fourth-order dispersion in optical fibers*, Optics Communications, **282**, 3798 (2009).

39. **Samudra Roy**, Shyamal K. Bhadra and Govind P. Agrawal, *Effects of higher-order dispersion on resonantv dispersive waves emitted by solitons*, Optics Letters, **34**,2072 (2009).

40. Debashri Ghosh, **Samudra Roy**, Mrinmay Pal, Somnath Bandyopadhyay, and Shyamal K. Bhadra, *Modeling of microstructured nonzero dispersion shifted optical fiber with ultralow dispersion slope*, Journal of the Optical Society of America B , **26**, 337 (2009).

41. **Samudra Roy**, Shyamal K. Bhadra and Govind P. Agrawal *Raman amplification of optical pulses in silicon waveguides: effects of finite gain bandwidth, pulse width, and chirp*, Journal of the Optical Society of America B , **26**, 17 (2009).

2008

42. Debashri Ghosh, **Samudra Roy**, Mrinmay Pal, A. Pal, Shyamal K. Bhadra, *Index guided photonic crystal fiber: Study of fiber drawing parameters*, Journal of Optics , **37**, 72 (2008).

43. **Samudra Roy**, Shyamal K. Bhadra and Govind P. Agrawal, *Femtosecond pulse propagation in silicon waveguides: Variational approach and its advantages*, Optics Communications, **281**, 5889 (2008).

44. M. Ballav, A.Roy Chowdhury, **Samudra Roy**, Shyamal K. Bhadra, *Raman scattering for spatiotemporal Ssoliton in a cylindrical optical fiber*, Nonlinear Optics and Quantum Optics, **38**, 81 (2008).
45. **Samudra Roy** and Shyamal K. Bhadra, *Solving soliton perturbation problems by introducing Rayleighs dissipation function*, IEEE- Journal of Lightwave Technology, **26**, 2301 (2008).
46. **Samudra Roy** and Shyamal K. Bhadra, *Effect of two photon absorption on nonlinear pulse propagation in gain medium*, Communications in Nonlinear Science and Numerical Simulation, **13**, 2157 (2008).

2007

47. **Samudra Roy** and Shyamal K. Bhadra, "*Study of nonlinear dissipative pulse propagation under the combined effect of two-photon absorption and gain dispersion: A variational approach involving Rayleighs dissipation function*, Physica D, **232**, 103 (2007).
48. **Samudra Roy** and Shyamal K. Bhadra, *Study of pulse evolution and optical bistability under the influence of cubic quintic nonlinearity and third order dispersion*, Journal of Nonlinear Optical Physics and Materials, **16**, 119 (2007).

Conference Abstracts

1. *Manipulation of the trajectory of an airy pulse using linear temporal potential near zero dispersion wavelength*, A. Banerjee and **S.Roy**, SPIE Optics+Optoelectronics 2018, Prague, Czech Republic.
2. *Analysis of the twin-soliton bound states in passive microresonator*, M.Saha, **S.Roy**, S.K. Varshney, Frontier in Optics, Washington DC, USA (2018).
3. *Soliton interaction through input pump phase modulation in passive microresonator*, M.Saha, **S.Roy**, S.K. Varshney, Photonics-2018, New Delhi, India.
4. *Optical light bullet inside Si-waveguide array*, A.P. Lara, **S.Roy**, Photonics-2018, New Delhi, India.
5. *Unique power-law trajectory of an Airy pulse under linear temporal potential*, A. Banerjee and **S.Roy** Photonics-2018, New Delhi, India.
6. *Redshifting dissipative Plasmon solitons under thermo-modulational nonlinearity*, A. Sahoo and **S.Roy**, Photonics 2018, New Delhi, India
7. *Dissipative soliton dynamics in non-Kerr and Kerr type nonlinear media* , A. Sahoo, **S.Roy**, SPIE Photonics Europe, Strasbourg, France (2018)
8. *Unique propagation dynamics of Airy pulse under cubic phase modulation in linear regime* A. Banerjee and **S. Roy**, Frontiers in Optics, Washington DC, USA (2017).
9. *Frequency down-shifting of perturbed dissipative soliton: A variational approach*, A Sahoo, **S.Roy**, G.P Agrawal, Frontiers in Optics, Washington DC, USA (2017).
10. *Effect of two-photon absorption on cavity soliton: stability and perturbation analysis* A. Sahoo and **S.Roy** , Frontiers in Optics, Washington DC, USA, 2017.
11. *Controlling Dispersive Waves through Zero-Nonlinearity Wavelength in Silver Doped Photonic Crystal Fiber.* S. Bose, A. Sahoo,R. Chattopadhyay, **S. Roy**, S.K Bhadra and G.P Agrawal, Photonics-2016, IIT Kanpur, India.
12. *Formation of Cascaded Dispersive Wave in Active Silicon-Based Waveguides.* A. Sahoo and **S.Roy**, Photonics-2016, IIT Kanpur, India.
13. *Dissipative soliton mediated dissipersive wave in silicon based waveguides*, A. Sahoo and **S.Roy**, WRAP-2015, IISc Bangalore, India.
14. *Supercontinnum generation in silver doped photonic crystal fibers*, S. Bose, R. Chattopadhyay, S.K. Bhadra and **S.Roy**, WRAP-2015, IISc Bangalore, India.
15. *Supercontinuum generation in suspended core photonic crystal fibers doped with silver nanoparticle*, S. Bose, R. Chattopadhyay, **S.Roy**, S.K. Bhadra, CLEO Pacific Rim 2015, BEXCO, Busan, Korea.

16. *Experimental study of solitonic dispersive wave in photonic crystal fiber*, S. Bose, **S.Roy**, S.K. Bhadra, ICOP 2015, India.
17. *Spontaneous symmetry breaking induced by tachyon condensation in amplifying metal-dielectric multi-layered media.* A. Marini, T. Tran, **S. Roy**, S. Longhi and F. Biancalana, CLEO 2014, San Jose, USA .
18. *Free carrier-induced universal modulation instability in amplifying silicon waveguide.* **S. Roy**, A. Marini and F. Biancalana ICOL-2014, Dehradun, India
19. *Mid-IR supercontinuum generation in chalcogenide-core step index fibers.* Sheela C. S, **S. Roy** and S. K. Varshney Workshop on Recent Advances in Photonics (WRAP 2013), Delhi, India.
20. *Carrier-induced temporal dynamics of optical pulses in amplifying silicon waveguides.* **S. Roy**, A. Marini and F. Biancalana, 1st international meeting on Spatio-Temporal Complexity in Optical Fibers, Como, Italy, 2013.
21. *High-field Bessel Pulses and Shock-front Assisted Resonant Radiation*, T. W. Roger, C. Li, M. F. Saleh, **S. Roy**, F. Biancalana, and D. Faccio PIERS 2013, Stockholm, Sweden
22. *Formation of quartic solitons in silicon-based slot waveguides*, **S. Roy** and F. Biancalana, CLEO 2013, San Jose, USA
23. *Optimization of core suspension of microstructured fibers to obtain two zero dispersion points and enhanced nonlinearity*, D. Ghosh, **S. Roy**, S.K. Bhadra Photonics 2012, Madras, India.
24. *Study of hybrid corrugated metal-clad planer waveguide for efficient sensing.* R. Deb Roy, M. Rahman, **S.Roy** and S.K. Bhadra, International conference on: Specialty glass and optical fiber (ICGF 2011), CGCRI-CSIR, Kolkata, India, August 2011.
25. *Role of chirp on spectral recoil of solitons across second zero dispersion wavelength in a defect-core photonic crystal fiber.* **S. Roy**, D. Ghosh, S.K. Bhadra, K. Saitoh, M. Koshiba and G.P. Agrawal, 4th International GCOE-NGIT 2011 Symposium, Sapporo, Japan.
26. *Impact of chirp on spectral recoil of solitons in a defect core photonic crystal fiber with two zero dispersion wavelengths*, **S. Roy**, D. Ghosh, S.K. Bhadra, K. Saitoh, M. Koshiba and G.P. Agrawal, OFC 2011, Los Angeles, USA.
27. *Efficient supercontinuum generation in simple nonlinear photonics crystal fibers and role of higher order dispersion*, D. Ghosh, **S.Roy**, M. Pal and S.K. Bhadra, Photonics 2010, Guwahati, India.
28. *Strong infra-red radiation through passive dispersive wave generation and its control*, **S. Roy**, D. Ghosh, S.K. Bhadra, K. Saitoh and M. Koshiba Photonics 2010, Guwahati, India.
29. *Observation of soliton attraction and repulsion phenomenon for monotonous dispersion slop under normal group velocity dispersion pumping*, **S. Roy**, S. K. Bhadra, and G. P. Agrawal Photonics 2010, Guwahati, India.
30. *Strong infra-red radiation through passive dispersive wave in defect core photonic crystal fiber*, **S. Roy**, K. Saitoh and M. Koshiba, GCOE Symposium -2010, Sapporo, Japan.
31. *Role of dispersion profile in controlling emission of dispersive waves by soliton inside optical fiber*, **S. Roy**, S. K. Bhadra, G. P. Agrawal, SPIE, Photonics Europe 2010, Brussels, Belgium.
32. *Supercontinuum generation in nonlinear microstructured fiber and recent advances*, D. Ghosh, **S.Roy**, M. Pal, S.K. Bhadra, ISMOT-2009, Delhi, India.
33. *Enhancing visible supercontinuum generation in three-ring nonlinear microstructured fibers*, D. Ghosh, M. Pal, **S.Roy**, S.K. Bhadra, P. Leproux and P. Viale. ICOP-2009, Chandigarh, India.
34. *Dispersion tailoring in microstructured optical fibers* D.Ghosh, **S.Roy**, A.Pal, M. Pal and S.K. Bhadra, National Symposium on Science and Technology of Glass and Glass-Ceramics (NSGC-08), BARC 2008, Mumbai, India.
35. *Supercontinuum generation in highly nonlinear microstructured silica fiber* D. Ghosh, M. Pal, **S. Roy**, A. pal, S. K. Bhadra, J. McCarthy, H. Bookey and A. Kar Photonics 2008, Delhi.

36. *Influence of two photon absorption and dynamic free carrier density on optical pulses inside silicon waveguides* **S. Roy**, S.K. Bhadra and G. P. Agrawal, Photonics 2008, Delhi, India.
37. *Effects of Finite Gain Bandwidth on Raman Amplification in Silicon Waveguides* **S. Roy** and S.K. Bhadra. Frontiers in Optics 2008 (FiO-2008). Rochester, USA.
38. *Study of fiber drawing parameters of index guided photonics crystal fiber* M.Pal, D.Ghosh, A.Pal, A.Dhar, **S.Roy**, S.Das, M.C. Paul, S.Bandyopadhyay,R.Sen, K. Dasgupta and S.K.Bhadra, Photonics 2006, India,
39. *A comparative study of three different methods to solve an optical soliton propagation problem in different dissipative systems* **S. Roy**, S. Bandyopadhyay and S.K. Bhadra , Photonics 2006, India.
40. *Effect of higher order dispersion on optical bistability in presence of cubic-quintic nonlinearity* **S. Roy** and S.K. Bhadra. Frontiers in Optics 2006 (FiO-2006). Rochester, USA.

CITATION METRIC

Total journal publication: 48
Total Conference proceedings: 40
Total citation: 688
h-index: 17
i10-index: 26
Average citation per article: 14.33

INVITED TALK

1. *Nonlinear dissipative effects on soliton dynamics: Use of Rayleighs dissipation function.* Mathematical Society of India , Kolkata, India, December, 2008.
2. *Dispersive wave generation in supercontinuum process* ICOP 2009, Chandigarh, India, October, 2009.
3. *Key nonlinear processes in supercontinuum generation and soliton blue shifting*, Indo- Japan workshop 2011, CGCRI-CSIR, Kolkata, India, January, 2012.
4. *Resonant Radiation: A study of new frequency generation*, Optical Society of India, XXXVII national Symposium:2013, 23-25 January 2013, Pondicherry, India.
5. *Nonlinear pulse dynamics inside Si-based waveguides* IEM, Kolkata, SPIE Chapter, 2015.
6. *Pulse dynamics inside nonlinear waveguides*, Summer School on Optics and Photonics 2015, Department of Physics, St. Xaviers College, Kolkata, June2-12, 2015.
7. *Dissipative solitons in active silicon waveguides*, Optronics 2016 , August 2016, Kolkata.

WEBINER

1. *Nonlinear Optics* by **Dr. S. Roy**, Two-day National webinar on Some selected topics on DSE Physics course under CBCS, CU Organized by the Department of Physics in collaboration with IQAC. Maulana Azad College, Kolkata - 2020.
2. *Introduced Nonlinear pulse dynamics in nanostructured waveguide* by **Dr. S. Roy**, 5-day online Short term course on Integrated Optics organized by Department of Electronics and Communication Engineering, Punjab Engineering College (Deemed to be University) -2020.
3. *Playing with optical frequency* by **Dr. S. Roy**, 1 day seminar organised by Physics Department, Krishnagar Govenment College-2020.
4. *Dynamics of dissipative soliton* by **Dr. S. Roy**, 2 day international workshop SOLITON-22 organised by Thapar University-2022.

Summary of Research Achievements

The research background and activity of Prof. Roy includes the theoretical study of ultrashort pulse dynamics and nonlinear light-matter interaction in micro and nano-scale. In particular, Prof. Roy's expertise on optical soliton and vortex, supercontinuum generation, photonic crystal waveguides, dispersive waves, gap soliton, dissipative soliton, cavity solitons in nonlinear micro-cavities, and frequency combs. Prof. Roy published more than 40 papers in reputed international journals (with more than 590 citations and an h-index of 16), two book chapters, and more than 40 international conference abstract /proceedings. Prof. Roy serves as a reviewer of the reputed journals like, Optics letters, JOSA B, Optics Express etc. He is a life member of Indian Physical Society and Optical Society of India. The research achievements of Prof. Roy are summarised below,

Soliton perturbation

Development of new perturbative approach based on variational technique by introducing *Rayleigh's dissipation function* (RDF).

Successful implementation of RDF in variety of soliton perturbation problems in nonconservation systems.

Dissipative Soliton

Modelling of nonlinear dynamics of Dissipative Soliton (DS) is active Si-based waveguide.

Theoretical analysis of the the dynamics of DS under perturbations.

Establish the theory of Ds mediated radiation under higher order dispersion

airy pulse

Theoretical modelling of optical *Airy pulse*.

Development of new model of Airy dynamics under collision, linear optical potential and phase modulation.

cavity soliton

Modelling of *cavity soliton* (CS) under perturbation.

Establish the roll of polarization of CS dynamics.

discrete soliton

Modelling the *Discrete Soliton* (DiS) in chirped waveguide array (WA).

Establish the theory of dynamic *diffractive radiation* emitted by DiS in non-uniform WA.