



Curriculum Vitae

A. GENERAL INFORMATION :

- a. Name : **Dr. R. RADHAKRISHNAN**
- b. Date of Birth : 01-05-1968
- c. Address(Residential) : Plot No :2 ,Pandian salai,
LIC Colony,K.K.Nagar,
Tiruchirappalli- 620 021.
- d. Designation : **Associate Professor**
- e. Department : P,G & Research Department of **PHYSICS**
- f. Area of Specialization : Non-Linear Dynamics; Optical Soliton
Integrable properties of N.L.D.E and
Choas in Non –Linear Oscillators

B. ACADEMIC QUALIFICATIONS : M.Sc.,M.Phil.,Ph.D.,

Examination Passed	Board/University	Subject	Year	Division Grade Merit etc.
High School/ S.S.L.C	Board of Secondary Education	General Science	1983	First Class
Higher Secondary	Board of Higher secondary Education	Maths I –Group	1985	First Class
B.Sc	Madurai Kamaraj University	Physics	1988	First Class
M.Sc	Madurai Kamaraj University	Physics	1990	Distinction

M.Phil	Madurai Kamaraj University	Physics	1991	First Class
Ph.D	Bharathidasan University	Physics	1998	Highly Commended

C. RESEARCH EXPERIENCE & TRAINING:

Research Stage	Title of Work /Thesis	University where the work was carried out
M.Phil	A new method of calculating potential energy curves of Diatomic Molecules	Madurai Kamaraj University Madurai
Ph.D	Exact Coupled Optical Solitons in Fibers	Bharathidasan University, Tiruchirappalli-620 024
Post Doctoral	Nonlinear Dynamics Vector Soliton interaction in Fibers DST-Research Associate	University of Turku, Finland University of Dijon, France BARD University, Trichy
Publication (give a list separately)	Please see Annexure-III	
Research guidance (give names of M. Phil and Ph.D. students guided successfully)	Annexure – IV	
Training (Please Specify)	Annexure – V	

D. RESEARCH PROJECTS CARRIED OUT :

Title of the Project	Name of the funding Agency	Duration	Remark
Nil	Nil	Nil	Nil

E. SEMINARS , CONFERENCES , SYMPOSIA WORKSHOP etc ., ATTENDED :

SEE Annexure II

F. TEACHING EXPERIENCE :

Courses Taught	Name of the University/ College/Institution	Duration
UG(B.A./ B.Sc. ,etc.,Pass) (B.A./B.Sc.,Hons)	Jamal Mohamed College	Feb 2000-till date
PG (M.A./ M.Sc. ,/M.Com.,etc.,)	Jamal Mohamed College	1998-2000 2000-till date
M.Phil.,	Jamal Mohamed College	2002-till date
Any Other M. Phil M. Phil M. Phil and Ph.D.	M.S.University M.K.University Bharathidasan University	2002-till date

Total Teaching Experience

- a. Under –Graduate (pass) : 16 years (as on Feb. 2016)
- b. Under-Graduate (Hons) : -----
- c. Post – Graduate : 16 years (as on Feb. 2016)

G. INNOVATIONS/CONTRIBUTIONS ON TEACHING :

- a. Design of Curriculum : Members in the Board of Studies in Physics of different colleges during different periods(For details please see Annexure V).
- b. Any other : Please see Annexures V &VI.

H. EXTENSION WORK / COMMUNITY SERVICES :

- NSS unit leader during College studies
- Ph.D. Scholar's representative of BARD UNIV Student Hostel
- Delivered series of lectures for different college students and college teachers to explain the concept of Non-Linear Dynamics
- Conducted inter-college function from the Physics Association of Jamal Mohamed College (JAMPHY 2002).
- Member in the Board of Studies of different Colleges; Participated in the one day seminar on "Higher Education"
- Referee in the following International Journals,
PRL Phy.Rev.A. Phy.RevE.(USA-APS),
J.Phys.A (IOP.UK),PRL(APS)USA,
M.Science Monitor (USA)
- M Phil Examiner –Dissertation and Theory papers ,external practical examiner (UG and PG) 2004-2009; External theory paper evaluation UG &PG
- Resources person in the Physics Association of many Colleges
- UG and PG Question papers setter in different colleges/Universities.
- Member in Ayya Nadar Janaki Ammal College Alumini
- Vice-president of the Physics Association of the P.G. and research department of physics, Jamal Mohamed college

I. IMPROVEMENT OF PROFESSIONAL COMPETENCE:

Details regarding refresher courses/Orientation attended, participation in summer schools, workshops, seminars, symposia etc ,including open university courses M..Phil /Ph. D

Courses	Name of the University/funding agency	Duration
Orientation Courses	BARD UNIV.TRICHY-23(ACC.Staff,College)	03-10-2001 to 01-11-2001
Refresher courses in Environmental Education	BARD UNIV,TRICHY-23(Grade A) Please see Annexure I	02-11-2006 to 22-11-2006
Refresher Courses in Physics	BARD UNIV,TRICHY-23(Grade A) Please see Annexure I	04-03-2008 to 24-03-2008
Refresher Courses in Theoretical Physics	Bishop Moore College,Mavelikara-690110,Kerala	07-12-2009 to 19-12-2009
40 – National and International Conferences/seminars/,paper presentation/,participation etc		Please see Annexure II
Visit Abroad 1)University of TURKV,FINLAND 2) University of Dijon,France 3) ICTP Itally 4) University of Ruhuma,Srilanka 5) Other Research Fellowships		Details see Annexure V &II

b. No.of research papers published : 25 publications ; 1-Reference
(please enclose list) Book (an article) ; 18 International Journals ; 4 National Journals
2 articles in the proceeding ;
1-proceeding edited; 2- under preparations
(for details see Annexure III)

Details of seminars , Conference , and Symposia organized :

INTERNATIONAL:

- International seminar on “Crystalline Materials and Optoelectronic Devices organized on 03rd Feb. 2014, by using the UGC autonomous grant.

NATIONAL:

- State-level “Special Lecture series on Theoretical and physics ” organized during Feb. 10-12, 2010 by using UGC autonomous grant.
- Conducted inter-college function from the Physics Association of Jamal Mohamed College (JAMPHY 2002).
- Organized Education Tour for P. G. Students during 8-11 Jan. 2010
- Organized Education Tour for P. G. Students on 05th Feb. 2015

Annexure II

International Conferences

1. Participant in the Indo-French conference on "Mathematical Methods for Partial Differential Equations" held at Tata Institute Fundamental Research Centre, Indian Institute of Science Campus, Bangalore, India during June 27 - July 1, 1994 (Organizers: Dr. Adimurthi and Prof. Haim Brezis).
2. Participant in the CIMPA International School on "Nonlinear Systems" organised at the Pondicherry University, Pondicherry, India during January 8-26, 1996 (organizer: Dr. K. M. Tamizhmani) .
3. Participant in the International conference on "Nonlinear Differential Equations and Applications" organized at the TIFR Centre (IISC Campus), Bangalore, India during August 19 - 23, 1996 (Organizers: Prof. A. Ambrosetti, Prof. H. Brezis and Prof. P. N. Srikanth) .
4. Participant (**and delivered a talk**) in the International Conference on "Nonlinear Dynamics: Integrability and Chaos" held at the Bharathidasan University, Tiruchirapalli, India during February 12-16, 1998 (Organizer: Dr. M. Daniel).

Title of Talk: Soliton interaction in the random Birefringent Fiber

5. Participant (**and delivered a talk**) in the International Workshop on "Optical Soliton : Theory and Experiment" held at Cochin University of Science and Technology, Cochin during Jan. 24 –29, 2002 .

Title of Talk: Polarization Scattering in the periodically twisted Fiber

6. Participated and **presented a paper** in the International School on "Computational and Mathematical Physics" held at University of Ruhuna, Matara, Srilanka during Dec. 20, 2004 – Jan 2, 2005 (Conducted by CIMPA, France).
7. Participated and **presented a paper** in the International conference on "Recent developments in Nonlinear Dynamics" held at the Bharathidasan university Tiruchirapalli, during 13-16 ,Feb.2008.

Title of Paper: Characterizing the spatial vector soliton in isotropic self-defocusing

Kerr media based on its state of polarization and nonlinear anisotropy

8. Participated in the International Conference on Symmetries and Integrability of Nonlinear Systems held at Pondicherry University during February 2010.
9. Participated (**with paper presentation**) in the International workshop on “Nonlinear Integrable systems and their applications held at Bharathidasan University, Trichy-24 during 24 Feb. 1 March 2014
Title of the paper: Polarization vector and collision dynamics of DB vector soliton with moveable singularity

National Conferences

1. Participant in the winter school on "Manifolds and Physics" held at the Bharathidasan University, Tiruchirapalli, India during December 21, 1992 - January 9, 1993 (Organizer : Prof. M. Lakshmanan).
2. Participant in the SERC School on "Coherence and Correlation in Modern Optics and Quantum Physics" organized at the Institute of Mathematical Sciences, Madras, India from 23 January to 10 February, 1995 (Organizer: Prof. R. Simon).
3. Participant in the Winter School on "Integrable Systems and Low Dimensional Many Body Problems" held at the Bharathidasan University, Tiruchirappalli, India from December 18 - 23, 1995 (Organizer: Prof. M. Lakshmanan).
4. Participant in the conference on "Recent Developments in Chaotic Dynamics" held at the Bharathidasan University, Tiruchirapalli, India during December 9-13, 1996 (Organizers: Prof. M. Lakshmanan and Dr. S. Rajasekar).
5. Participant (**and delivered a talk**) in the SERC School on “Nonlinear Optics and Laser Spectroscopy ” organized at IIT Delhi, India during March 10-28, 1997 (Organizers: Prof. S. C. Abbi and Prof. S. A. Ahamad).
6. Participant in the Seminar on “Selected Topics in Theoretical Physics” held at the University of Hyderabad during September 15-17, 1998 (Organizers : Prof. S. Dutta Gupta).
7. Participant in the “National Laser Symposium” held at the University of Hyderabad during December 15-17, 1999. (**Delivered a talk**) (Organizer : Dr. D. Narayana Rao) .

8. **Resource Person** in the Workshop on “Nonlinear Dynamics” held at Department of Physics Bharathidasan University during Jan. 3-6, 2001 (Organizer: Prof. M. Lakshmanan).
9. Participated in the “Orientation Course” held at Academic Staff College Bharathidasan University Trichy – 23 during 03-10-2001 to 01-11-2001.
10. Participant in the Seminar on “Recent Advance in Bio-Physics and Application of Nonlinear Concepts” held at Bharathidasan University during 26-27, March 2002.
11. Participant in the One Day Seminar on “Quality Enhancement and sustenance in Higher Education” held at Jamal Mohamed College on 27 March 2002.
12. **Resource Person** in the winter school on, “Nonlinear Optics”, held at CNLD, Bharathidasan University, during Dec. 01-13, 2003.
13. Participant in the “Prof. P.K.P. endowment lecture programme” held at the Bharathidasan University, on 17 Jan. 2005.
14. Participated in the seminar on “Photonics” held at the School of Physics, M. K. University, Madurai during July 18-19, 2005.
15. Participated in the seminar on “Applications of Ultrasonic to Organic and Bio-molecular Compounds”, held at Jamal Mohamed College, Tiruchirapalli during September 26-27, 2005.
16. Participated (and **presented a paper**) in the third National Conference on “Nonlinear Systems and Dynamics” (NCNSD-2006) held at Ramanujam Institute for Advanced Study in Mathematics at Madras, Chepauk, Chennai during Feb. 06-08, 2006.
Title of Paper: Periodically varying breathing solitons in the normal dispersion
1. region of nonlinear birefringent coupler.
17. Participated in the three day workshop on “Curriculum Development and Evaluation” organized by UGC-Academic Staff College, Bharathidasan University and Jamal Mohamed College from 2nd to 4th March 2006.
18. Participated in the one-day seminar on “Advances in Electronics”, held at Jamal Mohamed College, Tiruchirapalli on 20th March 2006.
19. Participated in the “Refresher Course in Environmental Education” held at UGC-Academic Staff College, Bharathidasan University, Tiruchirapalli during November 02-22, 2006.

20. Participated in the four day workshop on “High Performance Computing” organized by Centre for Nonlinear Dynamics, School of Physics, Bharathidasan University, Tiruchirapalli and Centre for Development of Advanced Computing (C-DAC), Pune, held at Tiruchirapalli during August 6-9, 2007.
21. Attended UGC sponsored “Refresher Course in Physics” held at the UGC-Academic Staff College, Bharathidasan University, Tiruchirapalli ,during 04-24 ,March.2008.
22. Participated in the seminar on “Nonlinear Electronics and Spintronics”, organized by the Centre for Nonlinear Dynamics, School of Physics, Bharathidasan University, Tiruchirapalli, during 20-21, March 2009.
23. Participated in the seminar on “Frontier Topics in Fundamental Physics” organized by School of Physics, Bharathidasan University, Tiruchirapalli, during 30-31, March 2009.
24. **Resource Person** in the National Conference on “Mathematical, Theoretical and Computational Chemistry held at “The Madura College (Autonomous)”, Madurai, during 29th and 30th March, 2010.
25. **Resource Person** in the Special Lectures on Electromagnetic Theory held at “Dhanalakshmi Srinivasan College”, Perambalur, during 15th March, 2010.
26. **Resource Person** in the Special Lectures on Fundamentals of Non-Linear Dynamics held at “Seethalakshmi Ramawswami College (Autonomous)”, Tiruchirappalli, during 18th March, 2010.
27. Participated in the State level seminar on Recent advances in Laser applications held at JMC on 01-04-2010
28. Participated in the State level seminar on Nanoscience and Technology held at JMC on 07-10-2010
29. Participated in the State level Seminar on Advanced Research in Physics-A Few Perspectives held at JMC on 28- 02-2012
30. Participated in the National Seminar on Nanoscience and Laser Materials Processing held at JMC on 09-03-2013
31. Participated in the state level seminar on Laser and its applications held at JMC on 16-03-2015

Annexure-III

LIST OF PUBLICATIONS (h-intex=11; i-10 intex-11; Total citations-709)

S. No	Title and Author of the Publication in International Journal	#Citation received	*impact parameter
1	Integrability and singularity structure of coupled nonlinear Schrödinger equations, R.Radhakrishnan , R. Sahadevan and M. Lakshmanan, <i>Chaos Solitons and Fractals</i> 5 , 2315 - 2327 (1995).	47	1.526
2	Bright and dark soliton solutions to coupled nonlinear Schrödinger equations, R.Radhakrishnan and M. Lakshmanan, <i>J. Phys. A : Math. Gen.</i> 28 , 2683 – 2692 (1995).	153	1.504
3	Bright and dark optical solitons in coupled higher-order nonlinear Schrödinger equations through singularity structure analysis, R. Radhakrishnan , M. Lakshmanan and M. Daniel, <i>J. Phys. A : Math. Gen.</i> 28 , 7299 – 7314 (1995).	33	1.504
4	Exact soliton solutions to coupled nonlinear Schrödinger equations with higher-order effects, R. Radhakrishnan and M. Lakshmanan, <i>Phys. Rev. E</i> 54 , 2949 - 2955 (1996).	57	2.352
5	Inelastic collision and switching of coupled bright solitons in optical fibers, R.Radhakrishnan , M. Lakshmanan and J. Hietarinta, <i>Phys. Rev. E</i> 56 , 2213 - 2216 (1997).	231	2.352
6	Suppression and enhancement of soliton switching during interaction in periodically twisted birefringent fiber, R. Radhakrishnan and M. Lakshmanan, <i>Phys. Rev. E.</i> 60 , 2317-2321, (1999).	20	2.352

7	Coupled Nonlinear Schrödinger equations with cubic-quintic nonlinearity: Integrability and soliton interaction in non-Kerr media, R. Radhakrishnan , A. Kundu and M. Lakshmanan, <i>Phys. Rev. E</i> 60 , 3314-3323, (1999).	67	2.352
8	Shape-Changing Collisions of Coupled Bright Solitons in Birefringent Optical Fibers, M. Lakshmanan, T. Kanna and R. Radhakrishnan , <i>Reports on Mat. Phys.</i> 46 , 143-156, (2000).	36	0.625
9	Application of Conjugate Gradient technique for finding the Potential Energy Curves of Diatomic Molecules, R. Radhakrishnan and R. Velusamy, <i>Asian J. phys.</i> 9 , 424-429, (2000).	-	-
10	Efficient control of the energy exchange due to the Manakov vector-soliton collision, R. Radhakrishnan , Patrice Tchofo Dinda and Guy Millot, <i>Phys. Rev. E</i> 69 , 046607, (2004).	26	2.352
11	Energy-exchange collision of the Manakov vector solitons under strong environmental perturbations, Patrice Tchofo Dinda, R. Radhakrishnan , and T. Kanna, <i>J. Opt. Soc. Am. B.</i> 24 , 592-605, (2007).	-05	2.649
12	Spatial vector soliton and its collisions in the isotropic self-defocusing Kerr media, R. Radhakrishnan and K. Aravinthan, <i>Phys. Rev. E</i> 75 , 066605, (2007).	12	2.352
13	Dark-bright optical soliton to coupled nonlinear Schrödinger equation, R. Radhakrishnan and K. Aravinthan <i>J. Phys. A : Math. Gen.</i> 40 , 13023, 2007	20	1.504
14	Synthesis, Growth And Characterization Nonlinear Optical Crystals: Glycine Ammonium Chloride (GAC) Single Crystals For Opto Electronic Materials MR Ramanan, R Radhakrishnan , S Krishnan, V Chithambaram International Journal of Engineering Research and Technology 2 (3 (March-2013))	--	--

15	CRYSTAL GROWTH AND CHARACTERIZATION OF A NEW SEMI ORGANIC NON-LINEAR OPTICAL UREA MAGNESIUM SULPHATE SINGLE CRYSTALS BY SOLUTION GROWTH SLOW EVAPORATION METHOD MR RAMANAN, R RADHAKRISHNAN, S KRISHNAN, ... Science and Engineering (IJMMSE) 3 (2), 33-38, 2013		
16	Generalized dark-bright vector soliton solution to the mixed coupled nonlinear Schrödinger equations N Manikandan, R Radhakrishnan , K Aravinthan Physical Review E 90 (2), 022902, 2014	02	2.352
17	Growth, spectral, optical and dielectric characterization of an organic nonlinear optical material: 4-hydroxytetramethylpiperazinium picrate MR Ramanan, R Radhakrishnan, T Dhanabal, M Sivaraju, R Ashokkumar Optik-International Journal for Light and Electron Optics 126 (24), 5600-5604, 2015		0.696
18	Energy-exchange collisions of dark-bright-bright vector solitons R Radhakrishnan, N Manikandan, K Aravinthan Physical Review E 92 (6), 062913, 2015		2.352

See for Details

- i) <https://scholar.google.com/citations?hl=en&user=FgjP4FUAAAAJ>
- ii) https://www.researchgate.net/profile/Rengaraj_Radhakrishnan
- iii) Over all IP =23.97; h-index -11, i10-index- 11; Over all H-intex-165
- iv) **Total citations 709**

Book Published:

- **Proceeding of the International Seminar on Crystalline Materials and Optoelectronic Devices, Edited by R. Radhakrishnan.**

+LIST OF PUBLICATIONS IN NATIONAL JOURNAL

15. Ground state reduced potential curves of some hydride and oxide diatomic molecules, **R.Radhakrishnan** and R. Velusamy, *ANJAC Journal* **10**, 32-37 (1990).
16. Occurrence of Chaotic Dynamics in Cubic Anharmonic oscillators, K. Srinivasan and **R. Radhakrishnan** *J. Acade. Res.Jour.* **1**, No.1, 53-56 (2004).
17. Stability analysis of the damped anharmonic oscillator having n-th order nonlinearity, S. Kaleel Mohamed Ibrahim, V. Shanmugam and **R. Radhakrishnan** *J. Acade. Res. Jour.* **1**, No.2, 83-86 (2004).
18. Dark-Dark soliton interaction in the periodically twisted fiber, K. Aravinthan, K.Mohamed Iqbal, and **R. Radhakrishnan**, *J. Acade. Res. Jour.* **2**, No.2, 64-67(2005).

Proceedings:

1. Periodically varying breathing solitons in the normal dispersion region of nonlinear birefringent coupler, **R. Radhakrishnan**, K. Aravinthan and R. Anantharaman, in the third National Conference on Nonlinear Systems and Dynamics (NCNSD-2006) held at Ramanujam Institute for Advanced Study in Mathematics at Madras, Chepauk, Chennai during Feb. 06-08, 2006.
2. Various collision scenario in the normal dispersion region of BGD vector solitons **K. Manikandan & R. Radhakrishnan** (NCNSD-2010) held at Bharathidasan University. (Proceeding)

CONTRIBUTED ARTICLES IN REFERENCE BOOK

1. Encyclopedia of Physics (Tamil) ed. P. K. Ponnusamy (Madras University Publication, Chennai, 1997).

Title of Articles: a) Ferroelectricity, b) Dielectric, c) Electric Current, d) Dielectric Constant, e) Electric Displacement, f) Electric Susceptibility, g) Resistance, h) Electric-Polariza

Annexure -IV

M.Phil. Dissertation-Guided Details

S. No.	Reg. No.	STUDENT NAME	DISSERTATION TITLE	YEAR OF SUBMISSION
1	2K3F T- 11909	S. KALEEL MOHEMD IBRAHIM	Addition and suppression of periodicity in the route to chaos of damped and driven cubic anharmonic oscillator by tuning quartic nonlinearity	Dec. 2004
2	2K3F T- 11913	V. SHANMUGA M	Systematic addition and suppression of periodicity in the damped and driven quadratic and cubic anharmonic oscillator	Dec. 2004
3	2K4F T – 13353	M. SIVANANTHA M	Synthesis and Characterization of Hydro gels	Aug. 2005
4	2K4F T – 13352	K.M. SHAIK MAHEEN ABUBUCKER	Periodic variation inside the standard elastic collision region against initial time-delay between two colliding vector bright one-solitons of the Manakov model	Nov. 2005
5	2K4P T – 16372	D. SENTIL MURUGAN	Periodic variation inside energy exchange collision region against initial time-delay between two colliding vector bright one-solitons of the Manakov model	Jan. 2006
6	05 MP PH 01	JASPER GOLDWIN	Bright-dark vector soliton collision in nonlinear media with negative cross-phase modulation	Oct. 2006
7	05 MP PH 02	M. MUTHAZHAG U	Exact bright-dark vector soliton solution of coupled nonlinear Schrödinger equation having different cross-phase modulation	Oct. 2006
8	05 PM PH 03	V. SARAVANAN	Optical computation by using the energy exchange collision between the vector solitons in non-linear Kerr media	Aug. 2007
9	06 MF PH 15	M. ANU RADHA	A mixed type coupled nonlinear Schrödinger equation with P-property	Aug. 2007
10	06 MF PH 11	V. RAMASAMY	Painlevé singularity structure analysis of a coupled nonlinear partial differential equation	Aug. 2007
11	06 MF PH 01	M. ABDUL GAFOOR	Analyzing the integrable properties of a mixed type coupled nonlinear equation	Aug. 2007
12	06PP H 032	BABEESH PARAMBAN	Analyzing the stability of singular points associated with certain nonlinear autonomous systems: analytical and numerical studies	Apr. 2008

13	07 MF PH 06	H. MOHAMED MOHAIDEEN	Stability analysis and chaotic dynamics of forced damped anharmonic oscillator with 3 rd and 5 th order nonlinearities	Aug. 2008
14	07 MF PH 04	N. MEERA MOHAIDEEN	Stability analysis and chaotic dynamics of forced damped anharmonic oscillator with 2 nd and 4 th order nonlinearities	Aug. 2008
15	08MF PH02	S. BAKKEER MOHEMD	3-D continuous Autonomous systems and their chaotic generations in Phase portraits	Nov.2009
16	08MF PH13	M. PARVEEN BANU	Observation of chaotic Behaviors in Phase portraits: 3D Autonomous systems	Nov.2009
17	MNU; DE	IQBAL	Dark-Dark soliton interaction in the periodically twisted fiber	Apirl. 2004
18	09MF PH01	A. ANBANANTH	Bright guided Dark vector optical solitons and their reflection collision with and without beating effect	May 2011
19	09MF PH	S. SHARMILA	Closely packed BGD vector solitons and breathing effect	May 2011
20	10MF PH	I. SRINIVASAN	Two parameter bifurcation diagram of certain nonlinear oscillators	Aug..2011
21	10MF PH08	T. D.SOWALIK	Radon Monitoring	Aug. 2011
22	10MF PH12	J. PREETHI	Am1, Pm3, Rm1 and pm6 calculations of some 1H – ImidAzolew compounds	Feb. 2012
23	11MP FPH0 19	K. Arumugam	Study of dispersion induced pulse broadening of positive and negative chirped Gaussian pulses in the normal dispersion region by using the Fourier transform method	Jan. 2013
24	11MP FPH0 24	S. Sivasankari	Study of dispersion induced pulse broadening of Gaussian pulse by using the Fourier transform method	
25	13MP FPH0 03	J.Mohamed Arsath	Investigating the effect of the external frequency on certain nonlinear pendulam	Dec.2014
26	13MP FPH0 01	M. GANESAN	Investigating stability, period doubling and route to chaos of certain nonlinear pendulam	Dec.2014
27	14 MP FPH0 01	M. P. ABDUL GAFOOR	Chaotic dynamics of Quasiperiodically driven UED's Equation	Dec.2015
28	14MP FPH0 08	M. Bharathi	Effect of external frequency on the dynamics of Quasiperiodically driven UED's Equation	Dec. 2015

Ph. D. Thesis-Guided Details

S. No.	STUDENT NAME	DISSERTATION TITLE	YEAR OF SUBMISSION
1	Mr. K. Aravinthan	Exact Vector optical solitons in nonlinear Kerr-media	Degree awarded (2010)
2	Mr. N. Manikandan	Vector Optical solitons and their interaction in the periodically twisted nonlinear media	Work in progress (2-papers published)
3	Mr. M. Radha Ramanan	Vector Optical solitons in the nonlinear Kerr media with the cubic-quintic nonlinearity	Work in progress 1-paper published
4.	Mr. M. Abdur Rahman	Femto Second Optical Solitons and their collision dynamics	Work in progress
5.	Ms. Anu Radha	Perturbed vector solitons and the influence of perturbations	Work in progress

Annexure-V

Innovations / In service Training /Contribution to Teaching Methodologies:

- Technical biography included in the 15th Edition of Marquis "Who's Who in the world", 1998.
- Nominated as a member to serve on the "Board of Studies in Physics (U.G.)" for the academic year 1997-'98 at the A.N.J.A College, Sivakasi, India.
- Nominated as a member to serve on the "Board of Studies in Physics (P.G.)" for the academic year 1999-2k at the A.N.J.A. College, Sivakasi, India.
- Member in the "Board of Studies in Physics" at the JMC, Tiruchirapalli, India.
- Member in the "Board of Examinations" of Karpagam Arts and Science College, Coimbatore, India
- Member in the "Board of Examinations" of Govt. Arts and Science College, Karur, India
- Member in the "Board of Examinations" of Govt. Arts and Science College, Tanjaviur
- Vice –President of Physics Association, P.G. and Research Department of Physics, Jamal Mohamed College, 2009 -2010
- N.S. S. Unit leader during my U.G. course at ANJAC, Sivakasi.
- Ph.D. Student Hostel leader during my Ph.D. programme at BARD UNI., Tiruchirapalli-24

Resource Personnel in the Different Special Programme :

- Selected as a Category-A speaker in the Theoretical Physics Seminar Circuit (TPSC) programme, Department of Science and Technology, Government of India for the period 1997 - 1998

CENTRES VISITED AS A CATEGORY-A SPEAKER:

- (i) School of Physics, University of Hyderabad
 - (ii) Indian Institute of Technology, Mumbai
 - (iii) Tata Institute of Fundamental Research, Mumbai
- Invited speaker from the Physics association of Holy Cross College, Trichy. Talk delivered on Optical fiber on 06-02-2001.

- Invited speaker from the EE association of Oxford Engineering College, Trichy Talk delivered on Solitons in Optical fiber on 20-02-2001.
- Selected as a Category-A speaker in the Theoretical Physics Seminar Circuit (TPSC) programme, Department of Science and Technology, Government of India for the period 2001 – 2002

CENTRES INVITED AS A CATEGORY-A SPEAKER:

- (i) Indian Institute of Technology, Guwahati
 - (ii) Cochin University of Science and Technology, Cochin .
- Invited speaker from the Physics association of Nehru Memorial College, Puthanampatti, Tiruchirapalli and talk delivered on 22nd February 2005.
 - Series of special lectures on the Nonlinear Dynamics: soliton and chaos topic was given at the I) Chidambarampillai college, Manachanallur, Tiruchirapalli -621105, II) Holy-cross college, Tiruchirapalli-02.
 - Resource person in the “PHYSICS ASSOCIATION” held at Ayya Nadar Janaki Ammal College, SIVAKASI, Feb. 2008.
 - Vice –President of Physics Association, P.G. and Research Department of Physics, Jamal Mohamed College, 2009 -2010
 - Presented a research article in the International Workshop on the “Nonlinear Integrable Systems and their applications” held at Bharathidasan University, Trichy-24 during 24 Feb. 1 March 2014

Resource Person in the year 2010-2015

Sl. No.	Name of the Professor	Course / Seminar	Topic	Organization Place	Date
1.	Dr. R. Radhakrishnan	Special Lecture series	Electro Magnetic wave propagation	Dhanalakshmi Srinivasan College, Perambalur	15 th March 2010
2.	Dr. R. Radhakrishnan	Special Lecture series	Fundamentals of Non-Linear Dynamics	Seethalakshmi Ramawswami College, Tiruchirappalli.	18 th March 2010
3.	Dr. R. Radhakrishnan	State Level Seminar	Vector Optical Solitons	Madura College, Madurai	29 th and 30 th March, 2010
4.	Dr. R. Radhakrishnan	National level DST conference	Nonlinear Crystals	Kongu Engineering College, Erode	February, 2010
5.	Dr. R. Radhakrishnan	Special Lecture series based on CSIR syllabus	Mathematical Physics(3-sections)	Alagappa University, Karaikudi	October 2013
6.	Dr. R. Radhakrishnan	Special Lecture series based on CSIR syllabus	Classical Mechanics (6-hours)	Alagappa University, Karaikudi	23, Nov. 2015

Educational Tour arranged for II M.Sc Students

o PG students visited Indian Institute of Science and Visvesvaraiyar Museum, Bangalore, under the guidance of Dr. R. Radhakrishnan, Vice President of Physics association (2009-2010).

o PG students visited Observatory Kodaikannal, under the guidance of Dr. R. Radhakrishnan, Vice President of Physics association.(2014-2015)

Research Experiences:

1. Junior Research Fellow in the University Fellowship Scheme Bharathidasan University, Tiruchirapalli, India for the period September 23, 1991 - September 22, 1993.
2. Council of Scientific and Industrial Research (CSIR) - Senior Research Fellow, Government of India, for the period January 03, 1994 - January 31, 1997 .
3. Senior Research Fellow in the Department of Science and Technology, Government of India funded project for the period February 13 - December 31, 1997.
4. Research Associate in the Department of Science and Technology, Government of India funded project for the period December 01, 1997 - April 2000.
5. Postdoctoral Researcher in the University of Turku, Finland during March 1999 - August 1999 (Host: Prof. J. Hietarinta, Dept. of Phys., University of Turku, FIN-20014, TURKU, FINLAND).
6. Senior Scale Lecturer in the Research Department of Physics, JMC, Aff. BARD UNIV. Trichy- 620 020 , INDIA since from Feb. 2000
7. Postdoctoral Researcher in the Université de Bourgogne, France during November 2003 – October 2004 (Host: Prof. Patrice, T. Dinda, Laboratoire de Physique, Université de Bourgogne, B.P. 47480, 21708 DIJON Cedex, FRANCE).
8. Short Term Visitor in the Condensed Matter Section of International Centre for Theoretical Physics (ICTP) at ICTP campus, Trieste, Italy during November 01-30, 2005.

Academic visit to foreign countries:

Visited Research centers in Foreign (Finland, France, Srilanka, Italy)	From – To	Purpose Of Visit
University of Turku, Finland	01.03.1998 - 31.08.1998	Post Doctoral Fellow
University of Dijon, France	14.11.2002 – 04.11.2003	Post Doctoral Fellow
University of Ruhuna, Srilanka	20.12.2004 – 02.01.2005	International (CIMPA) RISCMA P School
International Centre for Theoretical Physics (ICTP)	01.11.2005 – 30.11.2005	Short Term Visitor in the Condensed Matter Physics section of ICTP

Honors received from learned accredited bodies:

1. Referee Member for the Journal of **Physical Review A**, **Physical Review E** and **Physical Review Letter**, American Physical Society, USA (www.aps.org).
2. Referee Member for the **Journal of Physics A**, Institute of Physics, UK (www.iop.org).
3. Invited Referee for the **Medical Science Monitor**, **International Scientific Literature, Inc.**, (www.medscimonit.com).
4. Invited Member in the **Optical Society of America** ; -to be joi
5. Vice –President of Physics Association, P.G. and Research Department of Physics, Jamal Mohamed College, 2009 -2010
6. Member in the Advisory Editorial Board JARJ Interdisciplinary Academic research Journal.

CURRENT RESEARCH ACTIVITIES

Optical solitons in the condensed matter are not only interesting mathematical objects but also they are real objects. It can be used to construct soliton based high-bit rate and long distance communication networks, planar X-junction, logic gates using fibers and multi-port devices. Because the nonlinear response of condensed matter (wave-guide) can compensate for diffractive spreading of optical beams or the dispersive broadening of pulses due to Group-Velocity Dispersion (GVD) forming spatial or temporal soliton.

Nonlinear effects responsible for soliton formation in optical fibers (SiO_2) are in general weak and Kerr-like. In the case of silica fiber, the nonlinear coefficient is positive ($n_2 > 0$). If this n_2 compensates positive GVD, temporal dark soliton appears while it compensates negative GVD, temporal bright soliton forms. A similar situation occurs for the spatial optical solitons observed in planar wave guides (AlGaAs, CdS like semi-conductors), bulk media (saturated nonlinear media), and photo refractive crystals (LiNbO_3). Here diffraction plays a role analogous to dispersion in the temporal domain, but now the nonlinearity may be either positive, for so called self-focusing nonlinear medium, or negative for self-defocusing medium. This again gives rise to two distinct types of soliton, bright and dark respectively.

One of the most exciting concepts associated with the optical solitons is their collision. To increase the bit rate of communication system it is desirable to place solitons close to each other. Under such situation, solitons mutually interact because of the nonlinearity of the system. This interaction influences directly the capacity and quality of communication. Therefore considerable attention has been paid theoretically and experimentally to analyze the soliton interaction and such studies are helpful to draw the full benefit of optical soliton applications particularly in the soliton-based optical communication systems and nonlinear optical switches.

The main aim of my recent research work is to investigate the interaction between the multi-component bright-bright, dark-dark and bright-dark vector solitons in the different nonlinear media namely single-mode birefringent fiber, rocking rotator, multi-mode fiber,

planar semi-conductor wave guide and photo refractive crystals. By analyzing the orthogonal soliton interactions in nonlinear media, the benefit of the polarization demultiplexing (PDM) technique was analytically demonstrated. These techniques can double the transmission rate as shown in experimentally.

The system of coupled equations constructed for such physical situations are more helpful to find the answer to the question as, what happens to the solitary waves of different modes when they are coupled. When such a coupled-pair interacts with other coupled-pair what does happen? Is it possible to reduce the interaction effect in order to achieve high-bit rate communication? Therefore the investigation on the interaction between coupled solitons is important from the theoretical point of view. In general the proposed mathematical model is not completely integrable. Theoretically, the interaction between the closely spaced solitons belonging to one optical mode may be understood by analyzing the interaction forces between the solitons in the generalized uncoupled mathematical model. However if an optical pulse propagates through different modes of a multi-mode fiber, the interaction between solitons belonging to the different optical modes seems to be more complicated and this interaction can be modeled by a set of coupled mathematical model. By solving such mathematical model, one can numerically demonstrate the effects of interaction by plotting the exact solution or approximate solution (depending upon the nature of mathematical model). Further depending upon the pulse width of colliding solitons, mathematical model decides to take some additional terms or not. Based on this aim few problems have been investigated.

SCIENTIFIC VALUE AND REMARKABLE CITATIONS FOR OUR WORK

Our recent results on the collision between two bright-bright vector solitons besides being fundamentally interesting have also opened the exciting possibility of soliton applications to the implementation of all optical logic in a way that does not require fabrication of individual gates. Further Anastassiou et. al. (*Phys. Rev. Lett.*, **83**, 2332 (1999)) and Rand.D.Giesk, et al. (*Phys. Rev. Lett.*, **98**, 053902 (1999)) in practically observed such concepts by making the strong energy-exchange collisions between the bright-bright vector solitons predicted by Radhakrishnan et. al in [*Phys. Rev. E.*, **56**, 2

(1997); *Phys. Rev. E.*, **69**, 046607 (2004)] by deriving the polarization vector associated with the bright-bright case. Such polarization vector is not realized for the dark-dark and bright-dark cases. In addition as in the bright-bright multi-soliton solution, dark-dark multi-soliton solution does not allow to tune the amplitude, pulse-width and direction of travel (velocity) independently at a time. Because the derived dark-dark solutions in the literature did not have enough degrees of freedom and hence it allows to take either pulse-width or velocity parameter is arbitrary. There is no systematic work to derive its polarization vector and exact multi-soliton solutions having essential degrees of freedom. Thus there exist more open questions than solved problems in the theory of multi-component dark-dark solitons and bright-dark solitons.

In addition, recent results have demonstrated the possibility of using vector-solitons in **Bose-Einstein condensates media to perform quantum information processing**. Moreover the studies of polarization changes due to collision between the vector-solitons of Manakov model have important consequences in **soliton transmission systems that uses polarization division multiplexing (PDM)**. In a PDM system, adjacent solitons are launched along orthogonal polarizations. **These techniques can double the transmission rate** as shown in recent experiment. More than 300 citations received for our work for example few of recent citation.

Current Achievements:

- **For the first time, Bright-Dark optical vector multi-soliton with moveable singularity whose existing regions are decided by its initial parametric choices was realised and published**
- **By using the above solution, for the first time, we have numerically realised optical computation in the self-defocusing Kerr-media. Publication is under the progress.**