Curriculum Vitae

Dr. Vinayak Shivaji Pawar

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Sr. No.	Exam. Passed	University	Subject	Year	Grade / Class
1.	CSIR-NET	Joint CSIR – UGC NET, India	Physics	2023	AIR 72
2. Ph. D.		Department of Physics, Shivaji University Kolhapur, India.	Theoretical Physics	2022	Awarded
3.	GATE- 2021	IIT Bombay	Physics	2021	AIR-855
4.	GATE- 2020	IIT Delhi	Physics	2020	AIR-798
5.	GATE- 2019	IIT Madras	Physics	2019	AIR-2095
6.	GATE- 2018	IIT Guwahati	Physics	2018	AIR-1970
7. JEST-2018		Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam.	Physics	2018	AIR 369
8. SET		Savitribai Phule University, Pune, India.	Physics	2018	Qualified
9. M. Sc. Shivaji Universi		Shivaji University, Kolhapur.	Physics	2016	66.71 %
10. B. Sc. 5		Shivaji University, Kolhapur.	Physics	2014	89.12 %
11.	H. S. C	Maharashtra State Board of Secondary and Higher Secondary Education, Pune.	РСМ	2011	75.50 %
12.	S. S. C	Maharashtra State Board of Secondary and Higher Secondary	Marathi, Sanskrit,	2009	86.92 %

Academic Qualification

Education, Pune.	English,	
	Science,	
	Math's, Pol.	
	Science	

Research Skills

- Computer proficiency and good knowledge in Mathematica 12 and LaTex.
- Very good understanding of the mathematical perspective of Theoretical Physics.
- Problem-solving abilities in different branches of Theoretical physics like Quantum mechanics, General relativity, linear algebra, Complex Analysis, Transformations, etc.

Research Summary

Present Research Work

Presently, I am working in "Theoretical Nonlinear Optics" and "Plasma Physics". The central focus of my research work is to study the mathematical aspect of nonlinear optical phenomenons in the "High intense Laser-Plasma interactions" in relativistic magnetized and cold quantum plasmas.

Ph.D. Work

The central aim of my Ph.D. work was based on "*Theoretical Investigations Of Self-Focusing/Defocusing of Finite Airy-Gaussian Mode Laser Beams in Anisotropic and Absorbing Plasma Media*". For this theoretical investigation, I solved Maxwell's nonlinear differential equation in a nonlinear medium like collisionless plasma and relativistic cold quantum plasma. For solving these nonlinear differential equations, I used "Wentzel–Kramers–Brillouin" (WKB) and Paraxial Ray approximations for Finite Airy-Gaussian Laser beams under different physical conditions. The governing equations of the nonlinear behavior of the laser beams are obtained and solved under the different initial laser and plasma parameters. Under this study, I investigated the self-focusing/Defocusing characteristics of Finite Airy-Gaussian Laser beams in relativistic anisotropic (Magneto) plasma and obtain the critical values for self-trapping for both Extraordinary mode and Ordinary mode and the effect of absorption mechanism on the self-focusing, etc. Also, I studied the effect of

inter-particle distance and dual nature of plasma particles, quantum generated states of plasma particles on the self-focusing of finite Airy-Gaussian laser beams.

Sr. No.	Name of the Research Paper	Year
1	Self-focusing of asymmetric Airy-Gaussian laser beams in plasmas	2025
I	with exponential density distribution	2023
	P. P. Nikam , V. S. Pawar, P. P. Patil, M. V. Takale, S. D. Patil	
	Journal of Applied Spectroscopy 92 (1), 137.	
2	Propagation characters of finite cosh-Airy laser beams passing through	
Z	collisionless plasmas	2025
	VS Pawar , PP Nikam, BD Vhanmore, KY Khandale, PP Patil, MV Takale,	
	Journal of Optics, 1-9	
0	Higher-order nonparaxial approximation for the self-focusing	2024
3	propagation of circular cosine-hyperbolic-Gaussian beams in plasmas	2024
	VS Pawar , PP Nikam, VV Ganbavle, MV Takale, SR Kokare, SD Patil	
	Journal of Optics, 1-11	
	On exploration of effect of q-parameter and initial beam power on	
4	propagation dynamics of q-Gaussian laser beam in plasma	
	KY Khandale, AT Valkunde, BD Vhanmore, VS Pawar , SD Patil,	
	Journal of Optics, 1-6	
	Self-focusing of asymmetric finite Airy-Gaussian laser beams in	2024
5	magnetized plasma	
	PP Nikam, VS Pawar , MV Takale, SD Patil	
	Journal of Nonlinear Optical Physics & Materials 33 (03), 2350044	
6	Combined effect of relativistic and ponderomotive nonlinearities on	2022
6	self-focusing of asymmetric finite Airy–Gaussian laser beams in plasma	2023
	PP Nikam, PP Patil, VS Pawar , MV Takale, SD Patil	
	Journal of Optics, 1-7	
-	Analytical exploration of domain-dependent propagation of skew cosh	2022
	Gaussian laser beam in anisotropic plasma medium	
	PT Takale, KY Khandale, PP Nikam, SS Patil, TU Urunkar, VS Pawar , SD	

List of Publications

	Patil, MV Takale	
	Indian Journal of Physics 97 (6), 1849-1855	
0	Effect of q Parameter and Critical Beam Radius on Propagation	2022
8	Dynamics of q Gaussian Beam in Cold Quantum Plasma	2022
	PT Takale, KY Khandale, VS Pawar , SS Patil, PP Nikam, TU Urunkar, SD	
	Patil, MV Takale	
	Nonlinear Dynamics and Applications: Proceedings of the ICNDA 2022,	
	55-62	
	Nonlinear Propagation of Gaussian Laser Beam in an Axially	2022
9	Magnetized Cold Quantum Plasma	2022
	PP Nikam, VS Pawar , SD Patil, MV Takale	
	Nonlinear Dynamics and Applications: Proceedings of the ICNDA 2022,	
	149-154	
10	On the exploration of q parameter in propagation dynamics of q-	2022
10	Gaussian laser beam in underdense collisional plasma	
	KY Khandale, AT Valkunde, BD Vhanmore, VS Pawar , SD Patil, MV	
	Takale	
	Bulg. J. Phys. 49, 375-385	
	Nonlinear Propagation of Gaussian Laser Beam in Magnetized Plasma:	2022
11	Effect of Oblique Magnetic Field	2022
	VS Pawar , PP Nikam, PT Takale, SR Kokare, SD Patil, MV Takale	
	Journal of Physics: Conference Series 2267 (1), 012005	
4.0	Self-Focusing of Gaussian Laser Beam in an Axially Magnetized Plasma	2022
12	PP Nikam, VS Pawar , SD Patil, MV Takale	2022
	Journal of Physics: Conference Series 2267 (1), 012001	
10	Effect of asymmetry in the modulation parameters on self-focusing of	2022
13	asymmetric finite Airy-Gaussian laser beam in collisionless plasma	
	PP Nikam, VS Pawar , PT Takale, KY Khandale, SS Patil, MB Mane, MV	
	Takale	
	Indian Journal of Pure & Applied Physics (IJPAP) 60 (7), 576-581	
	Effect of Asymmetry in the Modulation Parameters on Self-Focusing of	2022
14		2022

	Asymmetric Finite Airy-Gaussian Laser Beam in Collisionless Plasma	
	PP Nikam, VS Pawar , PT Takale, KY Khandale, SS Patil, MB Mane, SD	
	Patil, MV Takale	
	NIScPR-CSIR, India	
1 5	Relativistic self-focusing of finite Airy-Gaussian laser beams in cold	2021
15	quantum plasma	
	VS Pawar , PP Nikam, SR Kokare, SD Patil, MV Takale	
	Journal of Optics 50 (3), 403-409	
10	Domains of modulation parameter in the interaction of finite Airy–	2020
10	Gaussian laser beams with plasma	
	VS Pawar , SR Kokare, SD Patil, MV Takale	
	Laser and Particle Beams 38 (3), 204-210	

Reference / Textbook Authored:

Sr. No	Authors	Year of Publication	Book Title	Publisher Name
1.	Dr. R. S. Patil, Dr. M. G. Patil, Dr. V. S. Pawar	2024	B. Sc. I, Paper- III, Properties of Matter	Nirali Publication
2.	Dr. R. S. Patil, Dr. M. G. Patil, Dr. V. S. Pawar	2024	B. Sc. III, Paper- XIII, Nuclear and Particle Physics	Nirali Publication

FDP/Refresher/Orientation Courses:

Sr. No	Name of Course	Name of the sponsoring Agency	Date
1	FDP- Receent Trends in	DCIET Kolhonun	07 Oct- 11 Oct
	Engineering Physics	dolel, kollapul	2024
3.	Faculty Induction	UGC Malaviya Mission Teacher	05 May 2025 - 31
		Training Centre, University of	05 May 2025 - 51
	Program (FIP)	Mumbai	Ma 2025

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	Sr. No	Name of Conference / Workshop	Name of the sponsoring Agency	Place and Date
	1.	MHMEE - 2020	Yashavantrao Chavan Institute of	29th - 31 January
			Science, Satara.	2018
Ī	2.	RAFAS-2021	Lovely Professional University,	25th –27th July
			Punjab.	2021
ſ	3.		Lal Bahadur Shastri College of Arts.	17th – 18th Mav

Workshop, Conferences, Seminar Attended:

		Punjab.	2021
3.	ICRT-PCB Nano - 2022	Lal Bahadur Shastri College of Arts, Science and Commerce, Satara	17th – 18th May 2022
4.	RTNA - 2022	Sangola Taluka Shetkari Shikshan Prakash Mandal Sangola's Vidnyan Mahavidhyalaya, Sangola	22nd - 23rd April 2022
5.	Nanotechnology: A Path Forward To Address Global Challenges	Balvant College, VitaSR University,	24 th Oct 2024
6.	Unveiling Materials Properties Through Computational Modelling	School of Sciences and Humanities, SR University, Warangal, India	25 th Oct 2024

Award

1st Rank in Poster presentation of international conference on RAFAS-2021 Organized by Department of Physics, Lovely Professional University, Punjab. Held From 25th – 27th July 2021. The presented poster was based on "Nonlinear Propagation of Gaussian Laser beams in Magnetized Plasma: Effect of Oblique Magnetic Field".

Declaration: I hereby declare that the particulars furnished herein by me are true to the best of my knowledge and belief.

Place: Kolhapur Date: 22/06/2025 (Vinayak. S. Pawar)