Dr. Saba Khalid

Assistant Professor,
Department of Physics,
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Personal Details

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Employment

- Worked as a Lecturer in Department of Physics, Government College University Lahore since from 27th April 2012 to 18th April 2021.
- I am working as Assistant Professor in Department of Physics, Government College University Lahore from 18th April 2021.

Research Interest

- Theoretical Modeling of Plasma Physics, focusing on space plasma
- Theoretical and computational analysis of solitary structures and Alfven waves
- Nonlinear processes in space plasma.
- Non-thermal plasma distribution functions and their theoretical formulation
- Analysis of data obtained from Satellite observations

Education

- Ph.D. (Plasma Physics) 2020, Government College University Lahore, Pakistan. Dissertation Title "Solitary structures in space plasmas with Non-Maxwellian electron distribution function".
- M. Phil (Applied Physics) 2011, University of Engineering and Technology Lahore, Pakistan.
- M. Sc (Applied physics) 2008, University of Engineering and Technology Lahore, Pakistan.

Teaching Experience

I have joined GC University Lahore in 2012 and have been teaching fundamental physics courses of intermediate and graduate level at GC University Lahore. I have supervised six M.Phil students and ten graduate students. I was on Study leave for Ph.D from November 2016 to March 2020. I joined the Department after successful completion of PhD and promoted as

Assistant Professor in April 2021. I have been performing following teaching assignments at the university.

Details of courses being taught

Course Name	Details of Course
Plasma Physics (PHY-4205)	Taught in Fall-2024
Calculus-I (PHY-1104)	Taught in Fall-2023, Fall-2024, Sumers-2024
Calculus-II (PHY-1203)	Taught in Spring-2024, Spring-2025
Lab-VI (PHY-3205P)	Taught in Fall-2022, 2023, 2024
Lab-II (PHY-1201P)	Taught in Spring-2025, Spring-2023, Spring2022
Lab-I (PHY-)	Taught in Fall-2022
Lab-IV (PHY-)	Taught in Spring-2024, 2023
Heat & Thermodynamics (PHY-2101)	Taught in Spring-2022, Spring-2023, Spring-2024
Electricity & Magnetism (PHY-2201)	Taught in Fall-2022, Fall-2023
Fluid Dynamics (PHY-4210)	Taught in spring-2023
Mechanics (PHY-1101)	Taught in Fall-2020, Fall-2021, Fall-2022
Geometrical and Physical Optics (PHY-2202)	Taught in Fall-2021
Intermediate Physics (PHY-2010)	Taught from 2012-2016, 2020-2022
Intermediate Physics Practivcals (PHY-2010P)	Taught from 2012-2016, 2020-2022

Faculty Development Trainings/Workshops

- "Intellectual property rights" focused on patent writing/drafting and submission, October 09, 2024, Organized by ORIC GCU, Conducted in GCU.
- "Advancing Teaching Excellence: Strategies for effective higher education instructions and professional development", 9th-11th January 2024, Organized by PHEC, Conducted in UVAS Lahore.
- "Advanced Teaching Excellence: Strategies for effective higher education instructions and professional development", 22nd-24th August 2023, Organized by PHEC, Conducted in The

Punjab University.

- "Advanced Teaching and Learning Program 2023", Director of Academics GCU Lahore, 17th July-16th August 2023.
- "Strengthening Pathways into Employment for Women at the Workplace: Bridging Gaps for Women's progression through health-related policies", Conducted in GCU Lahore in collaboration with University of Sunderland, 30th August, 2023.
- "Researchers Capacity Building Program for Researchers, BC-HEC, Pak-UK Education gateway", 25th July to 28th July, 2022, Conducted in Avari Hotel Lahore.
- "Workshop on Particle in Cell Simulation", Department of Physics, GCU Lahore, 20th- 22nd March 2017.
- "4th Workshop on Plasma Physics", NCP Islamabad,22nd-26th April 2019.
- "First ICTP-NCP International College on Plasma Physics", NCP Islamabad, 11th-15th November 2013.

Publications

- S. Khalid, M. Qureshi, W. Masood, Nonlinear kinetic Alfven waves in space plasmas with generalized $(\boldsymbol{r, q})$ distribution, Astrophysics and Space Science **363** (2018) 216.
- S. Khalid, M.N.S. Qureshi, W. Masood, Compressive and rarefactive solitary structures of coupled kinetic Alfven-acoustic waves in non-Maxwellian space plasmas, Physics of Plasmas **26** (2019) 092114.
- S. Khalid, M.N.S. Qureshi, W. Masood, Alfvenic Perturbations with Finite Larmor Radius Effect in Non-Maxwellian Electron-Positron-Ion Plasmas, AIP Advances **20** (2020) 025002.
- S. A. M. Zaidi, M. N. S. Qureshi, S. Khalid, Effect of nonthermal electron distributions on dust acoustic solitons in cometary plasmas, AIP Advances **14** (2024) 025122, https://doi.org/10.1063/5.0177023
- S. A. M. Zaidi, M. N. S. Qureshi, S. Khalid, Co-Existence of Compressive and Rarefactive Dust Acoustic Solitary Structures in Saturn's Rings with Non-Maxwellian Ions and Electrons, Communications in Theoretical Physics 77(5), December 2024,https://doi.org/10.1088/1572-9494/ada37a
- S. Khalid, Navaira Izhar, M.N.S. Qureshi, Interpretation of Double Layers and Associated Electric Field Structures in Earth's Magnetosphere based on (r, q) and nonextensive q-Distributions, Phys. Plasmas **32** (2025) 042302, https://doi.org/10.1063/5.0231787
- Ambar Tariq Sian, Laiba Emaan, Saba Khalid, M. N. S. Qureshi, Ijist Jr, Ion-Acoustic Density Hump Solitons in (r,q) Distributed Plasmas using Python, International Journal of Innovations in Science and Technology 7 (1):313-32, February 2025.
- S. Khalid, M.N.S. Qureshi, Umm e Hira, Shoai Akhtar, Linear Dispersion Relation of Kinetic Alfven Waves In Nonthermal Plasmas, Pakistan Journal of Science, 76(04):603-607, December 2024, https://doi.org/10.57041/vol76iss04pp603-607.

- M. N. S. Qureshi, Ambar Tariq Sian, Laiba Emaan, Saba Khalid, Ion-Acoustic bipolar Electric Field Solitary Structures with Trapped Electrons, Pakistan Journal of Science 76(04):608-613, December 2024, https://doi.org/10.57041/vol76iss04pp608-613

Conference Presentations

I presented my research work as an oral presentation at the following national and international conferences.

Conference/ Symposium	Date	Organized by
3rd International Conference on Recent Trends in Physics	9th- 11th April 2025	ORIC, FCCU, Lahore
4th International Conference on Emerging Trends in Physics	13th -15th January, 2025	LCWU-COMSATS Lahore
8th Asia-Pacific Conference on Plasma Physics (AAPPS-DPP2024), Malacca, Malysia.	3rd-8th November, 2024	AAPPS-DPP
EGU General Assembly, Vienna, Austria	23rd -28th April 2023	European Geosciences Union (EGU)
Joint NUST-NCP International College on Space & Astrophysical Plasmas	Oct. 30-Nov. 03, 2023	NUST Islamabad & NCP Islamabad
17th National symposium on Frontiers in Physics	01-03 December, 2022	GCU, Lahore, Pakistan Physical Society
2nd International Conference on Plasma Physics	28th-30th November, 2023	ORIC, FCCU, Lahore
Global forum on Innovation in Science and Technology	30th May 2021	Minhaj University LHR
International Conference on Physics and Contemporary Needs	19-21 November, 2014	GCU, Lahore

Students Supervised

No.	M. Phil Students		
1	Samia Ijaz (co-supervised)	0426-MPHIL-PHY-19	Nonlinear Kinetic Alfvén Waves in Low-$\boldsymbol{\beta}$ Multi-Component Space Plasmas
2	Sania Naeem (co-supervised)	0402-MPHIL-PHY-19	Nonlinear Inertial Alfvén Waves in Multi-Component Space Plasmas
3	Atia Munir	2021-GCUL-MP-PHY-176	Alfvenic double layers in three component space plasmas with superthermal electrons following kappa distribution
4	Rimal Fatima	2021-GCUL-MP-PHY-164	Field aligned potentials arising from Alfvenic double layers in three component space plasmas with superthermal electrons following (r, q) distribution.
5	Samreen Akhtar	2021-GCUL-MP-PHY-162	Parallel electric field associated with Alfvenic double layers in space plasmas with two temperature non-extensive electrons
6	Muhammad Yousaf	Roll No. 0419-MPHIL-PHY-21	Nonlinear propagation and interaction of multisolitons in the non-Maxwellian plasmas

No.	BS. Honors Students		
1	Zeshan Rafique	0792-BH-PHY-13	Electron Number Problem in Solar Flares

2	Noor Rehman	2013-BH-PHY-1120	Acceleration of Electrons in Solar Flares
3	Mehran Ullah	2013-BH-PHY-1121	Bulk Energization of Electrons in Solar Flares
4	Muhammad Akmal	0765-BH-Phy-17	Observational features of thermal and nonthermal distribution functions in space plasmas
5	Nauman Waseem	0238-BH(E)-PHY-18	Ambipolar Electric Field Associated with Thin Current Sheet: MMS Observations
6	Hamza Mushtaq	0202-BH(E)-PHY-18	Velocity Distributions Associated with Alfven Vortex Structures: MMS Observations
7	Muhammad Abu Bakar	0718-BH-PHY-19	Parallel electric field related to double layers in Auroral region of Earth
8	Muhammad Muzamil Sharif	0711-BH-PHY-19	Double layers and associated electric field structures in Earth plasma sheet
9	Shayan Amjad	0730-BH-PHY-19	Field alligned potentials arising from double layers in Earth's radiation belts
10	Abdullah Khalid	352-BH-PHY-19	Electrostatic structures associated with double layers in Earth bow shock

Research Projects

- ORIC funded research project No. 440/ORIC/24.

Administrative Responsibilities

- Incharge Modern Physics Lab
- Co-Advisor Jones Physics Society

Memberships

- Member of European Geosciences Union EGU for year 2023
- Member of IEEE for the year 2024

- Member of AAPPS-DPP Since 2024
- Life member of Pakistan Institute of Physics
- Life member of Pakistan Physical Society