

# Curriculum Vitae



## **Prof. Dr. Mushtaq Ahmad**

Nationality: Charsadda (Pakistan)

### **Personal Data**

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### **Academic**

M. Sc. Physics, University of Peshawar, Peshawar Pakistan (1995)

M.S, Applied Physics, Quaid-e-Azam University, Islamabad (1999)

**PhD Physics**, Govt. College University Lahore Pakistan (2007)

**Post-Doc Fellowship**, School of Physics university of sydney NSW 2006 Australia (2009-2011) with Prof. D. B. Melrose

### **Research Fields**

Classical and quantum plasma physics, nonlinear Physics and surface Plasmonic

### **Professional Experience**

1. **Junior Scientist:** Theoretical Physics Group, PRD, PINSTECH, 44000 Nilore Islamabad, Pakistan (1999-2001)
2. **Senior Scientist:** Theoretical Plasma Physics Division, PINSTECH 44000 Nilore, Pakistan (2001-2012)
3. **Associate Professor and Chairman** Department of Physics, Abdul Wali Khan University Mardan.KPK, Pakistan (2012-Feb. 2015)
4. **Professor** Department of Physics, Abdul Wali Khan University Mardan.KPK, Pakistan (Fe. 2015-5<sup>th</sup> May, 2016 )

5. **Director of Office of Research Innovation and Commercialization (ORIC)**, Abdul Wali Khan University Mardan.KPK, Pakistan (2013-2014).
6. **Chief Procter at Shankar Campus** Abdul Wali Khan University Mardan Pakistan (2014-till date).
7. **Interim Dean Faculty of Physical and Numerical Sciences**, Abdul Wali Khan University Mardan Pakistan (28-7-2015-5<sup>th</sup> May, 2016 till date)
8. **Professor and Chairman** Department of Physics, International Islamic University Islamabad Pakistan (5<sup>th</sup> May, 2016-till date)

## **Research Publications**

1. S. Mahmood and **A. Mushtaq** "*Dust streaming effect on dust acoustic solitary wave in magnetized dusty plasmas*", Journal of Fusion Energy, **21**, 199, (2003).
2. S. Mahmood, **Mushtaq A.** and H. Saleem "*Ion acoustic solitary wave in homogeneous magnetized electron-positron-ion plasmas*", New Journal of Phys. **5**, 28.1-28.10. (2003).
3. **A. Mushtaq** and H. A. Shah "*Effects of positron concentration, ion temperature and plasma  $\beta$ - value on linear and nonlinear two dimensional magnetosonic waves in electron-positron-ion plasmas*", Phys. Plasmas **12**, 012301 (2005).
4. **A. Mushtaq** and H. A. Shah "*Nonlinear Zakharov-Kuznetsov equation for obliquely propagating 2D ion acoustic solitary waves in a relativistic, rotating magnetized electron-positron-ion plasma*", Phys. Plasmas **12**, 072306 (2005).
5. **A. Mushtaq** and H. A. Shah "*Study of non-Maxwellian trapped electrons by using generalized  $(r, q)$  distribution function and their effects on the dynamics of ion acoustic solitary wave*", Phys. Plasmas **13**, 012303 (2006).
6. **A. Mushtaq**, H. A. Shah, N. Rubab, and G. Murtaza "*Study of an obliquely propagating dust acoustic solitary wave in magnetized tropical mesospheric plasmas with effect of dust charge variations and rotation of the plasma*", Phys. Plasmas **13**, 62903(2006).
7. N. Rubab, G. Murtaza and **A. Mushtaq** "*Effect of non-Maxwellian particle trapping and dust grain charging on dust acoustic solitary waves*", Phys. Plasmas **13**, 112104 (2006).
8. **A. Mushtaq**, S. A. Khan "*Ion acoustic solitary wave with weakly transverse perturbations in quantum electron-positron-ion plasma*", Phys. Plasmas **14**, 052 307 (2007).
9. S. A. Khan, **A. Mushtaq** "*Linear and nonlinear dust ion acoustic waves in ultra cold quantum dusty plasmas*", Phys. Plasmas **14**, 083703 (2007).
10. **A. Mushtaq** "*Cylindrical dust acoustic solitary waves with transverse perturbations in quantum dusty plasmas*", Phys. Plasmas **14**, 113701 (2007).
11. W. Masood, **A. Mushtaq**, and R. Khan, "*Linear and nonlinear dust ion acoustic waves using the two-fluid quantum hydrodynamic model*", Phys. Plasmas **14**, 123702 (2007).
12. W. Masood and **A. Mushtaq**, "*Electron acoustic soliton in a quantum magnetoplasma*", Phys. Plasmas **15**, 022306 (2008).
13. S. A. Khan, **A. Mushtaq** and W. Masood "*Dust ion-acoustic waves in magnetized quantum dusty plasmas with polarity effect*", Phys. Plasmas **15**, 013701 (2008).
14. S. Mahmood and **A. Mushtaq** "*Quantum ion acoustic solitary waves in electron-ion plasmas: A Sagdeev potential approach*", Phys. Lett. A **372**, 3467 (2008).
15. W. Masood, **A. Mushtaq**, "*Obliquely propagating magnetosonic waves in multi-component quantum magnetoplasma*", Phys. Lett. A **372**, 4283 (2008).
16. **A. Mushtaq**, and R. Khan "*Linear and nonlinear studies of two-stream instabilities in electron-positron-ion plasmas with quantum corrections*" Phys. Scr. **78**, 015501 (2008).
17. **A. Mushtaq** "*Spatially limited ion acoustic drift soliton in electron-positron-ion magneto plasma*" Phys. Plasmas **15**, 082313 (2008).

18. Q. Haque, S. Mahmood and **A. Mushtaq** “Nonlinear electrostatic drift waves in dense electron-positron-ion plasmas” Phys. Plasmas **15**, 082315 (2008).
19. **A. Mushtaq** and A. Qamar “Parametric studies of nonlinear magnetosonic waves in two-dimensional quantum magneto-plasmas” Phys. Plasmas **16**, 022301 (2009).
20. R. Saeed and **A. Mushtaq** “Ion acoustic waves in pair-ion plasma: Linear and nonlinear analyses” Phys. Plasmas **16**, 032307 (2009).
21. W. Masood, H. A. Shah, **A. Mushtaq** “Linear and Non-Linear Properties of an Obliquely Propagating Dust Magnetosonic Wave” Journal of Plasma Phys. **75**, 217 (2009).
22. **A. Mushtaq**, R. Saeed and, Q. Haque “Ion acoustic solitary waves in magnetized pair-ion electron plasmas” Phys. Plasmas **16**, 084501 (2009).
23. **A. Mushtaq** and D. B. Melrose “Quantum effects on the dispersion of ion acoustic waves” Phys. Plasmas **16**, 102110 (2009).
24. D. B. Melrose and **A. Mushtaq** “Quantum recoil and Bohm diffusion” Phys. Plasmas **16**, 94505 (2009).
25. M. Nadeem and **A. Mushtaq** “Thermal induced reversibility/ irreversibility in the ac electrical properties of  $La_{0.50}Ca_{0.50}MnO_{3+\delta}$  by impedance spectroscopy” J. App. Phys. **106** 737013 (2009).
26. **A. Mushtaq**, A. Qamar and Zulfiqar Ahmed, “Vortical structures in a non-uniform pair-ion dust magnetoplasma with sheared flows” Phys. Plasmas **17**, 014502 (2010).
27. W. F. El-Taibany, **A. Mushtaq**, W. M. Moslem and Miki Wadati, “A model for dust acoustic solitary waves in a non-thermal rotating magnetized dusty plasma with arbitrary dust polarity” Phys. Plasmas **17**, 034501 (2010).
28. **A. Mushtaq** “Ion acoustic solitary waves in magneto-rotating plasmas” J. Phys. A: Math. Theor. **43**, 315501 (2010).
29. D. B. Melrose and **A. Mushtaq** “Dispersion in a thermal plasma including arbitrary degeneracy and quantum recoil” Phys. Rev. E **82**, 56402 (2010).
30. **A. Mushtaq** and S. V. Vladimirov “Fast and slow magnetosonic waves in two dimensional spin-1/2 quantum plasmas” Phys. Plasmas **17**, 102310 (2010).
31. W Masood, S Hussain, H Rizvi, **A. Mushtaq** and M Ayub “Electromagnetic solitary structures in dense electron–positron–ion magneto-plasmas” Phys. Scr. **82**, 065508 (2010).
32. D. B. Melrose and **A. Mushtaq** “Plasma dispersion function for a Fermi-Dirac distribution” Phys. Plasmas, **17**, 122103 (2010).
33. D. B. Melrose and A. Mushtaq “Classical relativistic model for spin dependence in a magnetized electron gas” Phys. Rev. E **83**, 056404 (2011).
34. **A. Mushtaq**, R. Saeed and, Q. Haque “Coupled electrostatic drift and ion acoustic waves in pair ion–electron plasma” Phys. Plasmas, **18**, 42305 (2011).
35. A. J. Keane, **A. Mushtaq** and M. S. Wheatland “Alfvén solitons in a Fermionic quantum plasma” Phys. Rev. E **83**, 066407 (2011).
36. S. Ali Shan and **A. Mushtaq** “Role of Jeans instability in multi-component quantum plasmas in the presence of Fermi pressure” Chin. Phys. Lett, **28**, 075204 (2011).
37. **A. Mushtaq** and S. V. Vladimirov “Arbitrary magnetosonic solitary waves in spin 1/2 degenerate quantum plasma” Euro. Phys. J. D., **64**, 419 (2011).
38. **A. Mushtaq**, M. Nasir Khattak, Zulfiqar Ahmad and, A. Qamar “Dust ion acoustic soliton in pair-ion plasmas with non-isothermal electrons” Phys. Plasmas, **19**, 42304 (2012).
39. **A. Mushtaq**, R. Maroof, Zulfiqar Ahmad and, A. Qamar “Magnetohydrodynamic spin waves in degenerate electron-positron-ion plasmas” Phys. Plasmas, **19**, 52101 (2012).
40. S. Ali Shan and **A. Mushtaq** “Arbitrary dust ion acoustic soliton with streaming ions and superthermal electrons” Phys. Scr. **86**, 035503 (2012).

41. **A. Mushtaq** and S. V. Vladimirov “Nonlinear magnetosonic waves in spin 1/2 quantum plasma” AIP Conf. Proc. **1445**, 115 (2012); doi: 10.1063/1.3701892, (2012).
42. S. Hussain, **A. Mushtaq** and S. Mahmood “An arbitrary amplitude fast magnetosonic soliton in quantum electron–positron–ion plasmas” Phys. Scr. **87**, 025502 (2013).
43. Ata-ur-Rahman, **A. Mushtaq**, S. Ali, and A. Qamar “Nonplanar electrostatic solitary waves in a relativistic degenerate dense plasma” Commun. Theor. Phys. **59**, 479 (2013).
44. S. Ali Shan and **A. Mushtaq** “Dust acoustic soliton and double layers with streaming dust and superthermal particles” Astrophys Space Sci. **346**, 171 (2013).
45. S. Hussain, S. Mahmood and **A. Mushtaq** “Magnetoacoustic solitons in dense astrophysical electron-positron-ion plasmas ” Astrophys Space Sci. **346**, 359(2013).
46. Ata-ur-Rahman, S. Ali, **A. Mushtaq**, and A. Qamar “Nonlinear ion acoustic excitations in relativistic degenerate astrophysical electron–positron–ion plasmas” J. Plasma Physics **79**, 817 (2013).
47. Ata-ur-Rahman, S. Ali, W. M. Muslim and **A. Mushtaq** “Two-dimensional cylindrical ion-acoustic solitary and rogue waves in ultrarelativistic plasmas” Phys. Plasmas, **20**, 72103 (2013).
48. Zulfiqar Ahmad, **A. Mushtaq**, and A. A. Mamun “Effects of plasma particle trapping on dust-acoustic solitary waves in an opposite polarity dust-plasma medium” Phys. Plasmas, **20**, 32302 (2013).
49. S. Ali Shan, **A. Mushtaq** and N. Akhtar “Ion acoustic double layers in the presence of positrons beam and  $q$ -nonextensive velocity distributed electrons” Astrophys. Space Sci. **348**, 501 (2013).
50. **A. Mushtaq** and Attaullah Shah “Sheared flow-driven vortices and solitary waves in a non-uniform plasma with negative ions and non-thermal distributed electrons” J. Plasma Physics, **79**, 479 (2013).
51. **A. Mushtaq**, M. Ikram and R. E. H. Clark “Electrostatic Solitary Waves in Pair-ion Plasmas with Trapped Electrons” Braz. J. Phys. **44**, 614 (2014).
52. S. Ali Shan, N. Akhtar and **A. Mushtaq** “Kadomtsev–Petviashvili solitons in a warm electronegative plasma with  $q$ -nonextensive electrons ” Phys. Scr. **90**, 15602 (2015).
53. **A. Mushtaq**, AttaUllah Shah, M. Ikram, R. E. H. Clark “Sheared Flow Driven Drift Instability and Vortices in Dusty Plasmas with Opposite Polarity” Braz. J. Phys. **46**, 78(2016)  
DOI 10.1007/s13538-015-0376-1.
54. R. Maroof, S. Ali, **A. Mushtaq** and A. Qamar “Magnetohydrodynamic waves with relativistic electrons and positrons in degenerate spin-1/2 astrophysical plasmas” Phys. Plasmas **22**, 112102 (2015).
55. M. N. Khattak, **A. Mushtaq** and A. Qamar “Ion Streaming Instabilities in Pair Ion Plasma and Localized Structure with Non-Thermal Electrons” Braz. J. Phys. DOI 10.1007/s13538-015-0356-5.
56. R. Maroof, **A. Mushtaq** and A. Qamar “Quantum dust magnetosonic waves with spin and exchange correlation effects ” Phys. Plasmas **23**, 13704 (2016).
57. M. N. Khattak, **A. Mushtaq** and Z. Ehsan “Electrostatic baryonic solitary waves in ambiplasma with nonextensive leptons” Chinese Journal of Physics **54** (2016) 503–514.

### **Conferences/Schools/Colleges Attended**

1. 8<sup>th</sup> Symposium on “Frontiers in Physics” was attended from Nov. 20-22, 2000 held at Government College Lahore, Pakistan.
2. 26<sup>th</sup> International Nathiagali Summer College on Physics and Contemporary Needs was attended from 26<sup>th</sup> June – 1st July, 2001 held at Nathiagali, Pakistan.
3. “Regional College on Plasma Physics”, held under the auspices of National Centre for Physics, Quaid-i-Azam University, Islamabad, Pakistan, from 29 Jan - 03 Feb. 2001.
4. 27<sup>th</sup> International Nathiagali Summer College on Physics and Contemporary Needs was attended from 24<sup>th</sup> June – 6th July, 2002 held at Nathiagali, Pakistan.
5. 9th National Symposium on Frontiers in Physics, 28-30 January 2003, G. C. University, Lahore Pakistan.
6. Conference on Nuclear Science and Technology”, Oct. 15-16 (2001), Islamabad, Pakistan.
7. One day Symposium on Mathematics, November 27, 2004, G. C. University, Lahore Pakistan.
8. 30<sup>th</sup> International Nathiagali Summer College on Physics and Contemporary Needs was attended from 27<sup>th</sup> June – 13<sup>th</sup> July 2005 held at Nathiagali, Pakistan.
9. Autumn College on Plasma Physics, 5-30 September 2005, As-ICTP, Trieste, Italy.
10. International Workshop on Frontier of Plasma Sciences, 22<sup>nd</sup> August –1<sup>st</sup> September 2006, As-ICTP, Trieste, Italy.
11. 2007 Summer College on Plasma Physics, 30<sup>th</sup> July -24<sup>th</sup> August 2007, As-ICTP, Trieste, Italy.
12. 19<sup>th</sup> Australian Institute of Physics Congress, December (5-9) 2010 at Melbourne Convention and Exhibition center, Victoria Australia.

### **Miscellaneous**

**Languages:** English, Urdu, Pashto (native)

- **Referee of international journals:** Physical Review Letter, Physical Review E, Physics of Plasmas, Phys. Lett. A, Chinese phys. Lett. and Europ. Physical Journal D
- **Google scholar with total citation** of about **970**
- Paper total impact factor **105**
- **Won the best research productivity awards (from PCST) at A-level 3 times**
- **Introduced 8 advanced level courses at Msc, MS and PhD level.**
- **Best teacher award at university level in 2015.**

## **Teaching Interest**

Teaching of physics courses at graduate level to post-graduate level. Prime interests are in Quantum Mechanics, Electromagnetism, Nonlinear Physics, Plasma Physics, Mathematical Physics and Statistical Physics.

## **Professional References**

### **Prof. Don MELROSE**

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### **A/Prof. Mike WHEATLAND**

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### **Professor Dr. Hassan A. Shah**

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