Contact Details

Assistant Professor

- Centre for High Energy Physics
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About me ———

I obtained doctoral degree from LAREMA, Université d'Angers, France in field of theoretical physics with special focus on Integrability of nonlinear field equations and the computational representations of mathematical results in framework of Maple software. Recently I am working as Assistant Professor at CHEP and have supervised successfully three Ph.D and more then fifteen M.Phil/MS reseach projects. As an external examiner, My area of research encloses the investigation of various aspects of nonlinear physical systems, Integrable Systems, algebraic-geometrical features in the study of condensed matter physics with noncommutative extensions of field equations. Currently some Ph.D and M.Phil research projects are in progress under my supervision in above mentioned areas of research.

Skills ———

Computational skills: Maple and MatLab

Dr. IRFAN MAHMOOD

Education

2010-2014	Ph.D. in Theoretical Physics *LAREMA, Université d'Angers*	France
2006-2008	M.Phil. in Physics Dept. of Physics, Punjab University	Pakistan
2003-2005	M.Sc. in Physics Dept. of Physics, Punjab University	Pakistan
2001-2003	B.Sc in Physics, Math (A,B) Dept. of Physics, Sargodha University.	Pakistan
1998-2000	F.Sc in Pre-Engineering B.I.S.E Sargodha	Pakistan
1996-1998	Matric with Science B.I.S.E Sargodha	Pakistan

Research Interests

Integrability of Nonlinear Field Equations
Theoretical Physics
Nonlinear Condensed Matter Physics

Couses Taught

I taught the following courses on Post-graduate and Graduate levels:

1-Post-graduate Level M.Phil/Ph/D

i- Quantum Field Theory
ii-Group Theory in Particle Physics
iii-Relativistic Quantum Mechanics
iv-General Relativity
v-Advanced Mathematical Methods
vi-Integral Equations

2-Graduate Leve

i-Applied Nuclear and Particle Physics
ii-Applied Differential Equations
iii-Electromagnetic Theory
iv-Classical Mechanics
v- Mathematical Methods
vi- Modern Physics
vii-Relativity and Cosmology

PUBLICATIONS

[1]   Irfan Mahmood , Quantum Painlevé II solution and Approximated analytic solution of the Yukawa Potential, Advances in Mathematical Physics, Journal of Prime Research in Mathematics, 17(1) 1–6 (10 March 2021)

[2]   Irfan Mahmood and Muhammad Waseem, Lax Representation and Darboux Solutions of the Classical Painlevé Second Equation, Advances in Mathematical Physics V. 2021, $8851043, 5$ (15 January 2021)

[3]   S. Nazir, A. Laref, Irfan Mahmood, M. Sajjid and N. A. Noor, Ab-initio simulations of MgTiO3 oxide at different pressure, Journal of high energy density physics, Vol. 33, 100715, 21, (21 Sep,2019)

[4]   M. Waseem, Irfan Mahmood, Muhammad Rashid, Irfan Qasim, A. Laref , Investigations of physical aspects of spinel ABi2O4 (A=Zn, Cd) oxides via ab- initio calculations, Physics Letters A, (7 March,2019)

[5]   Irfan Mahmood, Zero-Curvature Representation of Non-Abelian Quantum Painlevé II Equation with Its Darboux Solution , J Phys Math, 9: 276, Vol 9(2), (8 July,2018)

[6]   Irfan Mahmood, Quasideterminant solution of NC Painlev II equation with the Toda solution at n=1 as a seed solution in its Darboux trans- formation, Journal of Geometry and Physics, 95, 127-136, (15 May, 2015)

[7]   Irfan Mahmood, Lax pair representation and Darboux transformation of noncommutative Painlevé second equation, Journal of Geometry and Physics, 62, 15751582, (25 Jan,2012)

Accepted Manuscripts

[8]   Irfan Mahmood and Asif Mahmood, Quasideterminant Darboux solutions of Noncommutative Equations of Langmuir Oscillations, arXiv:2101.11893, IOP SciNotes, Accepted

[9]   Nida Raees, Irfan Mahmood and Nosheen Mushahid, On integrability of Fokas-Lenells equation with quantum- noncommutative extensions, (revision sent)

ABSTRACT Published in international Proceedings:

[10]   Irfan Mahmood, Quasideterminant Solutions of NC Painlev́e II Equation with the Toda Solution at n = 1 As a Seed Solution in Its Darboux Transformation, Published in conference Proceedingd, The 11th AIMS Conference on Dynamical Systems,Differential Equations and Applications, July 2016, Orlando, Florida, USA, https://aimsconference.org/conferences/2016/index.html

[11]   Irfan Mahmood, Various Aspects on the Painlevé Equations, in conference proceeding, RIMS, Kyoto, JAPAN, December, 2012.

TEACHING EXPERIENCE

1-As Assistant Professor

2015. - till now	University of the Punjab, Pakistan, Since 6 Aug2015 Centre for High Energy Physics	Pakistan

2013 - 2014	St. Edward University and Faculty of Science	France
2013 - 2014	Catholic University and Faculty of Science	France

2- **As Lecturer of Physics**

2009 - 2015	University of the Punjab(26-08-2009-06-08-2015) Institute of Geology	Pakistan
2006 - 2007	University of the Punjab Punjab University College for Information Technology	Pakistan

THESES SUPERVISED Ph.D/M.Phil

1- Ph.D THESES SUPERVISED

Sr #	Student Name	At Dept./Centre, University of the Punjab	Status
1	Naveed Ahmad Noor	Centre for High Energy Physics	Completed Successfully
2	Wasif Tanveer	Centre for High Energy Physics	Completed Successfully
3	Syed Adeel Abbas	Centre for High Energy Physics	Thesis submitted for final defense

Ongoing Ph. D Projects:

- Right now **FIVE Ph.D research scholars** are working under my supervision and few have been submitted their Synopsis.

2- M.Phil THESES SUPERVISED:

Sr #	Roll No.	Student Name	Thesis Title	Status
1.	0814	Miss.Iqra Fatima	Some Integrable aspects of Non-linear Field Equations and their Solitonic solutions.	Completed 08-10-2016
2.	1214	Miss Anam Waheed	Various Mathematical and Physical aspects of classical Painlevé Second equation	Completed 26-10-2016
3.	1414	Miss.Sehrish Hanif	Classical and Quantum Analogues of Non-Linear Schrodinger Equation	Completed 07-11-2016
4.	1315	Mr. Saeed Iqbal	The study of associated Fermionic and Bosonic fields to the KdV equation.	Completed 20-04-2018
5.	0617	Miss Tahira Aslam	On Linearization and Darboux Transformation of Integrable Systems	Completed 20-07-2020
6.	1617	Miss. Ayesha Malik	Integrability of spin polarized interacting chain.	Completed 14-09-2019

7.	2117	Mr. Riaz Ahmad	Multisolitonic Solutions of Linear and Nonlinear Schrodinger Equations	Completed 14-09-2019
8.	0218	Miss. Samrah Amjad	On Semi Discretization and Integrability of Nonlinear Field equations	Completed 31-08-2020
9.	2218	Miss. Zahid Ali	On Hirota bilinear integrabilty of some Nonlinear field equations	Completed 31-08-2020
10.	0215	Rana Faisal	Isomonodromic Deformation and Hamiltonian Hierarchy Structure of Classical Painleve' Second Equation	Completed 2015-2017
11.	0919	Mr. Ali Raza	On integrability of Camassa Holm Equation with Peakon solutions	Ongoing
12.	2119	Miss. Misbah Nazira	Painlevé II Equation as model to investigate Electric field fluctuation in anisotropic interacting region	Ongoing
13.	2019	Mr. Abdul Rehman	On Discretization and Integrability of Nonlinear Field Equations	Ongoing

M.SC/BS THESES SUPERVISED:

1-More then 15 MSC/BS projects have been supervised and submitted successfully
2- FOUR are in progress.

RESEARCH PROJECTS: International & National

1-INTERNATIONAL

Sr #	Project Name	Awarded by	Status
1	France-Croatia Project	France and Croatia Institute of Physics, Zagreb	Completed 2011
2	Road & Belt Young Scientists Project	CHINA, Science and Technology Commission of Shanghai Municipality	2020-2023 In Progress

2-NATIONAL

Sr #	Project Name	Awarded by	Status
1	PU Project 2015-2016	University of the Punjab	Completed, June, 2016
2	PU Project 2017-2018	University of the Punjab	Completed, June, 2018
3	PU Project 2019-2020	University of the Punjab	Completed, June, 2020

Conferencs/ Workshps Attended

1-Attended as SPEAKER:

Year	Conference	Country
2018	School on Integrability in field theory and Statistical Physics *SCGP, Stony Brook University, NOV. 09-25*	USA
2016	Applied di erential equations and integrable systems The AIMS, Florida, JULY, 1-5	USA
2016	Recent Trends in Nonlinear Science Sevilla University, JAN 25-29	Spain
2013	Random Matrix Theory and Applications ZIF, Bielefeld University, DEC 17-19	Germany
2012	Various Aspects on the Painlevé Equation Kyoto University, NOV. 26-30	Japan
2011	On Integrable systems Institute of Physics, Zagreb University, SEP. 10-20	Croatia

2-Attended as Participant:

Year	Conference	Country
2013	Finite dimensional integrable systems ,*CIRM*	USA
2012	Contemporary ways of Integrability, University of Lisbon:	Portugal
2012	On integrable systems, University of Glasgow	Scotland
2012	Integrability: Modern Variational, Hausdor Center of Mathematics	Germany
2011	Noncommutative Algebra and D branes, SCGP, Stony Brook University	USA

Awards/ScholarShips

1- Awarded <u>merit scholarship</u> to Pursue M.Phil Studies at Dept. of Physics, University of the Punjab
2- Awarded <u>overseas scholarship</u> by Punjab University to pursue Ph.D studies at LAREMA, CNRS, Université d'Angers, France

MEMBER COMMITTEES/BOARDS

1-Ph.D and M.Phil admission Committee:
I am member of Ph.D and M.Phil admission committees since 2016 at Centre for High Energy Physics, University of the Punjab, Lahore

2-Memember Selection Board:
I am one of the members of Selection Board of Abbottabad University of Science and Technology, Pakistan

References

1-Professor Vladimir Retakh, Department of Mathematics, Rutgers University, USA
2-Professor Vladimir Rubtsov, LAREMA, Université d'Angers, France
3-Professor Mahmood Ul Hassan, Department of Physics, PU, Pakistan