



Muhammad Rehman

Date of birth: 03/01/1984 | **Nationality:** Pakistani | **Gender:** Male | **Phone number:** (+92) 3087039295 (Mobile) | **Email address:** m.rehman@comsats.edu.pk | **Address:** Islamabad, Pakistan (Home)

ABOUT ME

Assistant Professor of Physics with a Ph.D. from the University of Cantabria and over nine years of experience in teaching and research, specializing in Particle Physics Phenomenology and physics beyond the Standard Model, particularly supersymmetry. Proven track record in publication and supervision, with a commitment to innovative teaching that fosters critical thinking and student engagement.

WORK EXPERIENCE

COMSATS UNIVERSITY ISLAMABAD – ISLAMABAD, PAKISTAN

ASSISTANT PROFESSOR – 01/02/2018 – CURRENT

- **Graduate Courses Taught (Selected):** Quantum Field Theory, Particle Physics, Supersymmetry, Group Theory
- **Undergraduate Courses Taught (Selected):** Quantum Mechanics, Statistical Physics, Special Relativity, Classical Mechanics
- Supervised over 15 MS theses; currently mentoring 3 PhD candidates in theoretical particle physics
- Designed and updated curricula for undergraduate and graduate courses in theoretical physics
- Actively engaged in collaborative international research projects (Spain, Italy, Germany)

RIPHAH INTERNATIONAL UNIVERSITY ISLAMABAD (LAHORE CAMPUS) – LAHORE, PAKISTAN

ASSISTANT PROFESSOR – 19/09/2016 – 31/01/2018

- **Graduate Courses Taught (Selected):** Particle Physics, Advanced Quantum Mechanics, Mathematical Methods of Physics
- **Undergraduate Courses Taught (Selected):** Quantum Mechanics, Special Relativity, Classical Mechanics
- Supervised 10 MS theses in theoretical and phenomenological particle physics
- Designed and updated curricula for undergraduate and graduate courses in theoretical physics

MULTI-MESSENGER APPROACH FOR DARK MATTER DETECTION PROJECT – MADRID, SPAIN

UNIVERSITY RESEARCH ASSISTANT – 01/06/2011 – 30/06/2015

- Contributed to theoretical research in dark matter phenomenology under the Spanish Consolider MultiDark collaboration
- Participated in collaborative meetings and thematic workshops of the MultiDark project held across Spain (2011–2015)
- Worked closely with international collaborators from Spain, Italy, and Germany

EDUCATION AND TRAINING

01/06/2011 – 08/02/2016 Santander, Spain

PHD IN PHYSICS Universidad de Cantabria

Under the supervision of Sven Heinemeyer and Mario E. Gomez

Thesis Flavor Mixing Phenomenology in Supersymmetric Models

07/09/2008 – 20/10/2010 Islamabad, Pakistan

MASTER OF SCIENCE IN PHYSICS COMSATS Institute of Information Technology, Islamabad

Thesis Rare Decays, A window for new physics

01/09/2003 – 10/10/2007 Faisalabad, Pakistan

BACHELOR OF SCIENCE IN PHYSICS Government College University Faisalabad

● SKILLS

Theoretical Tools:

Expertise in QFT, Supersymmetry, and Group Theory for research and graduate teaching. | Skilled in EFT, flavor physics, renormalization, and radiative corrections in BSM models.

Computational Tools:

Proficient in FeynArts, FormCalc, FeynHiggs for one-loop and diagrammatic analyses. | Skilled in SARAH/SPheno for model building and spectrum generation. | Applied MicrOMEGAs and BSMART in dark matter and collider phenomenology. | Experienced with numerical scans, observable analysis, and data consistency checks. | Microsoft Office | Mathematica

Collaboration & Research

Regularly contribute to proposal writing, project planning, and academic peer communication. | Engaged in international collaborations with theoretical groups across various institutions. | Experienced in coordinating group efforts and mentoring junior researchers. | Secured competitive research grants through successful proposal writing and collaboration.

Teaching

Explain abstract theoretical concepts clearly to students from diverse backgrounds. | Mentor students to develop independence, problem-solving, and critical thinking. | Engage in science outreach via public talks, Facebook posts and a YouTube channel

● RESEARCH GRANTS

24/05/2023 – CURRENT

Phenomenological Effects of Flavored Gauge Mediated Supersymmetry Breaking and Higgs Physics

Rs. 2.8 million grant awarded as Principal Investigator under the National Research Program for Universities (NRPU), funded by the Higher Education Commission (HEC) of Pakistan.

01/02/2017 – 31/01/2018

Effects of Doubly Charged Fermions to the Electroweak Precision Observables

Rs. 415,000 grant awarded as Principal Investigator under the Start-Up Research Grant Program (SRGP) funded by the Higher Education Commission (HEC) of Pakistan.

● PUBLICATIONS

2025

[Radiative corrections to the \$S, T, U, S, T, U\$ parameters and their impact on the \$WW\$ boson mass in the 331 model](#)

Authors: M. Rehman, M. A. Iqbal, M. E. Gomez and O. Panella | **Journal Name:** Submitted to Physical Review D | **Publisher:** American Physical Society

2025

Impact of Nonholomorphic Soft SUSY-Breaking Terms on Two-Body Gluino Decays in the MSSM

Authors: M. Rehman, Rabish and S. Ajmal | **Journal Name:** Submitted to European Physical Journal Plus | **Publisher:** Springer

2025

[Signatures of Charged Lepton Flavor Violation in Flavored Gauge-Mediated SUSY-Breaking Scenarios](#)

Authors: M. Rehman and M. Khan | **Journal Name:** Accepted for publication in International Journal of Modern Physics A | **Publisher:** World Scientific

2025

[Towards a Refined Understanding of Non-holomorphic Soft SUSY-Breaking Effects on the Higgs Boson Mass Spectra](#)

Authors: M. Rehman and S. Heinemeyer | **Journal Name:** Phys. Rev. D | **Volume, Issue and Pages:** 111 (2025) 115027 | **Publisher:** American Physical Society

2025

[Lepton Flavor Violation in Nonholomorphic Soft SUSY-Breaking Scenarios: Experimental Limits and Excesses](#)

Authors: M. Rehman and S. Heinemeyer | **Journal Name:** Eur. Phys. J. C | **Volume, Issue and Pages:** 85 (2025) 638 | **Publisher:** Springer

2025

[Interplay between \$MW\$, \$\Omega_{CDM}h^2\$, and \$\(g-2\)_\mu\$ in Flavor Symmetry-Based Supersymmetric Models](#)

Authors: S. Israr, M. E. Gomez, M. Rehman and Y. Arafat | **Journal Name:** Adv. High Energy Phys. | **Volume, Issue and Pages:** 2025 (2025) 6941883 | **Publisher:** John Wiley & Sons

2025

[Higgs Decay to \$Z\gamma\$ in the Minimal Supersymmetric Standard Model and Its Nonholomorphic Extension](#)

Authors: S. Israr and M. Rehman | **Journal Name:** Eur. Phys. J. Plus | **Volume, Issue and Pages:** 140 (2025) 397 | **Publisher:** Springer

2025

[The Muon Anomalous Magnetic Moment in the Excited Fermion Paradigm](#)

Authors: M.Rehman, H. Muhammad, O. Panella, M. E. Gomez | **Journal Name:** Phys.Rev.D | **Volume, Issue and Pages:** 111 (2025) 095006 | **Publisher:** American Physical Society

2025

[Nonholomorphic Higgsino Mass Term Effects on Muon \$g - 2\$ and Dark Matter Relic Density in Flavor Symmetry-Based Minimal Supersymmetric Standard Model](#)

Authors: S. Israr, M.E. Gómez and M. Rehman | **Journal Name:** Particles | **Volume, Issue and Pages:** 8 (2025) 30 | **Publisher:** MDPI

2023

[Nonholomorphic Soft-Term Contributions to the Higgs-Boson Masses in the Feynman Diagrammatic Approach](#)

Authors: M. Rehman and S. Heinemeyer | **Journal Name:** Phys. Rev. D | **Volume, Issue and Pages:** 107 (2023) 095033 | **Publisher:** American Physical Society

2021

[Excited lepton triplet contributions to the electroweak observables at one loop level](#)

Authors: M. Rehman, M. E. Gomez and O. Panella | **Journal Name:** Eur. Phys. J. C | **Volume, Issue and Pages:** 81 (2021) 392 | **Publisher:** Springer

2017

[Lepton flavor violating Higgs Boson Decays in Supersymmetric High Scale Seesaw Models](#)

Authors: M. E. Gomez, S. Heinemeyer and M. Rehman | **Journal Name:** Journal of Particle Physics | **Volume, Issue and Pages:** 1 (2017) 30 | **Publisher:** Isaac Scientific Publishing

2016

[Flavor Mixing Effects Induced by RGE Running in the CMSSM](#)

Authors: M. E. Gomez, S. Heinemeyer and M. Rehman | **Journal Name:** Frascati Physics Series | **Volume, Issue and Pages:** 61 (2016) 145

2016

[Quark Flavor Violating Higgs Boson Decay \$h \rightarrow b\bar{s}\$ in the MSSM](#)

Authors: M. E. Gomez, S. Heinemeyer and M. Rehman | **Journal Name:** Phys. Rev. D | **Volume, Issue and Pages:** 93 (2016) 095021 | **Publisher:** American Physical Society

2015

[Effects of Sfermion Mixing Induced by RGE Running in Minimal Flavor Violating CMSSM](#)

Authors: M. E. Gomez, S. Heinemeyer and M. Rehman | **Journal Name:** Eur. Phys. J. C | **Volume, Issue and Pages:** 75 (2015) 434
| **Publisher:** Springer

2014

[Electroweak Precision Observables and Higgs Masses in Lepton Flavor Violating MSSM](#)

Authors: M. E. Gomez, T. Hahn, S. Heinemeyer and M. Rehman | **Journal Name:** Phys. Rev. D | **Volume, Issue and Pages:** 90 (2014) 074016 | **Publisher:** American Physical Society

TALKS

11/02/2025

Complimenting Beyond the Standard Model Searches at the LHC

18th National Symposium on Frontiers of Physics held in Quaid E Azam University Islamabad, Pakistan

28/11/2023

Supersymmetry: A unified solution to particle physics problems

Workshop on General Relativity, Cosmology, Astrophysics and Particle Physics organized by Institute of Space Technology Islamabad, Pakistan

18/05/2022

Effects of Composite Quarks & Leptons to the Electroweak Precision Data

International Conference on Physics, Air University Islamabad, Pakistan

28/01/2020

Excited Lepton Triplet Contributions to Electroweak Observables

Compose-IT: Unitarity for composite model and beyond in the HL-LHC era, University delgi studi di Perugia, Italy

29/01/2018

Lepton Flavor Violating Higgs Decays in Supersymmetric Seesaw Models

15th National Symposium on Frontiers in Physics, Govt. College University Lahore

15/03/2017

Effects of Sfermion Flavor Mixing in Constrained Minimal Supersymmetric Standard Model

International Scientific School (ISS 2017), National Center for Physics, Islamabad, Pakistan

31/05/2016

Quark flavor violating Higgs decay $h \rightarrow b s$ at the ILC

ECFA: Linear collider workshop 2016, Santander, Spain

25/05/2016

Flavor violating Higgs decays in Supersymmetric Models

Planck 2016, Valencia, Spain

28/11/2015

Quark Flavor Mixing in SUSY Models

13th Multidark Consolider Workshop, Madrid, Spain

26/11/2015

Flavor Mixing Phenomenology in Supersymmetric Models

LHCPheno 2015, Valencia, Spain

20/10/2014

Effects of Sfermion Mixing in Supersymmetric Models

VI CPAN Days, Seville, Spain

07/11/2013

Electroweak Precision Observables and Higgs Masses in Lepton Flavor Violating MSSM

9th Multidark Consolider Workshop, Alcala de Henares, Spain

● CONFERENCES AND SEMINARS

23/11/2015 – 28/11/2015 Madrid, Spain

IBS-MultiDark Joint Workshop on Dark Matter and 13th MultiDark Consolider Workshop

04/11/2014 – 07/11/2014 Bad Honnef, Germany

Physics Landscape after the Higgs Discovery at the LHC

11/08/2014 – 15/08/2014 Frauenchiemsee Germany

Linear Collider School 2014

11/07/2011 – 22/07/2011 Spanish Graduate School on High Energy Physics, Bilbao Spain

Taller de Altas Energias

06/07/2010 – 27/08/2010 European Organization for Nuclear Research (CERN) Geneva Switzerland

CERN Summer School for Non-member states

12/10/2009 – 30/10/2009 National Center for Physics Islamabad Pakistan

First School on LHC Physics

Santander, Spain

Higgs days at Santander

I participated in all workshops conducted from 2011 to 2015

Spain

Multidark Consolider Workshops

I participated in all workshops conducted from 2011 to 2015

● GRADUATE THESIS/DISSERTATION SUPERVISION

CURRENT

Irfanullah Salmani (MS Student)

Constraining the Singlet- Extended Standard Model Using Electroweak Precision Observables

CURRENT

Tania Malik (MS Student)

Collider Phenomenology of NJL-Type Composite Fermions

CURRENT

Nalain Zainab (MS Student)

Implementation and Validation of NJL-Type Composite Fermion Leptoquark Interactions in Monte Carlo Generators

CURRENT

Tehreem Nisa (MS Student)

Sensitivity Studies of the Higgs Decay to $Z\gamma$ at the Current and Future Colliders

CURRENT

Muhammad Adeel (PhD Student)

Course work in Progress

CURRENT

Rabish (PhD)

Course work in progress

CURRENT

Sajid Israr (PhD Student)

Phenomenological Aspects of Non-Holomorphic Soft SUSY-Breaking Terms in Supersymmetric Models

18/01/2025

Maaz Khan (MS)

Extending Gauge-Mediated Supersymmetry Breaking Via Non-Abelian Symmetries

19/01/2024

Rabish (MS Student)

Non-Holomorphic Contributions to the Two Body Gluino Decays at One-Loop Level

19/01/2024

Muhammad Adeel (MS Student)

Status of the Electroweak Precision Observables in 331 Model

19/01/2024

Kaleemullah (MS Students)

Study of Oblique Corrections to the S,T,U Parameters in Composite Fermion Models

19/01/2024

Haji Muhammad (MS Student)

Study of the Anomalous Magnetic Moment of the Muon in the Composite Fermion Models

2023

Syed Soban Tahir (MS Student)

Effects of gauge mediated supersymmetry breaking mechanism to the Higgs boson masses in the MSSM

2023

Aftab Ahmad (MS Student)

Status of the electroweak precision observables in the gauge mediated supersymmetry breaking MSSM

2023

Muhammad Awais (MS Student)

Calculation of Dark Matter Relic Density in the Non-Holomorphic Supersymmetric Standard Model

2023

Maryam Siddiqua

Study of the Correlation between $h \rightarrow \gamma \gamma$ and $h \rightarrow gg$ Decays in Non-Holomorphic Supersymmetric Standard Model

2023

Yasir Arafat (MS Student)

Higgs Sector of the Flavor Symmetry-Based MSSM: A Phenomenological Study

2022

Ali Raza (MS Student)

Neutrino Mass Generation Mechanisms: A Comparative Study

2020
Sheheryar (MS Student)

Charged Lepton Flavor Violating Decays in Inverse Seesaw Models

2020
Sehar Ajmal (MS Student)

Study of Two Body Gluino Decays at One-Loop Level in MSSM

2020
Akbar Ali (MS Student)

Heavy Scalar Tau Decays in MSSM without Flavor Mixing

2020
Hafsa Javid (MS Student)

Effect of the Quark Flavor Violation on $h \rightarrow \gamma\gamma/gg$ Decays in the Minimal Supersymmetric Standard Model

2020
Zain Ali (MS Student)

Lepton flavor violation in the B-L Supersymmetric Model

2019
Rabia Shah (MS Student)

Higgs boson mass predictions in MSSM with 11 parameters

2019
Mishel Zafar (MS Student)

Constraints on the MSSM-11 parameter space from Electroweak precision observables

2019
Junaid Ur Rehman (MS Student)

Unveil the effect of 4th generation neutrino

2019
Sadaf Naureen (MS Student)

Rare Decays in R-Parity Violating Minimal Supersymmetric Standard Model

2018
Imtiaz Ali (MS Student)

Radiative Corrections to the Higgs Boson Mass Spectrum in the Minimal Supersymmetric Standard model

2018
Narjis Bano (MS Student)

Study of Lepton Violation Within Supersymmetric Seesaw Model

2018
Imran (MS Student)

Study of Charged Lepton Flavor Violating Decays in CMSSM Extended by Type I Seesaw Mechanism

2018
Farhan Ahmad (MS Student)

Study of Excited Fermion Effects to Electroweak Precision Observables

Study of Electroweak Precision Observables in MSSM at One-Loop Level

Review of Lepton Flavor Violating Higgs Decays in Model Independent Approach

● **LANGUAGE SKILLS**

Mother tongue(s): **URDU**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1
SPANISH	A1	A1	A1	A1	A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● **RECOMMENDATIONS**

Sven Heinemeyer PhD Supervisor

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Mario E. Gomez PhD Co-Supervisor

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