

# Curriculum Vitae

## CONTACT INFORMATION:

Name: **Dr. AFAQ AHMAD**

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## PERSONAL INFORMATION:

Date of Birth: **March 15, 1970**

Place of Birth: City Kasur, Punjab, Pakistan

Citizenship: Pakistani

Sex: Male

## QUALIFICATION:

**2007** Ph. D. (Theoretical Physics), Institute of Theoretical Physics, Chinese Academy of Sciences Beijing China.

**Ph. D. Thesis Title:** Interferences in the Photo-detachment of negative ion systems

**1995** M. Phil. (Solid State Physics), CSSP Punjab University Lahore,..... **(67%) First Division M.**

**Phil. Thesis Title:** Reductive perturbation Methods and their Applications in the study of Non- linear Wave Propagation

**1991** M. Sc. (Physics), Quid-e-Azam University Islamabad, .....**(72%) First Division**

**1989** B. Sc. (Physics, Math A & B), Govt. Islamia College Civil Lines Lahore, **(73%) First Division**

**1987** F. Sc. (Pre-Engineering), Govt. Islamia College Kasur, ..... **(65%) First Division**

**1985** Metric (Science), Govt. Model High School Kasur, .....**(80%) First Division**

## **WORK EXPERIENCE:**

I have been working as a lecturer in the Punjab education department in various colleges since from 1995 to 2004. I worked as Assistant Professor in the Department of physics, COMSATS Institute of Information Technology from 2007 to 2009 and from 2009 to 2014, I worked as Assistant Professor in the Center of Excellence in Solid State Physics, University of the Punjab, Lahore Pakistan, where onward from 2014, I am working as Associate Professor. The detailed of my work experience is as under:

**1995-1996** Physics Lecturer at Govt. Post Graduate College Chakwal, Pakistan

**1996-1998** Physics Lecturer at Govt. Degree College JSK Sheikhpura, Pakistan

**1998-2001** Physics Lecturer at Govt. MAO College Lahore, Pakistan

**2001-2004** Physics Lecturer at Govt. Islamia College Kasur, Pakistan

**2004-2007** HEC PhD Scholar at the Institute of Theoretical Physics, Beijing China

**2007-2009** Assistant Professor in the Department of Physics COMSATS Institute of Information Technology Lahore, Pakistan

**2009-2014** Assistant Professor in the Center of Excellence in Solid state Physics, University of the Punjab Lahore, Pakistan.

## **AWARDS/POSITION:**

1. Merit Scholarship in B. Sc. (1987-1989)
2. Merit Scholarship in M. Sc. (1989-1991)
3. Runner up Position (Badminton) at QAU Islamabad (1989-1991)
4. Infaq Scholarship in M. Phil. (1993-1995)
5. HEC Scholarship in Ph. D. (2004-2007)
6. Research Productivity Award 2011
7. Performance based Honorarium & increment 2012
8. Performance based Honorarium & increment 2013
9. Research Productivity Award 2012
10. Research Productivity Award 2013
11. Performance based increment 2014

## COURSES TAUGHT to M. Phil and PhD Classes:

1. Semiconductor Theory
2. Defects in Solids
3. Lattice Dynamics
4. Optical Properties of Solids

## RESEARCH INTERESTS:

1. Atomic and Molecular Physics (Ion-Photon Interaction) :

The main area of research work is the photo-detachment of atomic and molecular negative ions near the interfaces. These interfaces may be insulator, dielectric or metals that induce oscillations in the total photo-detachment cross section after the removal of extra electron from the negative ion by laser polarized light. To investigate the cause of oscillations in cross section of Hydrogen negative ion near interfaces, I developed a theoretical imaging method under the supervision of Prof. Dr. Du Ming Li during my PhD research work. This method is straight forward that provides a help to find an analytical expression for total photo-detachment cross section whose asymptotic value for high energy falls back to the semi-classical closed orbit theory. I also developed a two-center model with Prof. Du Ming Li to

investigate the structural analysis of a diatomic negative ion and successfully applied it to study  $H_2^-$ . Still I am working on above research area with different negative ions and produced a number of publications in international peer reviewed

journals. Dr. Amin-ur Rehman and Dr. Muhammad Hanif from Hazara University have done their PhD research work under my co-supervision. Their PhD research titles are Photo-detachment of Linear Negative Ions Systems and Photo-detachment of negative ions near spherical surfaces respectively.

2. Material Simulation (Density Functional Theory):

Another area of research work is Density Functional Theory (DFT) calculations using Wein2K Package. A simulation Lab pertaining to this research area is working under my supervision. In this lab, Structural, electronic, magnetic and optical properties of different materials are determined using LDA, GGA and LDA+U, GGA+U techniques. Now we are going to use MBJ technique for highly correlated systems. We are succeeded to get some international publications in peer reviewed journals. Dr. Ghulam Murtaza from Hazara University and Dr. Bukhtiar Ul haq from University Technology Malaysia have completed their PhD research work under my co-supervision. Their PhD research titles are First Principles Study of Optoelectronic Properties of Cubic Perovskites and Study of doping effect of transition metals (Ni, Mn, Co, Fe, V, and Cr etc.) in ZnO respectively.

## CONFERENCES/WORKSHOPS ATTENDED:

1. Faculty Orientation Program 2009, 22-26 June 2009 held at Human Resources Development Center Institute of Administrative Sciences, University of the Punjab Lahore, Pakistan.
2. The 4<sup>th</sup> International Symposium on Quantum Optics, 3-4 August 2009 held at COMSATS Institute of Information Technology Islamabad.
3. 1<sup>st</sup> National Conference on Radiation, Particles and matter, 22-24 December 2009 held at GC University Lahore Pakistan.
4. One Day National Meeting on Nanotechnology Research in Pakistan, August 03, 2010, held at Centre of Excellence in Solid State Physics, University of the Punjab, Quid-e-Azam Campus Lahore.
5. PIP Conference-2011, 28-30 March, 2011 held at Department of Physics, University of Engineering and Technology, Lahore.
6. NUST Conference on Applications and Methods of Physics 2011, November 21-22, 2011 held at National University of Science and Technology (NUST) under Centre for Advanced Mathematics and Physics (CAMP) Sector H-12, Islamabad, Pakistan.
7. International Conference on Nanomaterial and Nano-ethics ICNN-2011, December 01-03, 2011 held at COMSATS Institute of Information Technology Lahore, Pakistan.
8. International Scientific Spring - 2012, March 05th - 09th, 2012 held at National Centre for Physics Shahdrah Valley Road, Islamabad.
9. 2<sup>nd</sup> International Workshop on Materials Modeling and Simulations (IWMMS-2012), May 21-24, 2012 held at Department of Physics, University of Malakand Chakdara, Dir, KPK.
10. One day Workshop on Laser and Nanotechnology, June 14, 2012 held at Department of Physics, UET Lahore.
11. International Conference on Condensed Matter Physics and Engineering, 27-29 Dec. 2012, held at Department of Physics, Bahauddin Zakria University Multan.
12. 3<sup>rd</sup> International Workshop on Materials Modeling and Simulations (IWMMS-2013), July 3-6, 2013 held at Department of Physics, University of Malakand Chakdara, Dir, KPK.
13. International Conference on Solid State Physics (ICSSP13), December 1-6, 2013, held at Center of Excellence in Solid State Physics, University of the Punjab Lahore.

14. International Conference on Impact of Nano-science on Energy Technologies (NanoSET 2014), March 19-21, 2014, held at Department of Physics, CIIT Lahore.
15. 2nd National Conference on Physics & emerging sciences, April 07-08, 2014, held at Allama Iqbal Open University Islamabad.
16. 5th Physics Colloquium, on November 12, 2014, held at Department of Physics, CIIT Lahore.
17. 7<sup>th</sup> International Meeting on Particles and Fields, on April 01-04, 2015, held at CHEP, University of the Punjab Lahore.
18. One Day Symposium on Nanotechnology, on April, 21, 2015, held at Department of Physics, UET Lahore
19. 3<sup>rd</sup> National Workshop on Modeling and Simulation of Materials Using Density Functional Theory, on 4-6 Nov. 2015, held at PINSTECH Islamabad.
20. International Conference on Solid State Physics (ICSSP' 15) Lahore, Dec. 13-17, 2015.
21. 8<sup>th</sup> International Meeting on Particles and Fields, on April 20-22, 2016, held at Department of Physics, COMSATS Lahore.
22. International Conference on Computational Physics, April 09, 2017, held at Department of Physics, University of Lahore.

## **SUPERVISED M. PHIL THESES:**

The following M. Phil student's theses have supervised:

### **Session 2008-2010**

1. **Sadia Ashiq** (SSP0802, PU Lahore)  
Thesis title: Bond length calculation of a diatomic anion and its classical limit using two center model.
2. **M. Asif Toseef** (SSP0810, PU Lahore)  
Thesis title: Theoretical investigation of structural and Optical properties of  $\text{Sc}_{1-x}\text{Y}_x\text{N}$ .
3. **Farooq Khan** (SSP0823, PU Lahore)  
Thesis title: Interferences in photo-detachment of Non-linear triatomic anion.

### **Session 2009-2011**

4. **Bakhtiar ul Haq** (SSP0915, PU Lahore)  
Thesis title: Characterization of Co doped ZnO based diluted magnetic semiconductors (DMS).
5. **Marayam Nawaz** (SSP0903, PU Lahore)  
Thesis title: Photo-detachment of hetero-nuclear diatomic anions near a reflecting wall.
6. **M. Hanif** (SSP0909, PU Lahore)  
Thesis title: Photo-detachment of hetero-nuclear diatomic anions using closed-orbit theory.
7. **M. Fahim Afsar** (SSP0916, PU Lahore)  
Thesis title: Analysis of Floquet Formulation of Time-Dependent Density-Functional Theory.

### **Session 2010-2012**

8. **Ayesha Amjad** (SSP1001, PU Lahore)  
Thesis Title: Photo-detachment of Hydrogen Halide Anions near a wall.
9. **Tayyiba Fiazi** (SSP1004, PU Lahore)  
Thesis title: Photo-detachment of  $\text{H}^-$  near a dielectric thin film.

**Sanober Kanwal** (SSP1013, PU Lahore)

Thesis title: Interferences in photo-detachment of a tri-atomic negative ion near a reflecting wall.

11. **Muhammad Ashraf** (SSP1019, PU Lahore)

Thesis title: Bandgap tailoring in ZnO with addition of 3d transition metal ions.

#### **Session 2011-2013**

12. **Salman Ahmad** (SSP1109, PU Lahore)

Thesis Title: Structural, electronic and magnetic properties of Cr-doped PbS alloys.

13. **Aneela Arshad** (SSP1105, PU Lahore)

Thesis Title: Structural and Optical Properties of BP, BSb, and their alloys.

14. **Farhan Shabir** (SSP1106, PU Lahore)

Thesis Title: Structural and Optical Properties of  $\text{XZrO}_3$  (X=Ba, Sr, Pb) perovskite crystals.

15. **Qandeel Fida** (SSP1107, PU Lahore)

Thesis Title: Photo-detachment spectroscopy of  $\text{H}^-$  near a dielectric slab.

16. **Ali Asad** (SSP1117, PU Lahore)

Thesis Title: Pressure dependent Structural and Optical Properties of XSe (X=Zn, Cd).

#### **Session 2012-2014**

17. **Hafsa Naz** (SSP1209, PU Lahore)

Thesis Title: Polarization-dependent photo-detachment of Hydrogen negative ion near metal surface

18. **Muhammad Saad Tariq Mirza** (SSP1212, PU Lahore)

Thesis Title: Structural and Electronic properties of cubic perovskites  $\text{XZrO}_3$  (X=Ba, Sr, Pb) under pressure: A DFT Study

19. **Ghazanfar Nazir** (SSP1213, PU Lahore)

Thesis Title: Optical Properties of cubic perovskites  $\text{XZrO}_3$  (X=Ba, Sr, Pb) under pressure: A DFT Study

#### **Session 2013-2015**

20. **Hafiza Bushra Munir** (SSP1315, PU Lahore)

Thesis Title: Structural and Magnetic Properties of  $\text{BiXO}_3$  ( $X = \text{Fe, Cr, Mn}$ )

21. **Muhammad Saad Tanvir** (SSP1311, PU Lahore)

Thesis Title: Photo-detachment Of  $\text{H}^-$  near a Non-absorbing Metal Surface

**Abdul Muteen** (SSP1323, PU Lahore)

Thesis Title: Photo-detachment of  $\text{H}^-$  in a soft microcavity

23. **Anam Lashari** (SSP1303, PU Lahore)

Thesis Title: Photodetachment of  $\text{H}^-$  in a Circular Microcavity

24. **Ariba Salah** (SSP1306, PU Lahore)

Thesis Title: Influence of a Gradient Electric Field on  $\text{H}^-$  : A semi-classical Description

25. **Maryam Ajmal** (SSP1301, PU Lahore)

Thesis Title: Photodetachment Cross Section of Hydrogen Negative Ion below Threshold Energy

26. **Rafia Ifikhar** (SSP1302, PU Lahore)

Thesis Title: Semi-classical description of Fullerene  $\text{C}_{60}$  and Metallic Clusters

Co-supervised the following M. Phil student's theses:

27. **Mr. M Musharaf Ansari** (CHEP, PU, Lahore), thesis title: Photo-detachment of  $\text{H}^-$  near an elastic wall using theoretical imaging method (2009).

28. **Mr. Azmat Iqbal** (CHEP, PU, Lahore), thesis title: Photo-detachment of  $\text{H}^-$  near an elastic wall using closed orbit theory (2009).

#### Session 2015-2017

29. **Abu Bakar (SSP)**

Thesis Title: First Principles Study of Elastic and Mechanical Properties of  $\text{AlZr}_3$ ,  $\text{AlCu}_3$ , and  $\text{AlCu}_2\text{Zr}$

#### Session 2013-2015

30. **Bilal Adeel Kazmi** (SSP1305, PU Lahore)

Thesis Title: Structural and Electronic Properties of  $\text{Zn}_{1-x}\text{Cd}_x\text{Se}$

Supervising the following M. Phil student's theses:



## Session 2015-2017

31. Ameer Hamza (SSP 1501)
32. Kiran Sijawal (SSP 1516)
33. M. Rizwan (SSP 1519)
34. Shafaq Naseer (SSP 1503)
35. Shaista Itefaq (SSP 1507)

### **SUPERVISING Ph. D. THESES:**

1. **Aneeza Iftikhar** (PHD1303) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)  
Thesis title: **DFT CALCULATIONS of Ru AND Rh BASED HEUSLER ALLOYS**
2. **Najam Ul Arfeen** (PHD1403) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)  
Thesis Title: **Theoretical investigations of thermodynamic properties of Cd substituted Zn-Chalcogenides**
3. **Ariba Salah** (PhD1504) ) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)
4. **Hafiza Bushra Munir** (PhD1605) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)
5. **Muhammad Aamir Iqbal** (PhD1606) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)
6. **Maryam Ajmal** (PhD1702) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)
7. **Abu Bakar** (PhD1704) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)
8. **Muhammad Saad Tariq Mirza** (PhD1708) ( Center of Excellence in Solid State Physics, University of the Punjab Lahore Pakistan)

Co-Supervised Ph. D. Students:

9. **Ghulam Murtaza** (03-01-2012) (Department of Physics, Hazara University, Pakistan) Thesis Title: **First Principles Study of Optoelectronic Properties of Cubic Perovskites**
10. **Amin-ur-Rehman** (13-06-2012) (Department of Physics, Hazara University, Pakistan)  
Thesis Title: **Photo-detachment of Linear Negative Ions Systems**
11. **Muhammad Hanif** (Department of Physics, Hazara University, Pakistan) (2015) Proposed Thesis Title: **Photo-detachment of negative ions near spherical surfaces**
12. **Bukhtiar Ul Haq** (Department of Physics, University Technology Malaysia (UTM)) (2015)  
Proposed Thesis Title: **Study of doping effect of transition metals (Ni, Mn, Co, Fe, V, and Cr etc.) in ZnO.**

Co-Supervising Ph. D. Students:

13. **Marryam Nawaz** (Department of Physics, University of the Punjab Lahore Pakistan)

### **PROFESSIONAL QUALIFICATIONS:**

MS World, WinEdt, Matlab, Mathematica, Origin

### **PROFESSIONAL MEMBERSHIPS:**

1. A life member of KSS (Khwarzimid Science Society),
2. A life membership PIP (Pakistan Institute of Physics).
3. A life membership and Secretary of SMSE (Society of Materials Science and Engineering)

## REFERENCES:

1. Prof. Dr. Du Ming Li, Institute of theoretical Physics, the Chinese Academy of Sciences, Beijing 100080, China.  
E-mail Address: [duml@itp.ac.cn](mailto:duml@itp.ac.cn)
2. Prof. Dr. Iftikhar Ahmad, Department of Physics, Malakan University KPK, Pakistan. E-mail Address: [ahma5532@gmail.com](mailto:ahma5532@gmail.com)