

# MUHAMMAD MAQBOOL

## **Current Position:**

Associate Professor (with tenure) of Physics & Health Physics and Associate Director of Health Physics Program, University Of Alabama at Birmingham, USA.  
E-mail: mmaqbool@uab.edu  
mmaqbool@gmail.com

## **Citizenship:**

Citizen of the United States of America.

## **Education:**

1. Ph.D (2005): Experimental Condensed Matter Physics. Ohio University, USA.
2. M.S. (2003): Experimental Condensed Matter Physics, Ohio University USA.
3. M.S. (1998): Medical and Radiation Physics, University of Birmingham, UK.
4. B.S. (1994): Physics, the University of Peshawar, Pakistan.

## **Academic Appointments:**

1. 05/2017 – Present: **Associate Professor of Physics & Health Physics, and Associate Director of Health Physics Program, the University of Alabama at Birmingham, USA.**  
*Promotion to the Full Professor rank is due next year.*
2. 08/2013 – 05/2017: Associate Professor of Physics & Astronomy, Ball State University, USA.
3. 08/2010 – 05/2017: Director, Optics & Photonics Research group, Ball State University, USA.
4. 08/2008 – 05/2017: Coordinator Medical Physics program, Ball State University, USA.
5. 09/2013 – 08/2014: Associate Professor and Associate Director of Materials Science & Technology Program, Qatar, University, Qatar.
6. 08/2008 – 08/2013: Assistant Professor of Physics, Ball State University, USA.
7. 08/2005 – 07/2008: Assistant Professor of Physics, University of Mount Olive, North Carolina, USA.
8. 08/2006 – 08/2008: Director, Pre-Engineering program, University of Mount Olive, North Carolina, USA.

### **Patents and Inventions:**

1. Patent achieved for inventing “Titanium doped aluminum nitride infrared microlaser on optical fiber”. **Patent # US 9,515,447 B2**.
2. Invented the smallest size semiconductor ring laser (SRL) reported by the Wikipedia (online encyclopedia). [http://en.wikipedia.org/wiki/Semiconductor\\_ring\\_laser](http://en.wikipedia.org/wiki/Semiconductor_ring_laser)

### **Grants Funded:**

1. Travel and facilities grant for faculty and students research and field trip to Oak Ridge National Laboratories, Tennessee, USA, 2017. Amount funded US\$9000.00
2. Transmission Electron Microscope for Interdisciplinary Research and Semiconductors characterization. National Science Foundation Grant 2011. Amount funded **\$497000.00**.
3. Transfer Functions, Build-up factors and Mass attenuation coefficients of MCP-69 alloy and Wax, for their use in radiation oncology and health physics. Indiana Academy of Science Grant 2009. Amount funded **\$3000**.
4. Growth, and characterization of AlN:Pr and AlN:Ho thin films. Nanohmic Grant 2004. Amount funded **US\$37000.00**.
5. Book chapter on ‘Cathodoluminescence of amorphous and nanocrystalline materials’. BSU Publications and Intellectual Properties Committee Funding 2012. Amount funded **\$400.00**
6. Build-up Factor and Linear Attenuation Coefficient and other properties of MCP alloys and wax for radiation shielding and protection. Qatar University Internal Grant 2013. Amount Funded: **\$40000.00**.
7. Light emission from nanoparticles and quantum wells for high efficiency optical devices and biomedical applications. Qatar University Internal Grant 2014. Funded amount \$12000.

### **Grants Submitted / Under Review:**

1. Buildup Factors of Tin Alloys for radiation shielding and protection and ultraviolet emission from AlN:Gd thin films for radiation detection and tissue safety purposes. Submitted to NRC. Amount requested: \$300,000.00
2. Graphene Oxide nanotubes in making glucose biosensors. Submitted to American Diabetes Association. Amount requested: \$595,000.00
3. Students Scholarships for program development. Submitted to NRC. Amount requested: \$200,000.00

### **Awards:**

1. Commonwealth Scholarship in 1997-98 for Master degree in Medical and Radiation Physics, from the University of Birmingham, UK.
2. Merit Scholarships on B.Sc and M.Sc levels at the University of Peshawar, Pakistan.
3. Teaching / Research Assistant at Ohio University, USA.
4. Recipient of University “Gold Medal” in M.Sc in 1993 from the University of Peshawar.
5. Certificate of best organizer of Science Fair, July 1999, University of Peshawar, Pakistan.

### **Distinctions:**

1. “ First Rank” in the University and State in B.S degree ( M.Sc in Pakistan ) from the Department of Physics University of Peshawar, Pakistan.
2. Recipient of Commonwealth Award, based on a competition amongst 52 commonwealth Countries.

### **Doctoral Dissertation committee member:**

1. **2018 - Present:** Doctoral Committee member of Shova Subedi, doctoral student in the department of Physics, at the University of Alabama at Birmingham, USA.  
**Dissertation:** Optical Physics – Laser matter interaction.
2. **2013 – 2016:** Doctoral Committee member of Khurram Shehzad, doctoral student at Leipzig University, Germany.  
**Dissertation title:** Structural health stability and stress monitoring by ultrasound.
3. **2013-2017:** Doctoral Committee member of Mustafa Harb, doctoral student at Ball State University, USA.
4. **2010 – 2015:** Doctoral Committee member of Tahirzeb Khan, graduated with a Ph.D. degree from Jacobs University, Germany.  
**Dissertation title:** Ultrafast laser spectroscopy in combination with scanning near field microscopy (SNOM).
5. **2009 – 2015:** Member and Departmental representative on the doctoral committee of Barbara Fennell (Graduated with Doctoral degree).
6. **2008 – 2011:** Co-advisor of Doctoral candidate, Bin Amin, graduated with Ph.D. degree from Hazara University, Pakistan.

### **Reviewer of Doctoral Dissertation:**

<b>Year</b>	<b>Name</b>	<b>Affiliations</b>	<b>Dissertation Title</b>
<b>2018</b>	Afshan Ashraf	Pakistan Institute of Engineering & Applied Sciences (PIEAS)	Study of Carbon Coating on Different Metallic Substrates with Respect to Hybridization.
<b>2016</b>	Khurram Shahzad Tarar	University of Leipzig Germany	Structural health stability and stress monitoring by ultrasound.
<b>2016</b>	Hazrat Ali	University of Malakand Pakistan	The effect of Kerr nonlinearity, Doppler broadening and spontaneous generated coherence on slow light propagation
<b>2015</b>	Tahirzeb Khan	Jacobs University, Germany	Femtosecond Time-resolved Exciton Dynamics and Non-linear Imaging with Sub-wavelength Resolution in Organic Semiconductors
<b>2014</b>	M. Haneef	Hazara University Pakistan	Photodetachment of negative ions near a surface

<b>2014</b>	F. Ali	Pakistan Institute of Engineering and Applied Science (PIEAS).	Corrosion resistant Zr-based nitride alloys fabrication.
<b>2014</b>	Z. Rahman	PIEAS	Internal Radiation Dosimetry of Human Organs Impedance Spectroscopy of Nano-porous Anodic Alumina Structures.
<b>2014</b>	M. Tahir	PIEAS	
<b>2013</b>	Z. Ali	Hazara University	Structural & magnetic Properties of cubic Perovskites by DFT.
<b>2011</b>	N. Ali	PIEAS	Study of Aerosol Deposition Rates using $^{210}\text{Pb}$ , $^{137}\text{Cs}$ and $^7\text{Be}$ inventories in soil.
<b>2011</b>	G. Murtaza	Hazara University	Optoelectronic properties Of cubic Perovskites.

### **Chairperson of Master's Degree Thesis committees:**

<b>Year</b>	<b>Name</b>	<b>Area of Research</b>
2017	Manar Alenezi	Medical & Health Physics
2015	Khattar. Al-Shammari,	Medical & Health Physics.
2015	Abbas. M. Jammali	Medical Physics
2014	Amani. Al-Ruwaili	Condensed Matter Physics
2014	Kent Bayens	Medical & Health Physics
2013	Ismail Balagoon	Condensed Matter Physics
2012	Krysta White	Condensed Matter Physics
2012	Joshua Clark	Medical Physics
2011	Lynda Wilkinson	Biophotonics
2010	Tyler Corn	Condensed Matter Physics
2010	Deidre N. Hopkins	Medical & Health Physics

### **Member of Master's Degree Thesis Committees:**

2016	Albert DiBenedetto	Condensed Matter Physics
2016	Scott Whitsitt	Physics Education
2015	Spencer Young	Condensed Matter Physics
2012	Eduardo Beltran	Biomechanics
2012	Sadeq Malakooti	BiopPhysics
2012	Imendra Ranatunga	Biomedical Physics
2012	Vida Teye	Biomedical Physics
2012	Dale Igram	Biophysics
2011	Christopher Wagner	BioPhysics
2010	Brian Dolasinski	Biohysics.
2010	Sunhee Lee	Biophysics
2010	Seth Ross	Condensed Matter Physics.

## **Research paper/creative project adviser**

### **Mentor of Undergraduate students:**

2017	Kayla Stinson	Medical & Health Physics
2015	Dunja Milinovic	Condensed Matter Physics
2012	Barak Pauley	Photonics
2012	Andrew Burk	Condensed Matter Physics
2011	Casey Whittern	Biomedical Physics
2010	Kyle Main	Laser Physics & Photonics
2010	Michael Gebs	Condensed Matter Physics
2010	Guy Crowder	Biomedical Physics
2009	Evan Wilson	Photonics

## **Books and Chapters:**

1. Book's Title: **Cathodoluminescence**  
ISBN # **979-953-307-319-3**  
Chapter's Title: **Cathodoluminescence from Amorphous and Nano-crystalline Nitride and Oxide Thin Films Doped with Rare Earth and Transition Metals**  
Link: <http://www.intechopen.com/books/cathodoluminescence>
2. Book's Title: **An Introduction to Medical Physics**  
ISBN # **978-3-319-61540-0**  
Role: Editor and Author  
Contribution: Contributed 5 chapters  
Link: <http://www.springer.com/us/book/9783319615387>

## **Publications:**

### **2018:**

1. M. Alenezi, K. Stinson, **M. Maqbool** and N. Bolus, Klein-Nishina electronic cross-section, Compton cross sections, and buildup factor of wax, for radiation shielding and protection, Journal of Radiological Protection, Vol. 38, 372 – 381 (2018).
2. S. Akhtar, **M. Maqbool et al**, Toxicity of PEG coated CoFe<sub>2</sub>O<sub>4</sub> nanoparticles with treatment effect of curcumin, Nanoscale Research Letters 13, 52 (2018).
3. S. Khan, G. Rehman, I. Ahmad, C. Franchini, B. Amin, **M. Maqbool**, Type-II Band Alignment and Schottky Contact in Van Der Waals Heterostructure of MXenes (Mo<sub>2</sub>CX<sub>2</sub> and

WCX<sub>2</sub> with X=O, F), Physical Chemistry Chemical Physics 20 (37); 24168 – 24175 (2018).

4. G. Rehman, B. Amin, I. Ahmad and **M. Maqbool**, Intriguing Electronic Structure and Optical Properties of Two-dimensional van der Waals Heterostructures of Zr<sub>2</sub>CT<sub>2</sub> (T= O, F) with MoSe<sub>2</sub> and WSe<sub>2</sub>. Journal of Materials Chemistry-C, Vol. 6 (11), 2830-2839 (2018).
5. **M. Maqbool**, A. Alruwaili, D. Milinovic, T. Khan, I. Ahmad and G. Ali, Structural analysis, thermal stability and infrared emission from AlN:Tm thin films. Under review in Journal of Alloys & Compounds.
6. M Naeem, Q. A. Naqvi, M. S. Amber Kanwal, S. Qaseem, M. Shafeeque, S. R. Ali, and **M. Maqbool**, Size dependent disinfection of bacterial growth by chemically engineered spherical ZnO nanoparticles. Accepted in Journal of Biological Physics.

### **2017:**

7. S. Qaseem, M. Naeem, S. Rizwan Ali, M. Maqbool & S. Imran Ali, Tunable High-TC ferromagnetism in Sn<sup>4+</sup>-doped (InFe<sub>0.04</sub>)<sub>2</sub>O<sub>3</sub> nanoparticles: a vital role of electron doping, Materials Technology Advanced Performance Materials, Vol. 32(5), 327-333 (2017).
8. M. Ahmad, G. Rehman, L. Ali, M. Shafiq, R. Iqbal, R. Ahmad, T. Khan, S. Jalali-Asadabadi, M. Maqbool, and I. Ahmad, Structural, electronic and optical properties of CsPbX<sub>3</sub> (X=Cl, Br, I) for energy storage and hybrid solar cell applications, Journal of Alloys and Compounds, Vol. 705(25), 828-839 (2017).

### **2016:**

9. G. Rehman, M. Shafiq, Saifullah, H. Rahnamaye-Aliabad, **M. Maqbool** and I. Ahmad, Electronic Band Structures of the Highly Desirable III–V Semiconductors: TB-mBJ DFT Studies, Journal of Electronic Materials, Vol. 45, page 3314 (2016).

### **2015:**

10. **Muhammad Maqbool**, Iftikhar Ahmad, Ghafar Ali and Khan Maaz, Energy level splitting and luminescence enhancement in AlN:Er by an external magnetic field, **Optical Materials**, Vol. 46, 601-604 (2015).
11. **Muhammad Maqbool**, Ghafar Ali and Iftikhar Ahmad, Luminescence Enhancement in Amorphous AlN:W by Direct UV Excitation through Co-Doped Gadolinium. **IEEE Photonic Technology Letters**, Vol. 27, Issue 14, 1519 – 1522 (2015).
12. **M. Maqbool**, K. Main and I. Ahmad, Structural analysis and infrared emission from AlN:Ti doped on silicon substrate and optical fibers, **Journal of Low Temperature Physics**, Vol. 179, 365-374 (2015).

13. N. Adeelaa, K. Maaz, U. Khan, S. Karim, M. Ahmad, M. Iqbal, S. Riaz, X.F. Han, *M. Maqbool*, Fabrication and temperature dependent magnetic properties of nickel nanowires embedded in alumina templates, **Ceramic International**, Vol 41, Issue 9, 12081-12086 (2015).
14. Muhammad Hussain, Maaz Khan, Hongyu Sun, Adeela Nairan, Shafqat Karim, Amjad Nisar, *M. Maqbool*, Mashkooor Ahmad, Fabrication and temperature dependent magnetic properties of NiCu-Co composite Nanowires. **Physica B: Condensed Matter**, Vol. 475, 99-104 (2015).
15. M. Shafiq, S. Arif, I. Ahmad, S. J. Asadabadi, *M. Maqbool*, and H.A. R. Aliabad, Elastic and mechanical properties of lanthanide monoxides, **Journal of Alloys and Compounds**, Volume 618, 292-298 (2015).
16. B. Khan, H. R. Aliabad, N. Razghandi, *M. Maqbool*, S. Asadabadi, and I. Ahmad, Structural and thermoelectric properties of pure and La, Y doped HoMnO<sub>3</sub> for their use as alternative energy materials. **Computer Physics Communications**, Vol. 187, 1-7 (2015).
17. I. Ahmad and *M. Maqbool*, Thermoelectric Properties of Metallic Antiperovskites AXD<sub>3</sub> (A=Ge, Sn, Pb, Al, Zn, Ga; X=N, C; D=Ca, Fe, Co), **Electronic Materials Letters** Volume 11 (3), 466-480 (2015).
18. Muhammad Usman, M. Naeem, Najam ul Hassan, *Muhammad Maqbool*, Iftikhar Ahmad, Ishaq Ahmad, Zahid Hussain, Structural, optical, and electrical characteristics of AlN:Ho thin films irradiated with 700 keV protons. **Applied Surface Science**, Vol. 357, 179-183 (2015).
19. J. Duan, S. Lyu, H. Yao, D. Mo, Y. Chen, Y. Sun, K. Maaz and *Muhammad Maqbool*; Jinglai Duan; Shuangbao Lyu; Huijun Yao; Dan Mo; Yonghui Chen; Youmei Sun; Khan Maaz; Jie Liu, Controlled structure of electrochemically deposited Pd nanowires in ion-track templates, **Nanoscale Research Letters**, Vol. 10 (1), 1-6 (2015).
20. Imad Khan Iftikhar Ahmad, H.A. Rahnamaye Aliabad, M. Maqbool, DFT-mBJ Studies of the Band Structures of the II-VI Semiconductors. *Materials Today: Proceedings*, Vol. 2, Issue 10, part B, 5122 – 5127 (2015).
21. M. Naeem, S. Qaseem, S. R. Ali, and *M. Maqbool*, Tunable High-T<sub>C</sub> Ferromagnetism in Sn<sup>4+</sup> doped (InFe<sub>0.04</sub>)<sub>2</sub>O<sub>3</sub> Nanoparticles: A Vital Role of Electron Doping. Submitted to **ACS Applied Materials & Interfaces**.

## 2014:

22. M. Bilal, B. Khan, H. A. R. Aliabad, M. Maqbool, S. J. Asadabadi, I. Ahmad, Thermoelectric properties of SbNCa<sub>3</sub> and BiNCa<sub>3</sub> for thermoelectric devices and alternative energy applications. **Computer Physics Communications** 185, Issue 5, 1394–1398 (2014).

23. I. Ahmad and *M. Maqbool*, Investigation of the optical properties of P, As and Sb incorporated AlGaX alloys using full potential linearized augmented plane wave method. **Computer Physics Communications**, Vol. 185, Issue 11, 2829-2833, (2014).

**2013:**

24. Ghafar Ali and *Muhammad Maqbool*, Fabrication of cobalt-nickel binary nanowires in a highly ordered alumina template via AC electrodeposition. **Nanoscale Research Letters**, Vol. 8, 352 (2013).

25. I. Khan, I. Ahmad, H.A.R. Aliabad, S.J. Asadabadi, Z. Ali and *M. Maqbool*, Conversion of optically isotropic to anisotropic  $\text{CdS}_x\text{Se}_{1-x}$  ( $0 \leq x \leq 1$ ) alloy with S concentration. **Computational Materials Science**, Vol 77, 145-152 (2013).

**2012:**

26. M. Naeem, I. Ahmad and *M. Maqbool*, Effect of size reduction on the electronic and ferromagnetic properties of the  $\text{In}_2\text{O}_3$  Nanoparticles. **Journal of Nanoparticles Research** 14: 808 (2012).

27. I. Khan, I. Ahmad, H. A. R. Aliabad and *M. Maqbool*, Effect of phase transition on the optoelectronic properties of the  $\text{Zn}_{1-x}\text{Mg}_x\text{S}$ . **Journal of Applied Physics** Vol. 112, 073104 (2012).

28. G. Murtaza, B. Amin, S. Arif, *M. Maqbool*, I. Ahmad, A. Afaq, S. Nazir, M. Imran, M. Haneef, Structural, electronic and optical properties of  $\text{Ca}_x\text{Cd}_{1-x}\text{O}$  and its conversion from semimetal to wide bandgap semiconductor, **Computational Materials Science** 58, 71–76 (2012).

29. S. Arif, I. Ahmad, B. Amin and *M. Maqbool*, Robust Half-Metallicity of AlCoN and AlNiN, **International Journal of Quantum Chemistry** 112, 2668–2674 (2012).

30. S. Arif, B. Amin, I. Ahmad, *M. Maqbool*, R. Ahmad, M. Haneef and N. Ikram, Investigation of half metallicity in Fe doped CdSe and co-doped CdSe materials, **Current Applied Physics**, Vol 12, issue 1, pages 184-187, January 2012.

31. Deidre N. Hopkins, *Muhammad Maqbool* and Mohammed S. Islam, Linear attenuation coefficient and buildup factor of MCP-96 alloy for dose accuracy, beam collimation, and radiation protection, **Radiological Physics and Technology** 5, 229 – 236 (2012).

32. W. Muhammad, S. H. Lee, K. Alam, *M. Maqbool*, and G. Khan, Dose non-linearity of the dosimetry system and possible monitor units error on medical linear accelerators used in conventional and radiation-modulated radiation therapy, **Nuclear Technology & Radiation Protection** Vol. 27, No. 4, 368-373 (2012).

33.F. Ahmad, *M. Maqbool*, E. Kim, H. Park, and D. Kim, An efficient method for effective connectivity of brain regions, **Concepts in Magnetic Resonance Part-A**, Vol. 40 A(1), 14-24 (2012).

## 2011:

34.B. Amin, I. Ahmad, *M. Maqbool*, S. Goumri-Said, R. Ahmad, Ab-initio study of the bandgap engineering of  $Al_{1-x}Ga_xN$  for optoelectronic applications, **Journal of Applied Physics**, Vol 109, Issue 2, 023109-023113 (2011).

35.G. Murtaza, Iftikhar Ahmad, *M. Maqbool*, H. A. Rahnamaye Aliabad and A. Afaq, Structural and Optoelectronic Properties of Cubic  $CsPbF_3$  for Novel Applications, **Chinese Phys. Lett.** 28 117803 (2011).

36.Z. Ali, I Ahmad, B. Amin, M. Maqbool, G. Murtaza, I. Khan, M.J. Akhtar, and F. Ghaffor, Theoretical studies of structural and magnetic properties of cubic perovskites  $PrCoO_3$  and  $NdCoO_3$ , **Physica B**, Volume 406, 3800–3804 (2011).

37.B. Amin, S. Arif, Iftikhar Ahmad, *M. Maqbool*, R. Ahmad, S. Goumri-Said and K. Prsbrey, Cr-Doped III–V Nitrides: Potential Candidates for Spintronics, **Journal of Electronic Materials**, Volume 40, Number 6, 1428 – 1436 (2011).

38.G. Murtaza, I. Ahmad, B. Amin, A. Afaq, *M. Maqbool*, J. Maqsood, I. Khan, M. Zahid, Investigation of structural and optoelectronic properties of  $BaThO_3$ , **Optical Materials**, Volume 33, Issue 3, 553-557 (2011).

39.Fayyaz Ahmad, *Muhammad Maqbool*, and Namgil Lee, Regularization of Voxelwise Autoregressive Model for Analysis of Functional Magnetic Resonance Imaging Data, **Concepts in Magnetic Resonance part-A**, Volume 38A, Issue 5, 187-196 (2011).

40.W. Muhammad, *M. Maqbool* et. al. “Assessment of Computerized Treatment Planning System Accuracy in calculating Wedge Factors of Physical Wedged Fields for 6 MV photon beams”. **Physica Medica**, Volume 27, 135-143 (2011).

## 2010:

41.*Muhammad Maqbool*, Kyle Main and Martin E. Kordesch, Titanium doped sputter deposited AlN infrared whispering gallery mode microlaser on optical fibers, **Optics Letters** Vol. 35, issue 21, 3637-3639 (2010).

42.*Muhammad Maqbool* and Tyler Corn, Optical spectroscopy and energy transfer in amorphous AlN doped Erbium and Ytterbium ions for applications in laser cavities, **Optics Letters**, Vol. 35, Iss. 18, pp. 3117–3119 (2010).

43.*M. Maqbool*, G. Ali, S. O. Cho, I. Ahmad and M. E. Kordesch, Nanocrystals formation and

intense green emission in the thermally annealed AlN:Ho films for microlaser cavities and photonic applications. **Journal of Applied Physics Vol. 108, Issue 4, 043528-043532 (2010).**

44. W. Muhammad, **M. Maqbool** et. al. Assessment of Computerized Treatment Planning System Accuracy in calculating Wedge Factors of Physical Wedged Fields for 6 MV photon beams. **Physica Medica: European Journal of Medical Physics, Volume 27, 135-143, 2010.**
45. **M. Maqbool**, E. Wilson, J. Clark, I. Ahmad and A. Kayani, "Luminescence from Cr<sup>+3</sup> doped AlN films deposited on optical fiber and silicon substrates for use as waveguides and laser cavities", **Applied Optics, Vol. 49, issue 4, 653 – 657 (2010).**
46. Bin Amin, Iftikhar Ahmad, and **M. Maqbool**, "Conversion of direct to indirect bandgap and optical response of B substituted InN for novel optical devices applications", **Journal of Lightwave Technology Volume 28, Issue 2, 223 – 227 (2010)**
47. G. Ali, M. Ahmad, J. I. Akhter and S. Karim, **M. Maqbool**, S. Yang, and K. Maaz, "Characterization of cobalt nanowires fabricated in anodic alumina template through AC electrodeposition", **IEEE Transactions on Nanotechnology, Vol. 9, Issue 2. 223-228 (2010).**
48. D. Hopkins and **M. Maqbool**, Electron polarization and photoluminescence of sputtered AlN:Sm thin films for optoelectronics and photonics applications, **Journal of Nanoelectronics and Optoelectronics, Vol. 5, 1 – 4 (2010).**
49. Bin Amin, Iftikhar Ahmad, **Muhammad Maqbool**, Nazma Ikram, Yasir Saeed and Afaq Ahmad, Generalized gradient calculations of structural, electronic and optical properties of Mg<sub>x</sub>Cd<sub>1-x</sub>O oxides, **Journal of Alloys and Compounds Vol. 493, 212-218 (2010).**
50. Ghafar Ali, Maqsood Ahmad, Javed Iqbal Akhter, **Muhammad Maqbool** and Sung Oh Cho: Novel structure formation in porous anodic alumina fabricated by single step anodization process, **Micron 41, 560–564 (2010).**
51. K. Maaz, S. Karim, M. Usman, A. Mumtaz, J. Liu, J.L. Duan, **M. Maqbool**, Effect of crystallographic texture on magnetic characteristics of cobalt nanowires, **Nanoscal Research Letters, Volume 5, Issue 7, 1111-1117 (2010).**

## **2009:**

52. **Muhammad Maqbool**, Wazir Muhammad, Muhammad Shahid, Misbah Ahmad, Matiullah Matiullah, Accuracy checks of physical beam modifier factors algorithm used in computerized treatment planning system for a 15MV photon beam, **Reports of Practical Oncology and Radiotherapy 14, 214–220 (2009).**
53. **M. Maqbool**, B. Amin and I. Ahmad, 'Bandgap Engineering of In<sub>x</sub>Al<sub>1-x</sub>N and the effect of In And Al concentration on its optical properties", **Journal of the Optical Society of America-B, Vol. 26, Issue 11, 2180-2184 (2009).**

54. **Muhammad Maqbool**, Martin. E. Kordesch, and A. Kayani, ‘Enhanced Cathodoluminescence from an amorphous AlN:Holmium phosphor by co-doped Gd<sup>3+</sup> for optical devices applications, **Journal of the Optical Society of America-B**, Vol. 26, Issue 5, 998-1001 (2009).
55. **M. Maqbool** and Iftikhar Ahmad, Ultraviolet Spectroscopy of Praseodymium doped in AlN and the use of Gallium Nitride, as ultraviolet filters in radiation shielding and protection, **Current Applied Physics**, 9, (2009) 234-237.
56. **M. Maqbool** , H. H. Richardson and Martin E. Kordesch, Electron penetration depth in amorphous AlN by exploiting the luminescence of Ho and Tm ions added to AlN, **Current Applied Physics** 9, 417-421 (2009).
57. **M. Maqbool** and T. Ali, Intense red catho- and photoluminescence from 200 nm thick Samarium doped amorphous AlN thin films for nano-devices applications’ **Nanoscale Research Letters**’ Vol. 4, No. 9, 748-752 (2009).
58. A. Kayani, A. Moore, M.I. Nandasiri, S. AlFaify, E. Garratt, X. Gao, D. C. Ingram and **M. Maqbool**, “Effect of bias and hydrogenation on the elemental concentration and the thermal stability of amorphous carbon thin films, deposited on Si substrate”, **Diamonds and related materials**, Vol. 18, Issue 11, 1333 – 1337 (2009).

## 2007:

59. **M. Maqbool**, I. Ahmad, H. H. Richardson and M. E. Kordesch, Direct ultraviolet excitation of an amorphous AlN:Praseodymium phosphor by co-doped Gd<sup>3+</sup> Cathodoluminescence, **Appl. Phys. Lett.** **91**, 193511 (2007).
60. **M. Maqbool**, H. H. Richardson and M. E. Kordesch, Effect of material structure and thermal activation on the luminescence of praseodymium doped AlN thin films deposited by RF magnetron sputtering, **Journal of Material Science**, **Vol. 42, Number 14, 5657-5660 (2007)**.
61. **M. Maqbool** and Iftikhar Ahmad, Spectroscopy of gadolinium ion and disadvantages of gadolinium impurity in tissue compensators and collimators, used in radiation treatment planning, **Spectroscopy**, **Vol. 21, No. 4, 205 – 210 (2007)**.

## 2006:

62. **M. Maqbool**, Luminescence from Thulium and Samarium doped amorphous AlN thin films deposited by RF magnetron sputtering and the effect of thermal annealing on luminescence. **Eur. Phys. J. Appl. Phys.** **34**, 31-34 (2006).
63. S.B.Aldabergenova, G.Frank, H.P.Strunk , **M. Maqbool**, H.H.Richardson, M.E.Kordesch Structure Changes of AlN:Ho Films with Annealing and Enhancement of the Ho<sup>3+</sup> Emission,

**Journal of Non-Crystalline Solids, Vol. 352, 1290-1293 (2006).**

64. *M. Maqbool* and Tahirzeb Khan, Atomic force microscopy and X-rays analysis of silver films deposited by thermal evaporation, **International Journal of Modern Physics-B, Vol. 20, No. 2, 217-231(2006).**

**2005:**

65. *M. Maqbool* and Tahirzeb Khan, Atomic force microscopy and grain-size calculation of silver films deposited by thermal evaporation, **Surface Review and Letters, Vol.12, No. 5-6, 759 (2005).**

66. *M. Maqbool*, H. H. Richardson and M. E. Kordesch, "Cathodoluminescence of Praseodymium doped amorphous AlN, GaN and turbostratic BN ". **Mater. Res. Soc. Symp. Proc. Vol. 831 Article E8.12.1, @2005 Materials Research Society.**

**2004:**

67. *M. Maqbool*, H.H. Richardson, P.G. Van Patten and M.E. Kordesch, "Luminescent Holmium doped amorphous AlN thin films for use as waveguides and laser cavities", **Mat. Res. Soc. Symp. Proc. Vol. 798, pp 8.5.1-8.5.5, 2004 Materials Research Society.**

68. *M. Maqbool*, "Determination of Transfer Functions of MCP-200 alloy using 6 MV photon beam for beam intensity modulation", **Journal of Mechanics in Medicine & Biology Vol. 4 3, 305-310 (2004).**

## **Courses Taught**

### ***Graduate Level.***

1. Quantum Mechanics.
2. Physical Optics.
3. Physical Optics Laboratory.
4. Thermal Physics & Statistical Mechanics.
5. Mathematical Methods for Physicists.
6. Electromagnetic Theory.
7. Nanotechnology and Advanced Characterization Techniques
8. Thermodynamics of Materials
9. Materials for Radiation Technology
10. Materials Principles and Characterization
11. Materials Science
12. Research Methodology in Materials Science
13. Non-Ionizing Radiation
14. Advanced Radiation Biology
15. Principles of Health Physics

16. Principles of Radiation Dosimetry
17. Medical Physics-I (Radiation Oncology and Radiation Dosimetry and shielding).
18. Medical Physics-II (Diagnostic Radiology, Biophotonics and Health Physics)

### ***Undergraduate Level.***

1. Materials Science
2. Electromagnetic Theory.
3. Introduction to Quantum Mechanics.
4. Mathematical Methods for Physicists.
5. Applied Physics (Semiconductors and Photonics)
6. Modern Physics.
7. Thermodynamics and Statistical Mechanics.
8. Solid State Physics
9. Nuclear and Radiation Physics.
10. Biomedical Physics.
11. Solid State Physics laboratory
12. Optics and Spectroscopy laboratory.
13. Nuclear & Radiation Physics laboratory.

### ***Introductory Level.***

1. Introductory Physics for Teachers.
2. University Physics-I ( with laboratory)
3. University Physics-II ( with laboratory)
4. Calculus based College Physics.
5. Algebra based College Physics.
6. Radiation Physics-I
7. Radiation Physics-II
8. Introductory Astronomy.
9. Numerical problems in College Physics.
10. College Algebra
11. Contemporary Mathematics
12. Introduction to Environmental Sciences

### **Online Courses**

1. Developed and taught online course ‘Physics of Medical Imaging’ at the University of Alabama at Birmingham.
2. Taught online course “College Physics (algebra based)’ at Ball State University.
3. Developed and taught online course “Introductory Physics” at University of Mount Olive.

### **Computer Skills**

1. C++

2. Microsoft World.
3. Microsoft Excel.
4. Power Point.
5. Origin 8.

**Administrative, and Non-Academic Appointments:**

1. 05/2017 – Present: Associate Director of Master of Science in Health Physics Program at the University of Alabama at Birmingham (UAB). In charge of all matters including, curriculum development, students recruitment, collaboration and communication with other institute to grow program, discussing budgeting matters with department's chair, program assessment and others.
2. 09/2014 – Present: Reviewer, National Grants Proposals in Science & Technology for the Republic of Kazakhstan.
3. 03/2012 – Present: Coordinator of the American Institute of Research. Reviewer and Writer for the physics section of the exams for the Medical Colleges Admission Test (MCAT).
4. 08/2013- 05/2017: Grant Proposals Reviewer for the National Science Foundation (NSF) and National Institute of Health (NIH), USA.
5. 03/2018 – Present: Promotion & Tenure committee member, UAB.
6. 12/2017 – Present: Faculty Affairs Committee member, UAB.
7. 08/2018 – Present: Recruitment Committee member, UAB.
8. 10/2017 – Present: Radioisotopes & Radiation Safety Committee member, UAB.
9. 05/2017 – Present: Students Recruitment Committee, UAB.
10. 12/2017 - Present: Judge Undergraduate Research Competitions, UAB.
11. 02/2015 – 04/2017: Science and Humanities Division representative and member of the Faculty Council of Ball State University (BSU).
12. 05/2015 – 04/2017: Science and Humanities Division representative and member of the Athletic Committee, BSU.
13. 08/2012 – 05/2017: Faculty Recruitment Committee member, BSU.
14. 08/2014 – 05/2017: Staff Recruitment Committee member, BSU.
15. 08/2015 – 05/2017: Inter-Universities Collaboration and Students Exchange Committee member, BSU.
16. 08/2014 – 04/2017: Graduate Committee member, Department of Physics & Astronomy, BSU.
17. 08/2014 – 04/2017: Undergraduate Committee member, Department of Physics & Astronomy, BSU.
18. 08/2014 – 04/2017: Curriculum Committee member, Department of Physics & Astronomy, BSU.
19. 12/2014 - 04/2017: Colloquium Coordinator, Department of Physics & Astronomy, BSU.
20. 09/2013 – 06/2014: Associate Director, Master of Science Program and Department of Materials Science & Technology at Qatar University, Doha, Qatar.
21. 09/2013 – 06/2014: Program Assessment Coordinator, Master of Science degree Program in Materials Science and Technology at Qatar University.

22. 09/2013 – 06/2014: Program Accreditation Coordinator, Master of Science Degree Program in Materials Science and Technology at Qatar University.
23. 09/2013 – 06/2014: Faculty and Staff recruitment committee member, Department of Materials Science & Technology, Qatar University.
24. 09/2013 – 06/2014: Director, Graduate Admissions Committee, Master of Science Degree Program in Materials Science and Technology at Qatar University.
25. 08/2012 – 08/2013: Undergraduate Committee Chair, Physics Dept., Ball State University (BSU).
26. 08/2010 – 08/2012: Graduate Committee Chair, Physics Department, BSU.
27. 05/2009 – 08/2013: Admissions and Credits Committee member, BSU.
28. 09/2008 - 08/2013: Graduate Committee member. Department of Physics, BSU
29. 09/2008 – 08/2013: Undergraduate Committee member. Department of Physics, BSU.
30. 09/2008 - 08/2013: Curriculum & Assessment Committee member. Department of Physics. BSU.
31. 01/2008 – 12/2008: Physics Assistant Examiner, International Baccalaureate Organization (IBO), UK.
32. 08/ 2006 – 08/2008: Director and In charge of Pre-Engineering program at University of Mount Olive, North Carolina. In that program, I developed the entire curriculum, communicated with North Carolina State University, College of Engineering and run the program successfully. The students were supposed to spend one year at Mount Olive College and transferred to NC-State University in their second year with the minimum 30 credit hours required courses and lab work. I was the founder, and director of that program.
33. 2006 - 2008: Research Committee member, University of Mount Olive, North Carolina.
34. 2006 – 2008: Faculty Senator for Arts & Sciences, University of Mount Olive.
35. 1998 – 2000: Coordinator of the Radiation Physics section (courses and laboratories) at The department of physics, the University of Peshawar, Pakistan.
36. 1998 – 2000: Worked as examiner for the University of Peshawar, Pakistan.
37. 1994 – 1997: Worked as examiner for the Board of intermediate and secondary education, Peshawar, Pakistan.
38. 1998 – 2000: Director of Residence Halls, the University of Peshawar, Pakistan.
39. 1998 – 2000: Coordinator of the Science Society, University of Peshawar, Pakistan.
40. Judge, The Regional Science Fair, 03/ 2002, Ohio University, USA.
41. Judge, The Regional Science Fair, 03/2004, Ohio University, USA.

### **Academic and Curriculum Engagement:**

#### **(a) Curriculum Development:**

Broad experience of developing and improving curricula for many taught and laboratory courses for Physics graduate students, undergraduate students and non-major students.

- (1) Experience of Program accreditation for the Master of Science in Health Physics program at

the University of Alabama at Birmingham.

- (2) Modified and updated curriculum for Master of Science in Health Physics at the University of Alabama at Birmingham, USA.
- (3) Developed a complete curriculum and experimental set up for a new Laboratory course in Optics at Ball State University, USA.
- (4) Developed a complete curriculum for a new course “Research Methods in Physical Sciences” at Ball State University.
- (5) Developed a complete curriculum for a new degree of Master of Science in Medical Physics at Ball State University, according to the American Association of Physicists in Medicine.
- (6) Developed a complete curriculum for a new Physics major ‘Applied Physics with concentration in Medical Physics’ at Ball State University.
- (7) Developed and taught GRE Physics course for graduate and Physics major students at Ball State University.
- (8) Development of Pre-Engineering program at University of Mount Olive, USA, with the collaboration of North Carolina State University, College of Engineering, USA.
- (9) Modified and re-organized many laboratory courses and laboratory manuals for Physics 100 and 200 level courses.
- (10) Developed the program assessment rules and regulations for the Master of Science in Materials Science and Technology at Qatar University.

**(b) Curriculum Development:**

1. Currently engaged in developing an On-Line curriculum for the Master of Science in Health Physics at the University of Alabama at Birmingham (UAB), USA.
2. Taught online course “Physics of Medical Imaging” at UAB.
3. Taught online course “College Physics” at Ball State University.
4. Taught online course “Introduction to Physics” at Mount Olive University.

**(c) Budgetary Experience:**

1. **2017 – 18:** Making budgets for grant proposals, students recruitments and program development.
2. **2017 – 18:** Helping Program Director in health physics in making yearly budget.
3. **2013 - 14:** Experience of making full calendar year budget for the Department of Materials Science & Technology at College of Arts and Science, Qatar University, Doha, Qatar
4. **2012-17:** Experience of making budget for the new Undergraduate / Graduate Optics laboratory at Ball State University, USA.
5. **2011-12:** Experience of making budget to organize the American Physical Society Ohio Section Fall-2011 Meeting at Muncie, Indiana, USA.
6. **2008-9** Experience of making budget to build a new Optics, Spectroscopy and Photonics Research Laboratory at Ball State University, USA.
7. **2008-9** Experience of making budget to build a new Medical & Radiation Physics Research Laboratory at Ball State University, USA.
8. **2006-18:** Experience of making budgets for a number of Grants Proposals submitted to

various organizations like NSF, Indiana Academy of Science, Qatar National Research Fund and many others.

**(d) Certificates & Trainings:**

1. Financial Conflict of Interest in Research
2. HIPAA Privacy and Security Online Training
3. Policy and Students Code
4. Family Educational Rights and Privacy Act (FERPA)
5. Radiation Safety
6. Chemical Training Safety
7. Hazardous waste handling and packing

**(e) Students Advising Experience:**

Over 12 years of successful experience advising graduate and undergraduate students majoring in Physics, Medical Physics, Health Physics, Optics & Photonics, Mathematics, Engineering and Chemistry students at various institutes.

**(f) Program Assessment Experience:**

Broad experience of program assessment at University of Alabama at Birmingham, Ball State University, Qatar University and University of Mount Olive. To meet the learning objectives, institute's goals and mission, assessment of programs was performed numerous times.

**(g) Accreditation Experience:**

1. Engaged in the accreditation of Master of Science in Health Physics program of the University of Alabama at Birmingham, USA, with the Accreditation Board for Engineering & Technology (ABET).
2. Initiated the accreditation of Master of Science in Materials Science & Technology program of Qatar University, with ABET.

**Professional Experience:**

***(a) American Physical Society (APS) Organizational experience.***

1. Chairperson Nanoscience session, American Physical Society Southeastern Region and American Association of Physics Teachers, Fall Meeting 2018, Houston, Texas. 10/19/2018 – 10/20/2018.
2. Organizing Co-Chair of the Ohio Region American Physical Society Fall-2011 meeting.
3. Organizing Chair of the Medical Physics panel in Ohio Region American Physical Society Fall-2011 meeting.

***(b) Editorial Experience.***

1. Journal: Nanoscale Research Letters.  
Position: Editor
2. Journal: Advances in Metallurgical and Material Engineering  
Position: Editor
3. Journal: Global Journal of Advanced Radiation Research.  
Position: Editorial Board Member
4. Journal: Journal of Atomic & Nuclear Physics  
Position: Editorial Board Member

***(c) Journals / papers Reviewed.***

Work as reviewer for the following professional journals.

1. Optical Materials Express
2. Applied Physics Letters.
3. Optics Express
4. Optics Letters
5. Journal of Applied Physics.
6. Physical Review-B
7. Journal of the Optical Society of America-B.
8. Euro Physics Letters.
9. Journal of Physics-D: Applied Physics
10. Spectroscopy Letters.
11. IEEE Transactions on Nanotechnology
12. Material Science & Engineering – B.
13. Materials Chemistry and Physics.
14. Nanoscale Research Letters.
15. Journal of Alloys and Compounds.
16. Radiation Physics & Chemistry
17. ChemPhysChem.
18. Surface and Coating Technology.
19. Journal of Radiation Research
20. Journal of Photodynamic Therapy
21. Journal of Physical Chemistry-C
22. Electronic Materials Letters
23. Journal of Electronic Materials
24. Journal of Non-Crystalline Solids
25. Modern Physics Letters-B
26. Health Physics

## **Professional Membership:**

1. Health Physics Society, since June 2017.
2. Optical Society of America, since June 2018.
3. Radiation Research Society, since June 2018.
4. Society of Nuclear Medicine and Molecular Imaging, from June 2017 to June 2018.
2. Member of American Physical Society, since January 1, 2003.
3. Member of Materials Research Society, since Dec.1 2003.
4. Member of the Indiana Academy of Science, from June 2009 – May 2017.

## **Presentations:**

### **Condensed Matter Physics and Photonics.**

1. 04/2018: Light emission from rare-earth elements and transition metals and their biophotonics and health physics applications. Invited talk to the University of Northern Alabama, USA.
2. 02/2017: Physics and its career. Invited talk at Hamilton Southeastern Junior High School, Fishers, Indiana.
3. 11/2016: Superluminescence in wide bandgap Nitride Semiconductors. 5<sup>th</sup> International Conference and Exhibition on Lasers, Optics & Photonics November 28-30, 2016 Atlanta, USA
4. 06/2015: **Muhammad Maqbool**, Visible and Infrared emission from Erbium Oxide nanoparticle, for optical and biomedical applications. 2015 Tech Connect World Innovation Conference. Washington D.C., USA, June 13 – 17, 2015.
5. 04/2014: Muhammad Maqbool, Luminescence from in Rare-Earth elements for high efficiency photonic devices, Colloquium presentation at the College of Arts & Sciences, Qatar University, Doha, Qatar.
6. 03/2014: Ismail Balagoon, **Muhammad Maqbool** and Omar Al-Jaraod, Surface analysis and luminescence properties of AlN doped with RE elements (Ho, Gd, Tm). Seventh International Conference on Advances in Engineering Materials. American University of Sharjah, UAE.
7. 04/2013: Rare-Earth elements and Transition Metals, potential materials for energy saving devices. National Renewable Energy Laboratory (NREL), Golden, Colorado, USA.
8. 05/2012: Transition metals and rare-earth elements in laser cavities, 2nd International Workshop on Materials, The University of Malakand, Pakistan, May 21 – 24, 2012. Video presentation.
9. 03/2009: Luminescence Enhancement in AlN:Ho for optical devices applications. **American Physical Society**, March Meeting, Pittsburgh, Pennsylvania, USA.
9. 04/2006: Electron penetration depth in amorphous AlN for optical and biomedical applications. **APS, Spring Meeting**, Baltimore Maryland, USA.
10. 11/2004: Surface characterization and luminescence from praseodymium doped in AlN, GaN and turbostratic BN. **Materials Research Society (MRS) Fall Meeting**, Boston Massachusetts, USA.
12. 10/2004: Surface characterization and luminescence from amorphous AlN:Gd films.

**Condensed Matter and Surface Sciences Program, Ohio University, USA.**

13. **12/2003:** Luminescence from AlN doped holmium for laser cavities and waveguide applications. **MRS Fall Meeting**, Dec. 2003, Boston, Massachusetts, USA.
14. **09/2003:** New Reconstruction of clean c-GaN(001) studied by Scanning Tunneling Microscopy. **8<sup>th</sup> Wide Bandgap III Nitrides Workshop**, Sep. 2003, Richmond, Virginia, USA.
15. **04/2000:** First College Physics Teachers Training Program by UNESCO, Department of Physics, **University of Peshawar, Pakistan**. Contributed lectures.
16. **07/1999:** 24th International Nathiagali Summer College on Physics and Contemporary needs at Pakistan.

**Medical and Health Physics**

10. **06/2017:** Health Physics: Profession and Career. Invited talk at Alabama State University.
11. **07/2016:** Research, Curriculum development and Career in Health Physics. Invited talk at the University of Alabama at Birmingham.
12. **09/2011:** Wazir Muhammad, **Muhammad Maqbool**, *et al.* Dose non-linearity of Dosimetry system on a medical linear accelerator used for conventional and intensity modulated radiation therapy. European Medical Physics and Engineering Conference 2011, Trinity College, Dublin, Ireland, September 01-05, 2011.
13. **07/2011:** Biomaterials and Biophotonics in Medical and Health Physics. Invited talk at Hofstra University, New York, July 2011.
14. **03/2011:** Linear Attenuation Coefficient and Buildup Factor of MCP-200 alloy for radiation shielding and protection. Indiana Academy of Science Meeting at **Indiana University Purdue University Indianapolis**, Indiana, USA.
4. **09/2010:** Titanium doped sputter deposited AlN infrared whispering gallery mode microlaser on optical fibers. Talk at **Ball State University**, Sep. 2010.
5. **10/2010:** Buildup Factor of MCP-96 alloy for its use as tissue compensator in radiation oncology treatment planning. **Ohio Section American Physical Society Fall-2010**. Meeting at Delaware Ohio, USA.
6. **05/2010:** Luminescence Enhancement in Rare-Earth Elements for Optical Devices and Biomedical Applications. Invited talk (Colloquium) at **Delaware State University**, Delaware, USA.

**References:**

1. Professor Dr. Iftikhar Ahmad, Vice Chancellor, Abbottabad University of Science & Technology, Pakistan. Tel: (+92)3329067866
2. Dr. Wazir Muhammad, Associate Scientist, Department of Radiology, Yale University School of Medicine, New Haven, CT 06510, USA.  
Tel (Office): 203-7852368, Cell: 203-7640325, Fax: 203-7374765  
e-mail: [wazir.muhammad@yale.edu](mailto:wazir.muhammad@yale.edu)

3. Dr. Ghanim Ullah, Associate Professor, Department of Physics, University of South Florida, USA. Tel: 814-3217120, e-mail: [gullah@usf.edu](mailto:gullah@usf.edu)
4. Dr. Ghafar Ali, Research Associate Professor, Department of Nuclear & Quantum Engineering, Korean Advanced Institute of Science & Technology (KAIST), South Korea. E-mail: [ghafarali@kaist.ac.kr](mailto:ghafarali@kaist.ac.kr)
5. Dr. Mohammad Saiful Islam, Associate Professor, Department of Physics & Astronomy, Ball State University, Muncie, IN 47306, USA. Tel: 765-285-8066. E-mail: [mislam@bsu.edu](mailto:mislam@bsu.edu)
6. Dr. Asghar Kayani, Associate Professor of Physics, Western Michigan University, Kalamazoo, Michigan. E-mail: [asghar.kayani@wmich.edu](mailto:asghar.kayani@wmich.edu)
7. Dr. Mahfuza Khatun, Professor of Physics, Ball State University, Indiana, USA. E-mail: [mkhatun@bsu.edu](mailto:mkhatun@bsu.edu)