

Dr. Sardar Sikandar Hayat

Associate Professor

Department of Physics, Faculty of Basic and Applied Sciences, International Islamic University, H-10, Islamabad, Pakistan

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Education

- **PhD (Physics)** [2004-08] Pakistan (IUB)/USA (University of Central Florida, Orlando, FL, USA)
- **M.Sc (Physics)** [2001-03] The Islamia University of Bahawalpur
- **B.Sc** [1997-99] The Islamia University of Bahawalpur
- **F.Sc** [1995-97] Govt. Khawaja Fariad College of RYK
- **S.S.C** [1992-94] Govt. Colony H/S Liaquatpur

Personal

Father's Name	Noor Ahmad
Date & Place of Birth	July 20, 1978, Pakistan
CNIC #	31302-2146976-7
Passport #	AW6179762
Marital Status	Married
Nationality	Pakistani
Languages	English, Urdu, Punjabi and Saraike.

Area of Research

- Molecular Dynamics studies of phenomena at the surfaces, nanostructures, diffusion, and vibrational dynamics.
- Thermal properties such as specific heat, thermal coefficient of expansion, structure factor and melting temperature.
- Crystal defects such as point and planar defects in bulk crystals of metals and alloys and interactions of defects with the interfaces.

- Atomistic study of cluster diffusion at compact and complex solid surfaces (with steps and kinks); and epitaxial layer growth at the surfaces.
- First principle studies of charge density and band structures in case of Metals and Binary compounds.

PhD Thesis Title

“Computer Simulation of Planar Defects in Crystals of Metals using Molecular Dynamics”

Professional Experience

Institution/Organization	Position /Job Title	Period	
		From	To
International Islamic University Islamabad	Associate Professor	30 – 08 – 2017	Continue
Hazara University, Mansehra	Assistant Professor (TTS)	04 – 11 – 2010	30 – 08 – 2017
Hazara University, Mansehra	Lecturer	04 – 03 – 2009	03 – 11 – 2010

Teaching Expertise (Graduate and under Graduate level)

1. Solid-State Physics (I & II)
2. Materials Science (I & II)
3. Classical Mechanics
4. Advanced Mathematical Methods of Physics
5. Computational Physics
6. Atomic & Molecular Physics
7. Condensed Matter Physics
8. Research Methodology
9. Surface Physics
10. Modern Physics
11. Mechanics
12. Waves and Oscillations

Professional Responsibilities

- Member of Departmental DTRC, IIUI, 28/01/2019 to continue
- Member of Departmental Board of studies, IIUI, 31/08/2018 to continue
- Convener of Departmental graveness committee, HU, 21/7/2016 to 30/8/2018
- Departmental Focal Person of Laptop Scheme, HU, 21/7/2016 to 30/8/2018
- Member of departmental Board of studies, HU, 21/7/2016 to 30/8/2018
- Member of departmental committee for utility and maintenance, HU, 21/7/2016 to 30/8/2018
- Member of Departmental comprehensive examination committee for PhD, HU, 07/09/2010 to 30/8/2018
- Coordinator of general activities at department of Physics, Hazara University, 07/09/2010 to 30/8/2018

National/International Collaborations

- Computational Lab., Department of Physics, University of Central Florida, Orlando, Florida 32816, USA.
- LMPM, Mechanical Engineering Department, University of Sidi Bel Abbes, Sidi Bel Abbes 22000, Algeria.
- Institute of Science and Technology, University of Ain Temouchent, BP 284 RP, Ain Temouchent, 46000, Algeria.
- National Institute of Laser and Optronics, Nilore, Islamabad, 45650 Pakistan
- Materials Simulation Research Laboratory (MSRL), Department of Physics, Bahauddin Zakariya University Multan, Multan 60800, Pakistan.
- Department of Physics, Govt. College University Faisalabad, Faisalabad 38000, Pakistan.

Skills

- Strong knowledge and research experience in Molecular dynamics Technique
- Strong Programming expertise in Fortran Language
- Strong background of Crystallography, crystalline defects, thermal properties and surface diffusion
- Strong background of Materials Physics especially related to different
- Expertise in running the Simulation Packages like Dynamo, Solids, Crystal, Lamps, Dyne 86.

- Familiar with DFT and MC Simulations such as Win2K, WASP, SLKMC CPMD and Quantum ESPRESSO.
- Expertise to work on Solaris, Linux and Unix operating systems
- Strong expertise in office, origin and supporting software.
- Advanced English level skills and excellent abilities in article writing, composing and literatures.

Students Supervision

PhD Produced (as a Supervisor)

	<i>Name of Student</i>	<i>Title of Dissertation</i>
1	<i>Dr. Zulfiqar Ali Shah (HEC Scholar)</i>	<i>Study of Anharmonic Effects in the Presence of Adparticles at the Surfaces of Crystals of Nobel Metals</i>
2	<i>Dr. Zakirur-Rehman</i>	<i>Study of Thermal diffusive properties of d-Block transition metals</i>

MPhil Produced (as a Supervisor)

	<i>Name of Student</i>	<i>Title of Dissertation</i>
1	<i>Mr. Babar Shahzad Khan</i>	<i>Interaction of point defects with grain boundaries in metals</i>
2	<i>Mr. Zulfiqar Ali Shah</i>	<i>Theoretical Study of Anharmonic Effects near the Interfaces of Crystals</i>
3	<i>Mr. Raheel Iqbal</i>	<i>Structural and magnetic properties metals and metallic compounds</i>
4	<i>Mr. Zakir ur Rehman</i>	<i>Computational Study of Hetro-diffusion for fcc Metals</i>
5	<i>Mr. S. Siddique ur Rahman</i>	<i>Designing of Software for Three Phase Digital Energy Meter</i>
6	<i>Mr. Abul Raouf Malik</i>	<i>Study of the Efficiency of Phtosentizer Mediated Photodynamic Therapy on Cancerous Cell lines</i>
7	<i>Mr. Kashif Khan</i>	<i>Theoretical Investigation of Structural and Electronic Properties of Semiconductors</i>
8	<i>Mr. Imran Ullah</i>	<i>Diffusion of Pd Islands on Pt(111) surface and Pt Islands on</i>

		<i>Pd(111) surface: A Molecular Dynamics Approach</i>
9	Mr. Humayun Khan	<i>Computational Study of monomer and dimer Diffusion on Pt(111) and Pd(111) surfaces at different temperature</i>
10	Mr. Asghar Ali	<i>Computational study of effect of crystal defects on thermal properties</i>
11	Mr. Hamid Hussain	<i>Computer simulation of crystal defects in noble metals</i>
12	Mr. Sibghtullah	<i>First Principle Study of electronic and optical properties for $X^{II}-Y^{IV}-Z_2^V$ ($X=Zn, Cd$; $Z=P, As$) Chalcocopyrites</i>
13	Mr. Waqas Gul	<i>Estimation of thermal properties of Pd and Pt A molecular dynamics approach</i>
14	Mr. M. Arif	<i>First Principle Study of XYZ half heusler compounds($X=Li, Na, K$; $Y=Mg$; $Z=N, P, As, Sb, Bi$) Chalcopyrite</i>
15	Mr. Rashid Iqbal	<i>An ab-initio study of structural, electronic and magnetic properties of ThO_2 and CmO_2 compounds</i>
16	Mr. Sarfaraz Ahmad	<i>Structural and electronic tic properties of AmO_2 and PuO_2 compounds</i>
17	Mr. Shah Saleemullah sabir	<i>Study of dynamics of Cu and Ag trimer adatoms on compact surfaces at different temperatures</i>
18	Miss. Bushra Bibi	<i>Coalescence and deposition of silver nanoparticles on surface of silver</i>
19	Mr. Yasir Khan Abbasi	<i>Diffusion of Ag Clusters on different surfaces of Cu</i>
20	Mr. Wajid Ali	<i>Computational study of dynamics of small silver clusters on silver surface</i>
21	Mr. Fazal Ullah	<i>Computational study of the dynamics and diffusion of small Ag island on Cu(111) surface</i>
22	Mr. Zafar Javid	<i>Computational study of Thermal diffusion dynamic behaviour of two dimensional Ag-small clusters on Ag(111) surface.</i>
23	Mr. Asad Mehmood Ur Rehman	<i>Analysis of Plasma generated by laser induced breakdown spectroscopy</i>
24	Mr. Wajid Ali	<i>Virtual simulation in external beam radiotherapy and comparison with 2D simulation</i>

25	Mr. Fawad Farooq	<i>Compositional Analysis of Archeological Artifacts using laser induced breakdown spectroscopy</i>
26	Mr. Sohaib Khan	<i>Simulation of ignition processes in AC plasma Torch</i>
27	Miss. Anum Pervez	<i>Computational Study of interaction between clusters on silver (111) surface</i>
28	Miss. Faiza Rehman	<i>Computational study of thermal diffusion dynamic behavior of 2-dimensional Cu small clusters on Cu(111) surface</i>

MS Produced (as a Co-Supervisor)

	<i>Name of Student</i>	<i>Title of Dissertation</i>
1	Muhammad Khuram	<i>Theoretical Study of Crystal defects in Nobel Metals</i>
2	Shaista Rehman	<i>Study of heterogeneous adatoms clusters diffusion at Cu(111) surface</i>
3	Humara Batool	<i>Study of homogeneous adatoms clusters diffusion at Ag(111) surface</i>

MSc Projects

	<i>Name of Student</i>	<i>Title of Dissertation</i>
1	Khuram and Nauman	<i>How natural Fountain develops in Hilly Areas</i>
2	M. Naveed and Jumshaid Naeem	<i>Study of piezoelectricity in Ferroelectrics at different temperatures</i>

Internal Examiner (of MS Students) at Phys. Dept. of IIU

1. Raja Zohaib Rasool
2. Muhammad Hayat
3. Nauman Khan
4. Noor Rehman
5. Abdur Rahim
6. Aman Khan
7. Yasir ul Haq

External Examiner and Thesis Evaluation (of MS Students)

- ✓ External examiner of more than a dozen students of AIOU and IUB

International Publications

1. **Sardar Sikandar Hayat**, M. A. Choudhry and S. A. Ahmad, *Effect of twin boundaries on melting of aluminum*, J Mater Sci (2008) 43:4915-4920. (ISSN NO. 22-2461, I.F. 3.0)
2. **Sardar Sikandar Hayat**, M. A. Choudhry, S. A. Ahmad, J. I. Akhter and A. Hussain, *Study of thermal properties of Ni using Embedded-atom method*, Ind J Pure & Appl Phys (2008) 46:771-775. (ISSN NO. 0019-5596, I.F. 0.246)
3. A. Hussain, M. A. Choudhry, **Sardar Sikandar Hayat**, *Effects of ordering on thermal properties of Ni₃Al intermetallic alloy system: A Molecular dynamics approach*, Chinese Journal of Physics (2009) 47(3):344-355. (I.F. 0.515)
4. **Sardar Sikandar Hayat**, M. A. Choudhry, A. Hussain, S. Alam, Sheikh A. Ahmad and A. Ahmad, *Nanoscale Relaxation near the Twin Interfaces of Palladium and Platinum*, Ind J Pure & Appl Phys (2009) 47:730-736. (ISSN NO. 0019-5596, I.F. 0.511)
5. **Sardar Sikandar Hayat**, Marisol Alcántara Ortigoza, M. A. Choudhry, and Talat S. Rahman, *Diffusion of Cu monomer and dimer on Ag(111) studied with the Molecular Dynamics Method*, Phys. Rev. B (2010) 82:085405-085415. (I.F. 3.772)
6. Fekirini Hamida, Boualem Serier, Bouafia Farida, Sardar Sikandar Hayat, Bachir Bouiadjra Belabess *Computation of the Stress Intensity Factors for Interface Cracks in Fibrous Composite*, American Scientific Publishers (2011)
7. Fekirini Hamida, Boualem Serier, Bouafia Farida, Sardar Sikandar Hayat, Bachir Bouiadjra Belabbes; *Effect of Density and Pointed Corner Degree of Pore on Local Stress in Welded Structures: Defect in Marine Structures*, American Scientific Publishers (2011)
8. F. Hussain, **Sardar Sikandar Hayat**, and M. Imran, *Interaction of small vacancy clusters with (114) twin-boundary in gold*, Physica B. (2011) 405:1060-1064 (ISSN: 0921-4526, I.F. 1.45)
9. **Sardar Sikandar Hayat**, *Pop-up of atoms among copper 13-atom island on Ag(111)*, Computational material science, (2011) 50:1485-1489. (ISSN: 0927-0256, I.F. 2.53)

10. A. Hussain, **Sardar Sikandar Hayat** and M. A. Choudhry, *Ab-initio study of electronic structure and optical properties of TiAl alloy*, Physica B. (2011) 405:1961-1965 (ISSN: 0921-4526, I.F. 1.45)
11. **Sardar Sikandar Hayat**, I. Ahmad, and M. A. Choudhry, *Diffusion of 6-atom Cu island on Cu(111) and Ag(111)*, Chinese Physics Letters (2011) 28(5):053601-053604 (ISSN 1741-3540, I.F. 0.92)
12. **Sardar Sikandar Hayat**, Zakir-ur-Rehman, Ghulam Hussain, and N. Hassan, *Copper 10-atom Island Diffusion on Ag(1 1 1) Surface*, Chinese Journal of Physics (2011) 49(6):1264-1272 (ISSN: 0577-9073, I.F. 0.448)
13. M. Atif, R. Malik, M. Fakhar-e-Alam, **S. S. Hayat**, S. S. Z. Zaidi, R. Suleman, and M. Ikram, *In Vitro studies of Phtotfrin[®] mediated photodynamic therapy on human Rhabdomyosarcoma cell line (RD)¹*, Laser Physics (2012) 22(1):286-293;
14. *Erratum: In Vitro studies of Phtotfrin[®] mediated photodynamic therapy on human Rhabdomyosarcoma cell line (RD)*, Laser Physics (2012) 22(2):477-478 (ISSN: 1054-660X, I.F. 3.605)
15. N. Hassan, M. Irfan, N. A. Khan, S. Khan, A. Shakoor, A. Majid, and **Sardar Sikandar Hayat**, *Annealing effect on the excess conductivity of $Cu_{0.5}Tl_{0.25}M_{0.25}Ba_2Ca_2Cu_3O_{10-\delta}$ ($M=K, Na, Li, Tl$) superconductors*, Journal of Applied Physics (2012) 111:053914-053919 (ISSN: 0021-8979, I.F. 2.21)
16. Hamida Fekirini, Boualem Serier, Farida Bouafia, Bel Abbes Bachir Bouiadjra, **Sardar Sikandar Hayat**, *Effect of precipitate-precipitate interaction on residual stress in welded structure*, Computational Material Science, (2012) 65:207-215 (ISSN: 0927-0256, I.F. 2.53)
17. F. Hussain, **Sardar Sikandar Hayat**, M. Imran, S. A. Ahmad, and Farida Bouafia, *Sintering and Coalescence of nanoparticles: A Molecular Dynamics Approach*, Computational Material Science, (2012) 65:264-268 (ISSN: 0927-0256, I.F. 2.53)
18. S. Souad, Boualem Serier, F. Bouafia, Bel Abbes Bachir Boudjra, **Sardar Sikandar Hayat**, *Analysis of the stresses intensity factor in alumina–Pyrex composites*, Computational Material Science, (2013) 72:68-80; *Corrigendum to Analysis of the*

stresses intensity factor in alumina–Pyrex composites, Computational Material Science, (2013) 72:68-80 (ISSN: 0927-0256, I.F. 2.53)

19. F. Hussain, **Sardar Sikandar Hayat**, Z. A. Shah, and S. A. Ahmad, *Effect of Crystal Defects on Melting Temperature of Ni and Al*, Chinese Journal of Physics (2013) 51(2):356-367 (ISSN: 0577-9073, I.F. 0.477)
20. F. Hussain, **Sardar Sikandar Hayat**, Z. A. Shah, N. Hassan and S. A. Ahmad, *Interaction of Point Defects with Twin-boundaries in Au: A Molecular Dynamics Approach*, Chinese Physics B (2013) 22(9):096102-096110 (ISSN 1674-1056, I.F. 1.45)
21. Farida Bouafia, Boualem Serier, Nassim Serier, **Sardar Sikandar Hayat**, *Effect of Density and Pointed Corner Degree of Pore on Local Stress in Welded Structures: Defect in Marine Structures*, ISRN Mechanical Engineering, (2014) 2014: 1-7 (I.F. 1.730)
22. G. Murtaza, Sibghat-Ullah, R. Khenata, A. H. Reshake, **S. S. Hayat**, *Optoelectronic properties of $XYAs_2$ ($X=Zn, Cd$; $Y=Si, Sn$) chalcopyrite compounds*, journal of optoelectronics and advanced materials (January- February 2014), Vol. 16, No. 1-2, p. 110-116 (I.F. .56).
23. Sibghat ullah, G. Murtaza, R. Khenata, A.H. Reshak, **S. S. Hayat**, S. Bin Omran, *Towards from indirect to direct band gap and optical properties of XYP_2 ($X^{1/4}Zn, Cd$; $Y^{1/4}Si, Ge, Sn$)*, Physica B. (2014) 441:94-99 (ISSN: 0921-4526, I.F. 1.45).
24. Z. A. Shah, **Sardar Sikandar Hayat**, Z. Rehman, Farida Bouafia, *The molecular dynamic study of anharmonic effects at Cu(111) and Ag(111) surfaces in the presence of Cu-and Ag-trimer island*, Physics Letters A, 378 (2014) 1727–1732 (I.F. 1.86).
25. Z. A. Shah, **Sardar Sikandar Hayat**, Z. Rehman, S. S. Rahman and F. Bouafia, *Vacancy generation and adsorption of Cu atom at Ag(1 1 1) surface during diffusion of Cu-trimer*, Surface Review and Letters, Vol. 21, No. 5 (2014) 1450072-7 (ISSN:1739-6667, I.F. 0.734)..
26. Z. Rehman, **S. S. Hayat**, *Thermal Diffusion Dynamic Behavior of Two-Dimensional Ag-Small Clusters On Ag(1 1 1) Surface*, Surface Review and Letters, Vol. 22, No. 5 (2015) 1550067 (ISSN:1739-6667, I. F. 0.734)

27. Babar Shazad Khan, Adnan Saeed, **Sardar Sikandar Hayat**, Aiman Mukhtar, Tahir; Mehmood, *Mechanism for the Formation of Cuprous Oxide Nanowires in AAO template by Electrodeposition*, Int. J. Electrochem. Sci., 12 (2017) 890 – 897, (ISSN:1452-3981, I. F. 1.369) doi: 10.20964/2017.02.42

28. Zulfiqar Ali Shah, Sardar Sikandar Hayat and et al.; *Effect of Temperature on Diffusion Parameters for 2-Dimensional Copper 5-Atom Island*, Research & Reviews: Journal of Material Sciences, 5(6) (2017) 9-16 (ISSN:2347-2278, I. F. 0.57) DOI: 10.4172/2321-6212.1000189

29. Sardar Sikandar Hayat, Zakirur-Rehman and Z. A. Shah; *A study of dynamical evolution of small two-dimensional Copper islands' diffusion on Ag(1 1 1) surface and observed surface effects*, Modern Physics Letters B (2017) 1750316-18 (ISSN:0217-9949, I. F. 0.731) DOI: 10.1142/S021798491750316X

30. Asghar Khan M, Zulfiqar Ali Shah, Jabran Khan, Yasir Arafat, Sikandar Hayat, and Munawar Saeed; *Principle Investigation of Structural, Electronics and Chemical Properties of Sn Doped PbX (X=S, Se, Te)*, Journal of Theoretical & Computational Science, 4(2): (2017) 159. (ISSN:1096-9918, I. F. 0.5) doi:10.4172/2376-130X.1000159

31. Humaira Latif, Adnan Saeed, Sadaf Jamil Rana, Babar Shahzad Khan and Sardar Sikandar Hayat; *Nitrogen dissociation and its excitation/vibrational temperature with hydrogen admixture in 50 Hz DC discharge*, Radiation Effects & Defects In Solids, 172 (2017), (ISSN:1042-0150, I. F. 0.526) doi.org/10.1080/10420150.2017.1413648

32. Muhammad Imran, Fayyaz Hussain, Sardar Sikandar Hayat, et al.; *A study of surface diffusion of ternary (Cu-Ag-Zr)clusters for applications in thin film formation*, Surf Interface Anal. (2019)1-9, (ISSN:1096-9918, I. F. 1.23) DOI: 10.1002/sia.6608

33. Fayyaz Hussain, Muhammad Imran, Umbreen Rasheed, R.M. Arif Khalil, Anwar Manzoor Rana, Farhana Kousar, M. Arshad Javid and S.S. Hayat; *A First Principle Study of Graphene/Metal-Oxides as Nano Composite Electrode Materials for Supercapacitors*, Journal of Electronic Material, (2019) (ISSN:0361-5235, I. F. 1.56)

National/International Conference Presentations and Papers

2. **S. Sikandar Hayat**, M. A. Choudhry, S. A. Ahmad, Marisol Alcántara Ortigoza and Talat S. Rahman, *Diffusion of Cu hexamer island on Cu(111) and Ag(111) surface studied with the Molecular Dynamics Method*, 3rd International conference on Frontiers of Advanced Engineering Materials, (2008) P-24.
3. **S. Sikandar Hayat**, M. A. Choudhry, and S. A. Ahmad, *Nanoscale relaxation at the surfaces of Cu*, 3rd International conference on Frontiers of Advanced Engineering Materials, (2008) P-121.
4. **S. Sikandar Hayat**, M. A. Choudhry, S. A. Ahmad, and R. Rafiq, *Diffusion of Cu pentamer island on Ag(111) surface studied with the Molecular Dynamics Method*, Pakistan Institute of Physics, (2009) PIPIC-09-40.
5. Shabbir Ahmed, **S. Sikandar Hayat**, M. A. Choudhry, *ab-initio calculations for electronic properties of Pt and Pd*, Pakistan Institute of Physics, (2009) PIPIC-09-52.
6. **S. S. Hayat**, M. A. Choudhry, and S. A. Ahmad, *Relaxation near twin-boundaries of Pd and Pt: A molecular Dynamics Approach*, National Centre for Physics (NCP), QAU Islambad, First NCP Scientific Spring 2009”, April 6th - 9th, 2009
7. **S. Sikandar Hayat**, Marisol Alcántara Ortigoza and Talat S. Rahman, *Diffusion of two-dimensional Cu islets on Ag(111) studied with the Molecular Dynamics Method*, 2009 APS March Meeting, Pittsburgh, Pennsylvania, Volume 54, Number 1: B12.00002, March 16–20, 2009
8. **S. Sikandar Hayat**, *Molecular Dynamics Study of Tetramer Cu Island Diffusion on Ag(111) Surface*, International Nathiagali Summer College on Physics and Contemporary Needs. Pakistan Atomic Energy, Islambad, Pakistan.
9. **S. Sikandar Hayat**, *Molecular Dynamics Study of Cu Diffusion of Heptamer Island on Ag(111) Surface*, First NCP Scientific Spring 2009, National Centre for Physics.
10. **S. Sikandar Hayat**, M. A. Choudhry, *Diffusion of Cu 10-atom island on Ag(111) surface*, Pakistan Institute of Physics (PIP), (2011) PIPIC-11-19.

11. **S. Sikandar Hayat**, *Simulation Techniques*, International Multidisciplinary Conference on Ethics, Spirituality and Freedom (IMCESF), February 18-20, 2013, Lahore, Pakistan.
12. Z. A. Shah, Z. Rehman, **Sardar Sikandar Hayat**, *Study of anharmonic effects in the presence of Cu- and Ag-islands on (111) surface*, PJST, 1, 1(2015)80-89
13. Z. Rehman, Z. A. Shah, **Sardar Sikandar Hayat**, *Computational study of thermal diffusive properties of Cu/Ag(111)*, PJST, 1, 1(2015)68-79.
14. Muhammad Babar Taj, Ahmad Raheel, **Sardar Sikandar Hayat**, *Synthesis and Anti-Cancer Activity of Copper Linked Benzimidazole-Furan Conjugates*, Advancement in Biotechnology, Feb. 08 2019. IIU, Islamabad
15. Sardar Sikandar Hayat, *Anharmonic behavior of small clusters during the diffusion on Ag(111) surface*, 2nd International Conference on Nano-materials modeling and simulation, Feb. 23-24, 2019, AIOU, Islamabad
16. Sardar Sikandar Hayat, *Surface diffusion of Heterogeneous adatoms clusters on Ag(111) surface*, 7th ICSMAND, 25 to 27th Feb. 2019. KFUEIT, Rahimyar Khan.
17. Sardar Sikandar Hayat, 1st National Symposium on Physics, *Surface dynamics in the presence of small Clusters*, March 27-29, 2019, HU, Mansehra

References

1. Prof. Dr. Talat S. Rahman
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2. Prof. Dr. Muhammad Arshad Choudhry
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