




## University Faculty Details Page on DU Web-site

Title	Prof.	First Name	AGNIKUMAR G.	Last Name	VEDESHWAR	Photograph
Designation	Professor					
Department	DEPARTMENT OF PHYSICS & ASTROPHYSICS					
Address (Campus)	NORTH CAMPUS, UNIVERSITY OF DELHI, DELHI-110007					
Address (Residence)	5/5, UNIVERSITY ROAD, DELHI-110007					
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Web-Page						
Education						
Subject	Institution	Year	Details			
Ph.D.	Karnatak University	1988	Thesis topic: Transport/Optical properties of some Semiconducting Minerals in bulk and thin film forms.			
M. Sc.	Karnatak University	1983	Subjects: Physics (Solid State Physics)			
B. Sc.	Karnatak University	1981	Subjects: Physics, Mathematics & Mathematical Statistics			
Career Profile						
Organisation / Institution		Designation	Duration	Role		
I.I.T., Kanpur		RA (National Superconductivity Fellow)	1988-1990	Research & Teaching		
I.G.C.A.R., Kalpakkam		RA (National Superconductivity Fellow)	1990-1993	Research		
Delhi University		Lecturer	1993-1998	Research & Teaching		
Delhi University		Senior lecturer	1998-2002	Research & Teaching		
Delhi University		Reader	2002-2005	Research & Teaching		
Delhi University		Associate Professor	2006-2009	Research & Teaching		
Delhi University		Professor	2009-present	Research & Teaching		
Research Interests / Specialization						
<ol style="list-style-type: none"> <li>1. Transport (Hall effect, Thermopower and resistivity) &amp; Optical Properties both at low &amp; high temperatures of Semiconductors &amp; High Tc Superconductors in both bulk &amp; thin film forms.</li> <li>2. Thin Film fabrication, Vacuum Technology, Photolithography, Electron beam gun, RF Sputtering, device fabrication etc.</li> <li>3. Analytical Techniques: X-ray diffraction, SEM, TEM, ESCA, DTA, EPR and Raman Effect in solids, UV/VIS spectroscopy of solids etc.</li> <li>4. Thin films for Optical Storage.</li> <li>5. Surfaces, Interfaces, Nanomaterials and Quantum Dots, Optical Properties.</li> <li>6. DFT calculations of Electronic structure, Elastic properties and Optical properties of solids.</li> </ol>						
Teaching Experience ( Subjects/Courses Taught)						

**(A) THEORY****CORE**

1. Quantum Mechanics –I (1993,1997)
2. Quantum Mechanics –II (1994, 1997)
3. Classical Mechanics (1998)
4. Electromagnetic Theory (1999)
5. Electronics (1996, 1997)
6. Statistical Mechanics (2000-2004)
7. Atomic & Molecular Physics (2005-2010)

**OPTIONAL (SPECIALIZATION)**

1. Electronics (1994-96)
2. Laser & Spectroscopy (2010-present )

**(B) EXPERIMENT (PRACTICALS)**

M.Sc.Previous: Electronics (1999-2005, 2008-10), Waves & Optics (1993-96)  
 M.Sc. Final : Electronics (1994-96, 2006-08), Laser & Spectroscopy (2010-present )

**Research Guidance****List against each head (If applicable)**

1. Supervision of awarded Doctoral Thesis: 10
2. Supervision of Doctoral Thesis, under progress: 0
3. Supervision of awarded M.Phil dissertations: NOT APPLICABLE
4. Supervision of M.Phil dissertations, under progress: NOT APPLICABLE

**Honors & Awards**

- National Superconductivity Fellow (DST) 1988-1993
- UGC Research Award 1999.

**Publications (LAST FIVE YEARS)****Books / Monographs/Chapter in a book**

<u>Year of Publication</u>	<u>Title</u>	<u>Publisher</u>	<u>Co-Authors</u>
2008	"Residual Stress in Thin Films" in "Smart Materials", Ed. M Shwartz , pp-1-1-1-13	CRC Press, New York	None
2014	"Synthesis of Semiconductor Quantum Dots by Physical Vapor Deposition" in "Handbook Of Functional Nanomaterials, Vol. 4, Properties and Commercialization", Ed. Mahmood Aliofkhaezrai, pp-379-407	Nova Science Publishers, New York	T Dhawan

**In Indexed/ Peer Reviewed Journals**

<u>Year of Publicatn</u>	<u>Title</u>	<u>Journal</u>	<u>Co-Authors</u>
2005	Occurrence of hysteresis like behavior of resistance of Sb <sub>2</sub> Te <sub>3</sub> film in the dynamical measurement of heating-cooling cycle	Physica B, Vol. 362, pp-158 -166	P Arun, P Tyagi
2006	Adsorption induced faceting and superstructural phase diagram of the Sb/Si(5 5 12) interface	Surface Science, Vol.600, No.13, pp-2745-2751	M Kumar, Govind, V K Paliwal, S M Shivaprasad
2006	Quantum Dot like behavior of ultra thin Pbl <sub>2</sub> Films	Acta Materialia, Vol.54, No.15, pp-3899 – 3905	V Gulia, N C Mehra
2006	Excitonic absorption in ZnI <sub>2</sub> films	J. Appl. Phys., Vol. 100, pp-083522-1-6	P Tyagi
2007	Optical properties of Pbl <sub>2</sub> films: Quantum confinement and residual stress effect	Physical Review B, Vol.75, No. 4,	V Gulia

2007	Formation of 1D-nanowires and 2D nanophases in heteroepitaxy of Sb on high index Si(5 5 12) surface	pp-045409-1-6 J. Nano Sci. & Nano Technol., Vol. 7, No. 6, pp-1841-1844	M Kumar, Govind, V K Paliwal, S M Shivaprasad
2010	Quantum confinement in amorphous InSb	Scripta Materialia Vol. 63, pp-97-100	T Dhawan, V N Singh, B R Mehta R P Tandon
2010	Dependence of optical band gap on residual stress in group IIB iodide (ZnI <sub>2</sub> , CdI <sub>2</sub> , HgI <sub>2</sub> ) films	Integrated Ferroelectrics Vol.122, pp-52-62	P Tyagi, R K Mishra, N C Mehra
2010	Growth of nanostructured amorphous InSb by vacuum thermal evaporation	Integrated Ferroelectrics Vol.122, pp-119-125	T Dhawan, R P Tandon
2011	Correlation of optical energy gap with the nearest neighbor short range order in amorphous V <sub>2</sub> O <sub>5</sub> films	J. Phys. D:Appl. Phys. Vol. 44, pp-215404-1-6	S Dhawan, R P Tandon
2012	The role of glass-viscosity on the growth of semiconductor quantum dots in glass matrices	J. Appl. Phys. Vol. 111, pp-094315-1-5	R K Mishra, R P Tandon
2013	Glass viscosity dependent growth of CdS nanocrystals in silicate glass matrix	AIP Conf. Proc. Vol.1536, pp-57-58	R K Mishra, R P Tandon
2013	Sb <sub>2</sub> S <sub>3</sub> quantum dots: diffusion-controlled growth and characterization	Phys. Stat. Sol. RRL Vol.7, pp-975-979	R K Mishra, R P Tandon
2013	Growth and characterization of PbI <sub>2</sub> thin films by vacuum thermal evaporation	J. Nano Res. Vol 24, pp-1-6	H Agrawal, V K Saraswat
2013	Residual stress dependant anisotropic band gap of various (hkl) oriented BaI <sub>2</sub> films	J. Appl. Phys. Vol 114, pp-193511-1-9	Pradeep Kumar, V. Gulia
2014	Optical absorption, photoluminescence and structural analysis of CdS quantum dots in weak confinement	Physica Scripta, Vol. 89, pp-025701-1-5	R K Mishra, R P Tandon
2014	Growth of Nb <sub>2</sub> O <sub>5</sub> quantum dots by physical vapor deposition	Materials Letters, Vol.126, pp-32-35	S Dhawan, T Dhawan
2014	Structural and Optical Properties of Sb <sub>2</sub> S <sub>3</sub> Nanocrystals in Glass	AIP. Conf. Proc. Vol. 1591, pp-327-329	R K Mishra, R P Tandon
2014	Residual stress induced crystalline to amorphous phase transformation in Nb <sub>2</sub> O <sub>5</sub> quantum dots	J. Appl. Phys. Vol 116, pp-043503-1-6	S Dhawan, T Dhawan
2015	DFT calculations of structural, electronic, optical and elastic properties of scintillators materials BaCl <sub>2</sub> and BaBr <sub>2</sub>	J. Phys. D: Appl. Phys. Vol 48, pp-105301-1-10	P Kumar
2015	Optical properties of scintillator material BaBr <sub>2</sub> films	Materials Letters Vol 157, pp-318-321	P Kumar
2015	Pressure dependence of electronic properties of BaI <sub>2</sub>	AIP Conf. Proc. 1675, 0200137	P Kumar

#### Articles

#### Conference Presentations

- "Experimental Observation of Energy Band Gap Variation with Grain Size for CdI<sub>2</sub> Films" XXVI Annual Conference of EMSI on Electron Microscopy & Allied fields, Shimla, April 16-18, 2003.
- "Faster Optical Data Storage in Sb<sub>2</sub>S<sub>3</sub> Films" XXVI Annual Conference of EMSI on Electron Microscopy & Allied fields, Shimla, April 16-18, 2003.
- "Optical band gap of nanophase lead iodide (PbI<sub>2</sub>) thin films", Proc. Int. Conf. on Optics & Optoelectronics, 12-15 Dec. 2005, IRDE, Dehradun, India, PP-OMSD-53
- "Morphological study of argon ion irradiated Sb<sub>2</sub>Se<sub>3</sub> films in a dense plasma focus device", Proc. 2<sup>nd</sup> Int. Conf. CDAMOP, March 21-23, 2006, Delhi, India.
- "Kinetically controlled superstructural phases at the Sb/Si (5 5 12) interphase" Materials Research Society Symposium Proceeding Vol. 891 (2006) 0891-EE07-27.1
- "Role of Electron Microscopy in Materials Research" Invited Lecture, XXIX Annual Conference of EMSI on Electron Microscopy & Allied fields, Delhi, November 26-28, 2007.
- "Morphology of different (hkl) oriented Films of some Metal Iodides", XXIX Annual Conference of EMSI on Electron Microscopy & Allied fields, Delhi, November 26-28, 2007, pp-82
- "Thickness dependent Morphology of BiI<sub>3</sub> Films", XXIX Annual Conference of EMSI on Electron Microscopy & Allied fields, Delhi, November 26-28, 2007, pp-86
- "Residual stress and its effect on optical properties in thin films" Invited Lecture, A G Vedeshwar, National Conference on Photonics & Materials Science (NCPMS-2008), Hisar, Haryana, October 24-25, 2008.

- "Investigations of Nucleation and Growth in thin films by Electron Microscopy" Invited Lecture, A G Vedeshwar, XXX Annual Conference of EMSI on Electron Microscopy & Allied fields, Jhansi, January 17-19, 2009, pp-15.
- "Single Crystal growth of  $\text{BiI}_3$  by thermal evaporation: TEM investigations" Pankaj Tyagi\*, Chhavi Ranjan, Karnik Pandya, N. C. Mehra<sup>†</sup> & A. G. Vedeshwar, XXX Annual Conference of EMSI on Electron Microscopy & Allied fields, Jhansi, January 17-19, 2009, pp-83-84.
- "Optical properties of Semiconductor films under stress" Invited Lecture, A G Vedeshwar International Conference on Electroceramics, Delhi, December 13-17, 2009, pp-70.
- "Growth of Amorphous InSb Quantum Dots using Thermal evaporation Technique" T Dhawan, A G Vedeshwar, V N Singh, B R Mehta and R P Tandon, International Conference on Electroceramics, Delhi, December 13-17, 2009, pp-166.
- "Growth & Characterization of PbTe bulk compound & its nanostructured thin films deposited by thermal vacuum evaporation technique" R Kumar, K N Sood, A G Vedeshwar & S Singh, International Conference on Electroceramics, Delhi, December 13-17, 2009, pp-420.
- "Dependence of Optical band gap on residual stress in group IIB Iodide ( $\text{ZnI}_2$ ,  $\text{CdI}_2$ ,  $\text{HgI}_2$ ) Films" P Tyagi, N C Mehra & A G Vedeshwar, International Conference on Electroceramics, Delhi, December 13-17, 2009, pp-446.
- "Thickness dependant optical properties of amorphous  $\text{V}_2\text{O}_5$  Thin films" S Dhawan, A G Vedeshwar, A Goyal, N C Mehra & R P Tandon, International Conference on Electroceramics, Delhi, December 13-17, 2009, pp-446.
- "Growth of CdS Quantum Dots in silicate glass matrices" R K Mishra, A G Vedeshwar, A Goyal, N C Mehra & R P Tandon, International Conference on Electroceramics, Delhi, December 13-17, 2009, pp-447.
- "Effect of film thickness in  $\text{V}_2\text{O}_5$  thin films grown by thermal evaporation" S Dhawan, R K Mishra, A G Vedeshwar, N C Mehra & R P Tandon, International Conference on Advances in Electron Microscopy and related techniques & XXXI Annual Meeting of EMSI, Mumbai, March 8-10, 2010, pp-307.
- "Nucleation & growth in  $\text{PbI}_2$  Thin films" P Tyagi, A G Vedeshwar, V Gulia & N C Mehra, International Conference on Advances in Electron Microscopy and related techniques & XXXI Annual Meeting of EMSI, Mumbai, March 8-10, 2010, pp-180.
- "CdS Quantum Dots in different Glass Matrices" R. K. Mishra, A. G. Vedeshwar, N.C. Mehra, R. P. Tandon International conference on Multifunctional Materials (ICMM-2010), BHU, Varanasi, 6-10 December, 2010.
- "Effect of glass matrix composition on the growth of CdS Quantum Dots in Silicate Glass" R. K. Mishra, A. G. Vedeshwar, R. P. Tandon National Review and Coordination Meeting of NANO Mission Council (NSNT-2011), IIT Delhi, 25-27 February, 2011.
- "Study and Characterization of CdS Nanostructure in Glass Matrices" R. K. Mishra, A. G. Vedeshwar, R. P. Tandon International Conference on Advanced Materials and application (ICAMA-2011), Kalasalingam University, Krishnankoil, 4-5 March, 2011. (Oral Presentation)
- "Growth of CdS Quantum Dots in different glass matrices" R. K. Mishra, A. G. Vedeshwar, R. P. Tandon International Conference on Electron Nanoscopy, Defence Metallurgical Research Laboratory, Hyderabad, 6-8 July, 2011.
- "Annealing Temperature Dependent growth of CdS semiconductor Quantum Dots in Glass Matrices" R. K. Mishra, A. G. Vedeshwar, R. P. Tandon National Workshop on Nanotechnology for Defence Applications (NWDA-2011), Solid State Physics Laboratory, Delhi. 16-17 November, 2011.
- "Growth and Characterization of CdS Quantum Dots in Borosilicate Glass" R. K. Mishra, A. G. Vedeshwar, R. P. Tandon, International Conference on Nanoscience And Technology (ICONSAT-2012), Hyderabad, 20-23 January, 2012.
- "X-ray Diffraction and Optical study of CdS Quantum Dots in Borosilicate Glass" R. K. Mishra, A. G. Vedeshwar, R. P. Tandon International Conference and Workshop on Nanostructured Ceramics and Other Nanomaterials" (ICWNCN-2012), New Delhi, 13-16 March, 2012
- "Growth and Characterization of InAs Nanostructures" Tanuj Dhawan, A. G. Vedeshwar, N. C. Mehra and R. P. Tandon, ICWNCN – 2012, Delhi, India.
- "Growth and Characterization of InP nanostructures" Tanuj Dhawan, A. G. Vedeshwar, N. C. Mehra and R. P. Tandon, ICWNCN – 2012, Delhi, India.
- "Growth and characterization of Vanadium Pentoxide ( $\text{V}_2\text{O}_5$ ) thin films" Sahil Dhawan, A. G. Vedeshwar, and R. P. Tandon.. International Conference and Workshop on Nanostructured Ceramics and other Nanomaterials (ICWNCN - 2012), New Delhi
- "Anisotropic nature of optical band gap of  $\text{SrI}_2$  thin films" Pankaj Tyagi, Vikas Gulia, N C Mehra & A G Vedeshwar (ICWNCN – 2012) DU, India

Total Publication Profile optional

Books/Chapters in a Book

4 Chapters in 4 Books

<u>In Indexed/ Peer Reviewed Journals</u> 68 publications in international refereed journals
<u>Articles</u>
<u>Conference Presentations</u> 54 Conference presentations
<u>Public Service / University Service / Consulting Activity</u> Not Applicable
<u>Professional Societies Memberships</u> <ul style="list-style-type: none"> <li>• Member, Indian Vacuum Society</li> <li>• Member, Materials Research Society of India</li> <li>• Member, Electron Microscopy Society of India</li> </ul>
<u>Projects (Major Grants / Collaborations)</u> <ul style="list-style-type: none"> <li>• Principle Investigator, UGC Major Research Project titled "Growth and Characterization of Semiconductor Quantum Dots in glass Matrix" 2004-07</li> <li>• Co-Investigator, UGC Major Research Project titled "Studies and development of oxygen gas sensors based on glasses" 2003-2006</li> <li>• Co-Investigator, SSPL Research Project titled "Development of thick PZT films by modified sol-gel technique" 2005-2008</li> <li>• Co-Investigator, LASTEK Research Project titled "Synthesis and Characterization of Quantum Dots" 2007-2009</li> <li>• Co-Investigator, DRDO Research Project titled "Synthesis and Characterization of Nanocrystalline Lead Titanate Ceramics" 2007-2010</li> <li>• Co-Investigator, DST Research Project titled "Study of Oxide films for Infrared Applications" 2007-2010</li> <li>• Co-Investigator, DST Research Project titled "Semiconductor Quantum Dots for Optical Storage Applications" 2007-2010</li> <li>• Principal Investigator, DST Indo-Mexican Joint Research Project titled "Theoretical &amp; Experimental Study of Transport Barrier Formation by RF waves" 2008-2011</li> </ul>
<u>Other Details</u>