

## *Curriculum Vitae*

1. Name : Jangvir Singh Shahi
2. Date of Birth : 2<sup>nd</sup> July 1961
3. Nationality : Indian
4. Marital Status : Married
5. Present Occupation : Assistant Professor  
Department of Physics  
PanjabUniversity,  
Chandigarh.
6. Present address : Dr. J S Shahi  
Department of Physics'  
PanjabUniversity,  
Chandigarh-160014, INDIA
7. Research Publications : 31
8. Academic Record :

No	Examination	Year	Board / University
1	Matriculation	1975	PunjabSchool Education Board
2	B.Sc I	1977	PunjabiUniversityPatiala
3	B.Sc. (Hons. School)	1982	Dept. of Physics P U Chandigarh
4	M.Sc. (Hons. School)	1983	Dept. of Physics P U Chandigarh
5	M.Phil	1986	Dept. of Physics P U Chandigarh
6	Ph.D.	2001	Dept. of Physics P U Chandigarh

9. Title of Ph.D. thesis : X-ray photon scattering cross section  
measurements and applications in elemental  
analysis using EDXRF technique

#### 10. Professional Background :

No.	Period	Post held	Name and Place of Institution
1	Jan 84 to Nov 84	Electronic Technician	ISRO Research Project Dept. of Physics P U Chandigarh
2	Jan 86 to Mar 86	Lecturer	S G T B Khalsa College Anandpur Sahib
3	Sept 86 to Apr 88	Teaching Assistant	PanjabEngineeringCollegeChandigarh
4	Apr 88 to June 90	Lecturer	Panjab Engineering College Chandigarh
5	June 90 to Oct 23	Radio chemist	Dept. of Physics P U Chandigarh
6	Oct 23 to till date	Assistant Professor	Dept. of Physics P U Chandigarh

#### 11. Outline of Professional / Research activities:

Research work has been pursued mainly in the field of X-ray Spectroscopy during the past 24 years. It has resulted in more than thirty publications in Journals. The photon-atom interaction studies include investigations of different phenomenon following the inner-shell vacancy production, Rayleigh scattering, and Compton scattering. It involved measurements of X-ray fluorescence cross-sections, fluorescence yields and vacancy transfer probabilities and scattering cross sections done using energy-dispersive spectrometers and radioactive sources/X-ray tubes as photon sources. A monochromatic X-ray tube based source has been established under the DST-FIST program for such measurements. RRS has been explored in different chemical forms of heavy elements and systematic data generated adds significantly to our knowledge. The Rayleigh and Compton scattering near the ionization thresholds of various elements across the periodic table have been investigated. In general good research interaction with colleagues and research students from various fields – because of availability of EDXRF facility with us. I always encourage collaboration – it always starts by selfless working for others.

Future plans for teaching and research

New photon-atom interaction studies in the x-ray energy region are planned. The following investigations shall be carried out in coming few years

Resonant Raman Scattering – to perform investigations in

- (a) Different chemical and physical (nano-particles) forms of element
- (b) Solution form where the band structure does not exist, and
- (c) Metallic and insulator compounds with different band gaps

Measurements of Rayleigh and Compton scattering cross sections over wider angular range  $5^{\circ}$ - $170^{\circ}$  (low momentum transfer) and to investigate angular dependence of anomalous scattering factors for elements having electron threshold energy close to the incident photon energy.

To study Chemical effects in X-ray Fluorescence - Depending upon the bound state of the element, the x-ray emission spectrum of an element is expected to display changes in x-ray intensities.

In the field of, application of XRF, efforts will be made to establish portable energy dispersive X-ray fluorescence set up based on Mini X-ray tube exciter and Peltier-cooled based detector. It will be used for in field measurements. To establish a collimated X-ray fluorescence set up for the elemental mapping of different Biosciences, Geology and extra-terrestrial objects.

I along with our group in the XRF section plans to start new experiments using the INDUS-2 Synchrotron radiation source at Raja Ramanna Center for Advanced Technology (RRCAT), Indore. Measurements of chemical effects using EXAFS, resonant Raman scattering, measurements of fluorescent and Coster-Kronig yields will be performed using Energy and Wavelength dispersive detection set ups.

I am also collaborating with the development of neutrino detector and related electronic setups for the upcoming Indian neutrino experiment INO-ICAL near Madurai. We have got the project for the same.

## Research Publications in International/National Journals:

- 1 WDXRF/ FTIR/UV-Vis based spectroscopic studies of Asphaltum (Shilajeet) for elemental profiling and its metal tagging capability from polluted waters.  
Atul Bhalla, Heena Duggala, J.S. Shahia, Bimal Raia, D. Mehta  
***The Journal of Physics. Photon 108 (2014) 181--191***
- 2 A study of toxicity of selenium, uranium and bromine in ground water of Punjab state in India  
Atul Bhalla, Heena Duggala, J.S. Shahia, Bimal Raia, D. Mehta  
***Journal of Water Research. Photon 136 (2014) 278-288***
- 3 A study of uranium depleting capability of earthenware vessels from drinking water using x-ray fluorescence technique  
Atul Bhalla, Heena Duggala, Gurjeet Singh J.S. Shahia, D. Mehta.  
INT. J. NEW. INN., 2013, 2(1), 482-487
- 4 Growing water footprints in Punjab- A crisis: Cause & Cures  
AtulBhalla, D Mehta and J S Shahi.  
***Journal of Political Science, Vol.VIII. No.2, Nov 2012, ISSN: 0976-8254.***
- 5 Satellite Broadcasting (DTH) and HDTV.  
J S Shahi  
***AIPT Bulletin Vol 4 Number 10, October 2012 ISSN 2277 8950***
- 6 Study of uranium contamination of ground water in Panjab state in India using X-ray fluorescence technique.  
Muhanad.Alrakabi ,G. Singh , Atul Bhalla , Sunil.Kumar , S. Kumar , A. Srivastava ,BimalRai , N. Singh , J.S. Shahi and D. Mehta,  
***Journal of Radioanalytical and Nuclear Chemistry (JRNC) (2011).***
- 7 Elemental analysis of ground water from different regions of Punjab state (India) using EDXRF technique and sources of water contamination.  
AtulBhalla, Gurjeet Singh, Sanjeev Kumar, J.S. Shahi and D. Mehta presented at 4th International conference (ICECS-2011), Singapore, published in ***IJESD, ISSN: 2010-0264.***
- 8 Extensive agricultural activities and environmental degradation in Punjab.  
AtulBhalla, D Mehta and J S Shahi.  
***Journal of Political Science, Vol.VII. No.2, Nov 2011, ISSN:0976-8254.***
- 9 Elastic scattering of 59.54 keV  $\gamma$ -rays in elements with  $22 \leq Z \leq 92$  at momentum transfer  $0.4 \leq x \leq 4.7 \text{ \AA}^{-1}$ .  
S. Kumar, V. Sharma, J.S. Shahi, D. Mehta and N. Singh.  
***Eur. Phys. J. D (2009) 23.***
- 10  $L_i$  ( $i=1,2,3$ ) Sub-shell production cross-section and fluorescence yields for Au, Hg, and Ti.  
M Sharma, Prem Singh J.S. Shahi D. Mehta and Nirmal Singh,  
***X-ray Spectrom.34 (2005) 35.***
- 11 Measurements of Rayleigh, Compton and resonant Raman scattering cross section for 59.536 KeV  $\gamma$ -rays.  
Prem Singh, D. Mehta, N. Singh, S Puri and J.S. Shahi,  
***Nucl.Instrum.and Methods B 225(2004) 198-206***
- 12 Large angle elastic scattering of 14.93 KeV photons.  
Prem Singh, D. Mehta, S Kumar, M Sharma, S Puri, J.S. Shahi and Nirmal Singh,  
***Nucl.Instrum.and Meth. B 222 (2004) 1***
- 13  $L_i$  ( $i= 1,2,3$ ) Sub-shell X-ray production cross-section and fluorescence yields for the elements Ir, Pt, Pb AND Bi,  
Prem Singh, M. Sharma, J.S. Shahi, D. Mehta and N. Singh,  
***Nucl.Instrum.and Methods B 211(2003)33.***
- 14 Hepatotoxin effect of differential doses of Nickel-A biochemical and elemental profile study.  
P Sidhu, Nirmal Singh J.S. Shahi, M L Garg, and, D K Dhawan.,  
***Vinca Bulletin 589 (Oct 2003)***
- 15 Differential cross-section measurements for elastic scattering of 22.10 keV photons by elements with  $6 \leq Z \leq 81$ ,  
Ajay Kumar, J.S. Shahi, D. Mehta and Nirmal Singh.  
***Nucl.Instrum.and Methods B 194 (2002) 105.***
- 16 Differential cross-section measurements for inelastic scattering of 22.10 keV photons by elements with  $4 \leq Z \leq 69$ .  
Ajay Kumar, J.S. Shahi, SanjivPuri, D. Mehta and Nirmal Singh  
***Nucl.Instrum.and Methods B 194 (2002) 99.***
- 17 L X-ray production cross section for Th and U at 17.8, 25.8 and 46.9 keV photon energies.

- Ajay Kumar, SanjivPuri, J.S. Shahi, M.L. Garg, D. Mehta and Nirmal Singh  
*J. Phys. B 34 (2001) 613.*
18. Incoherent scattering of 59.54 keV photons by elements with  $1 \leq Z \leq 82$ .  
J.S. Shahi, Ajay Kumar, D. Mehta, SanjivPuri, M.L. Garg and Nirmal Singh  
*Nucl.Instr.And Meth.B 179 (2001) 15.*
  19. Inelastic scattering of 88.03 keV photons by elements with  $4 \leq Z \leq 83$   
Ajay Kumar, J.S. Shahi, M.L. Garg, S. Puri, D. Mehta and Nirmal Singh  
*J. Phys. B 34, 17 (2001) 3555.*
  20. Large-angle elastic scattering of 88.03 keV photons by elements with  $30 \leq Z \leq 92$ .  
Ajay Kumar, J. S. Shahi, M. L. Garg, Sanjiv Puri, D. Mehta and Nirmal Singh  
*Nucl.Instrum.and Methods B 183 (2001) 178.*
  21. Elemental composition and sources of air pollution in the city of Chandigarh, India, using EDXRF and PIXE techniques.  
H.K. Bandhu, SanjivPuri, M.L. Garg, B.Singh, J.S. Shahi, D.Mehta, Erik Swietlicki, D.K. Dhawan and Nirmal Singh  
*Nucl.Instr.And Meth. B 160 (2000) 126-138.*
  22. Photon induced L x - ray Production differential cross section in thorium at 22.6 keV.  
Sanjiv Puri, D. mehta, J. S. Shahi, M. L. Garg, Nirmal Singh, P. N. Trehan  
*Nucl.Instrum.andMethd. B 154 (1999) 19-25*
  23. Large -angle scattering of 59.54-KeV photons by elements with  $12 \leq Z \leq 92$ . J. S. Shahi, S.Puri, D.Mehta, Nirmal Singh, &P.N.Trehan.  
*Phys. Rev. A 57, (1998) 4327.*
  24. Monitoring of urban air pollution using EDXRF technique. H.K.Bandhu, S.Puri, M.L.Garg, J.S.Shahi, D.Mehta, D.K.Dhawan, Nirmal Singh, P.C.Mangal and P. N. Trahan.*Radiat.Phys.Chem. Vol. 51, No. 4-6, (1998) 625.*
  25. Elemental analysis of poly metallic manganese nodules from central Indian Basin - A study using EDXRF techniques. S.Puri, J. S. Shahi, B. Chand, M. L. Garg, Nirmal Singh, P.N.Trehan N. Nath.  
*X-ray Spectrometry 27 (1998 ) 105.*
  26. Elastic scattering of 22.1 KeV photons by elements in the atomic region  $12 \leq Z \leq 92$ .  
J. S. Shahi, S.Puri, D.Mehta, Nirmal Singh, &P.N.Trehan.  
*Phys. Rev. A 55 (1997) 3557.*
  27. Elemental composition of fly ash from a coal fired thermal power plant- A study using PIXE and EDXRF techniques.  
V. Vijayan, S. N. Behera, V. S. Ramamurty, S.Puri, J. S. Shahi, N. Singh.  
*X-ray Spectrometry 26 (1997) 65.*
  28. An evaluation of sources of air pollution in the city of Chandigarh-A study using EDXRF techniques.  
H. K. Bandhu, S.Puri, J. S. Shahi, D.Mehta, B.Chand, M.L.Garg, Nirmal Singh, P.C.Mangal, C. R. Suri, E. Swietlicky&P.N.Trehan.  
*Nucl.Instrum.andMethd. B 114 (1996) 341.*
  29. EDXRF technique for the elemental analysis of industrial effluents.  
Surinder Singh, R.R.Garg, J.S.Shahi, D.Mehta, N.Singh, S.Kumar, M.L.Garg, P.C.Mangal andP.N.Trehan.  
*Indian Journal of Environmental Health 34 (1992) 33.*
  30. Measurements of L X-ray fluorescence cross-sections and fluorescence yields for elements in the range  $41 < Z < 52$  at 5.96 keV.  
R.R.Garg, S.Puri, S.Singh, D.Mehta, M.L.Garg, J.S.Shahi, Nirmal Singh and P.N.Trehan.  
*Nucl.Instru.andMethd. B 72 (1992) 147.*
  31. Measurement of M X-ray production cross-sections for some elements with  $77 < Z < 90$  using 5.96 keV photons.  
R.R.Garg, S.Singh, J.S.Shahi, D.Mehta, N.Singh, S.Kumar, M.L.Garg, P.C.Mangal and P.N.Trehan.  
*X-ray Spectrometry 20 (1991) 91.*

### **Few Research papers presented in Conferences/Symposia**

1. Photon-atom scattering of 59.54 keV  $\gamma$  rays in elements with  $Z = 12-92$ .  
S. Kumar, V. Sharma, J.S. Shahi, D. Mehta and N. Singh

- Presented in symposium on radiation sources, detection and applications (SRSDA-2007) at Punjabi University, Patiala.*
2. Rayleigh and resonant Raman scattering cross-sections in  $^{83}\text{Bi}$  for 88.03 keV  $\gamma$  rays.  
N. Singh, S. Kumar, P. Singh, J.S. Shahi and D. Mehta;  
*Presented in 20th International Conference X05: x-ray and Inner-Shell Processes, University of Melbourne, Australia. 4-8 July 2005 (2005)*
  3. Measurements of Raman scattering cross-sections in Yb, Lu, and Hf.  
P. Singh, A. Kumar, J.S. Shahi, S. Puri, , D. Mehta and N. Singh  
*Proceedings of workshop on Recent Advances in radiation Physics, Punjabi University Patiala, India, p 21 (2003)*
  4.  $L$  shell Coster-Kronig and fluorescence yields for elements with  $77 \leq Z \leq 83$   
M. Sharma P. Singh, J.S. Shahi, S. Puri, , D. Mehta and N. Singh  
*Proceedings of workshop on Recent Advances in radiation Physics, Punjabi University Patiala, India, p 7 (2003)*
  5. Measurements of scattering cross-section for the 14.93 keV photons at an angle of  $133^\circ$ .  
P. Singh, S. Kumar, S. Puri, J.S. Shahi, D. Mehta and N. Singh;  
*Presented in 15<sup>th</sup> National symposium on Radiation Physics 2003, BARC, Mumbai India p. 46(2003).*
  6.  $L_1$ - $L_2$  Coster-Kronig yields for the element with  $77 \leq Z \leq 92$ .  
M. Sharma, P. Singh, S. Puri, J.S. Shahi, D. Mehta and N. Singh;  
*Presented in 15<sup>th</sup> National symposium on Radiation Physics 2003, BARC, Mumbai. p. 50 (2003).*
  7. Measurement of elastic and inelastic (Compton and resonant Raman scattering) cross-sections  
Prem Singh, Ajay Kumar, J.S. Shahi, S. Puri, D. Mehta and Nirmal Singh  
*Presented in 15<sup>th</sup> National symposium on Radiation Physics 2003, BARC, Mumbai, (2003) P7*
  8. Differential cross sections for inelastic scattering in the elements with  $4 \leq Z \leq 69$  at 88.03 keV photon energy  
Ajay Kumar, J.S. Shahi, M.L. Garg, SanjivPuri, D. Mehta and Nirmal Singh  
*Presented in 7th Symposium on Radiation Physics at Punjabi University, Patiala, March 26-27, 2001*
  9. Elastic and inelastic scattering of 22.1 keV photons from C, S, As, Se, Ag, Ho and Tm  
Ajay Kumar, J.S. Shahi, SanjivPuri, D. Mehta and Nirmal Singh  
*Presented in 14<sup>th</sup> National symposium on Radiation Physics 2001, Guru Nanak Dev University, Amritsar, Nov. 1-3, 2001*
  10. Elemental analysis and thickness determination of multilayer samples using x-ray fluorescence and scattering measurements  
J.S. Shahi, Ajay Kumar, D. Mehta and Nirmal Singh  
*Presented in 14<sup>th</sup> National symposium on Radiation Physics 2001, Guru Nanak Dev University, Amritsar, Nov. 1-3, 2001*
  11. Study of Uranium Contamination of Ground water In Punjab using X-ray Fluorescence technique.  
Muhanad. Alrakabi, AtulBhalla, Gurjeet Singh, Sunil Kumar, Sanjeev Kumar, AlokSrivastava, N. Singh, J.S. Shahi, and D. Mehta, *Presented in Fourth International Symposium on Nuclear Analytical Chemistry (NAC-IV), Bhabha Atomic Research Centre, Trombay, Mumbai, India, November 15-19, 2010.*
  12. Flyash from thermal power plant as a possible source of contamination of ground water, Gurjeet Singh, AtulBhalla. Muhanad. Alrakabi, Sunil Kumar, Sanjeev Kumar, N. Singh, J.S. Shahi and D. Mehta, *presented in International conference at KMV Jalandhar, Punjab (2010).*
  13. Investigations relevant to uranium contamination of ground water in Malwa region of Punjab state.  
AtulBhalla, Muhanad. Alrakabi, Gurjeet Singh, Sunil Kumar, Sanjeev Kumar, BimalRai, AlokSrivastava, N. Singh, J.S. Shahi and D. Mehta, , *presented in International conference at KMV Jalandhar, Punjab (2010).*
  14. EDXRF monitoring of toxic elements in ground water of Malwa region in Punjab.  
Muhanad. Alrakabi, Gurjeet Singh, AtulBhalla, Sunil Kumar, Sanjeev Kumar, N. Singh, J.S. Shahi and D. Mehta, , *Presented in National Symposium on Radiation Physics and Nanomaterials (NSRPN-11) February 04-05, 2011, Physics Department, Punjab University, Patiala .*
  15. Elemental analysis of water using EDXRF - need for chemical speciation of Br.  
AtulBhalla, Gurjeet Singh, HeenaDuggal, M. Alrakabi, J.S. Shahi and D. Mehta *presented at International Conference at University of Kerala, Thiruvananthapuram, Kerala, 9-11, Dec 2011.*
  16. Sources of Uranium contamination in ground waters of Malwa region, Punjab  
AtulBhalla, G. Singh, M. Alrakabi, J.S. Shahi and D. Mehta *presented at National conference on Advanced materials and radiation (AMRP-2011), SLIET, Longowal, Sangrur on 4-5, Nov 2011.*
  17. Earthenware Ceramic Pottery: A Potential Remedial Tool for Decontaminating Drinking Water.

Atul Bhalla, Heena Duggal, Gurjeet Singh, J.S. Shahi and D. Mehta *presented at Chandigarh Science congress, 2012.*

18. Growing Water Footprint In Punjab: 20-points for solving the Crisis  
AtulBhalla, HeenaDuggal, J.S. Shahi and D. Mehta *presented at National conference,DAV College,Jalandhar held on 2-3,march,2012.*