CURRICULUM VITAE

1. **Name** : Dr. Gurjeet Singh
2. **Designation** : Assistant Professor
3. **Department** : Physics
4. **University/Institute** : Punjabi University, Patiala

5. **Broad Area :** : Physical and Environmental Science
6. **Specialization** : Atomic and Nuclear radiation Physics, Material & Environmental Science
7. **Nature of Present Employment:** Regular
8. **Area of Interest** : X-ray Spectroscopy:

9. **Mailing Address** : Department of Physics, Punjabi University, Patiala, Punjab-147002, India.
Mobile: +918872118772
Email ID: gurjeet_physics@pbi.ac.in, gurjeets59@gmail.com

10. **Date of Birth** : 26 July 1983
11. **Academic Qualifications**

S.No.	Degree	University/ Board	Year of passing	Thesis topic/ subject studied	Division
1.	Doctor of Philosophy (Ph.D)	Panjab University Chandigarh	2014	Investigation of atomic inner-shell vacancy decay and photon-atom scattering processes	Paper in Physical Review Letter
2.	Master of Philosophy (M.Phil)	Panjab University Chandigarh	2009	Study of resonant Raman Scattering in the X-Ray energy region	Ist
3.	Master of Science (M.Sc)	Punjabi University, Patiala	2007	Physics	Ist
4.	Bachelor of Science (B.Sc)	S.C.D Government college, Ludhiana	2005	Physics, Chemistry, Maths, Punjabi, English	Ist

12. Experience in research area

(a) X-ray spectroscopy

X-ray scattering (coherent and Incoherent x-ray scattering from soild, liquid, polymers and nano-materials), Resonant Rama X-ay scattering (RRS), Alignments of emitted x-rays, X-ray fluorescence cross sections, K to L and L to M shell vacancy transformation probabilities, X-ray fluorescence yields and Coster-Kronig transition probabilities, Characterization of solid state detectors

(b) X-ray diffraction

Determination of crystalline size, crystalline phase, crystalline structure and quantitative elemental analysis.

(c) Heavy ion induced x-ray photoionization

Wake field analysis, X-ray cross sections.

(d) Spectroscopy analysis:

Analysis of environmental samples, biological and synthetic (nano, polymers) materials.

(e) Scanning electron microscope:

13.Details of employment including current employment

No.	Period of Employment		Name of Employer/Organization	Post held	Major Job Responsibilities and Nature of Experience
	From	To			
1	Aug 2014	Feb 2015	GGDSD College, Chandigarh	Assistant Professor	Teaching and research
2	March 2015	August 2015	Panjab University, Chandigarh	Post-doctoral Fellow	Teaching and research
3	Sept, 2015	March 2016	Arya College, Ludhiana	Assistant Professor	Teaching and research
4	April, 2016	Continuing	Punjabi University, Patiala	Assistant Professor	Teaching and research

14. Professional recognition, awards, fellowships received

1. **UGC Postdoctoral Fellowship (2015):** Awarded by University Grant Commission (UGC), New Delhi (India).
   Total Approved Amount: 3223900/-

2. **Rajiv Gandhi National Fellowship (2011) for doctoral students:** Awarded by University Grant Commission (UGC), New Delhi (India).
   Total Approved Amount: 1750600/-

3. **Junior Research Fellowship (2009) in project:** Awarded by: Council for Scientific and Industrial Research (CSIR), New Delhi (India).
   Total Approved Amount: 228600

4. **Project proposal accepted (2015) by** SLAC National Accelerator Laboratory, Stanford Synchrotron Radiation Light Source, Stanford University, USA

15. Details of project being implemented/ completed as Principal Investigator/ Co-PI along with its salient features.

1. **Uranium in Drinking water (2011) : Co-Principal Investigator (Completed)**
   Awarded by Punjab Pollution Control Board, Patiala (India)

2. **UGC Post-Doctorate Fellowship (2015); : Principal Investigator (Left for Job)**
   Awarded by University Grant Commission (UGC), New Delhi (India)
   .
3. **Young Scientist Award ((2016): Principal Investigator (Ongoing)**
   Awarded by Science Engineering Research Board (SERB), New Delhi.

16. SUMMARY OF RESEARCH WORK DONE (Research experience)

M.PHIL DEGREE DETAILS (2009)

TITLE OF M.PHIL THESIS: Study of resonant Raman Scattering in the X-Ray energy region

INSTITUTE: Department of Physics, Panjab University, Chandigarh (India)

Ph.D DEGREE DETAILS (2014)

TITLE OF Ph.D THESIS: Investigation of atomic inner-shell vacancy decay and photon-atom scattering processes

INSTITUTE: Department of Physics, Panjab University, Chandigarh (India)

POST DOCTRATE DETAILS (2015)

INSTITUTE: Department of Physics, Panjab University, Chandigarh (India)

2007-2009

Master of Philosophy: Towards the partial fulfillment of requirements for the completion of "M.Phil. Course in Physics" I participated in various experiments regarding photon-atom interaction processes at EDXRF Laboratory Panjab university, Chandigarh. I have studied

the various characterization parameters of the low energy Ge detector via. efficiency calibration, escape fraction, dead layer thickness and energy resolution measurements. The L_3-M radiative Resonant Raman Scattering (RRS) cross-section in the $_{59}$Pr element [K-shell binding energy (B_{L3}) = 5.964 keV, level width (Γ_{L3}) = 3.6 eV] has been measured using $PrCl_3$ compound for the unpolarised Mn-$K\alpha$ x-rays ($E_{K\alpha 2}$ = 5.888 keV, $E_{K\alpha 1}$ = 5.899 keV and line width $\Gamma_{K\alpha i}$ ~ 1.49 eV). The experimental set-up involved an annular radioactive ^{55}Fe annular source and a low-energy Ge (LEGe) detector in horizontal configuration. Attenuation of the characteristic L_i-subshell x-rays of $_{83}$Bi element has been measured in the $_{82}$Pb element. The characteristic x-rays were obtained from fluorescence of the $_{83}$Bi target by the 59.54 keV γ rays from the ^{241}Am radioisotope.

2009-2014

Doctoral of Philosophy Experimental Atomic Physics: After the completion of degree in Master of Philosophy in Physics, I joined the Experimental Atomic Physics group at Panjab University in 2009 as a Ph.D student and completed my doctoral programme. The thesis work involves the

(a) Measurements of coherent and incoherent scattering of the Mn-$K\alpha$ x-ray photons for elements/compounds in liquid phase through the large scattering angle and comparison with theoretical values

(b) Thesis work discusses the various near-edge processes (RRS, XAFS) and their influence in the elemental analysis using x-ray emission based techniques. A list of pairs of characteristic incident x-ray energies and attenuator elements across the periodic table where XAFS contribute significantly for the same or another elements has been tabulated.

(c) Alignment of the L_3 subshell (J = 3/2) vacancy states in case of the $_{82}$Pb, $_{90}$Th and $_{92}$U elements produced in selective photoionization have been investigated through angular distribution measurements of the emitted L_3 subshell x-rays. The effect of the magnetic field on the L_3 subshell vacancy alignment following photoionization has also been investigated.

(d) A computer programme has been written, which has been used to optimize the thickness of the combination of selective filters in order to achieve the best

detection limit in the x-ray detection energy region of interest. This is useful for trace elemental analysis.

(e) The elemental analysis of coal and flyash samples from the thermal power plants have been performed to investigate contamination of ground water in the Malwa region of Punjab state in India. Further, SEM, XRD and CHNS analytical techniques have been used for characterization of flyash relevant to the studies.

(f) I have studied the water and soil samples using EDXRF and WDXRF techniques. I am member of companion of the fact sheet " Uranium in ground water" available at http://physics.puchd.ac.in/dmehta/uranium-facts-201207.pdf

(g) I have experience of atomic physics beam line at Inter University Accelerator Centre (IUAC), New Delhi**.**

2015

Post-Doctorate:

Two computer programs had written to calculate the theoretical values of elastic and inelastic scattering cross section.

(a) The first computer programme calculate the elastic scattering cross section at momentum transfer $0.00001 \leq x \leq 1000$ for elements/compounds in the atomic range $1 \leq Z \leq 92$. This program calculates the theoretical values of elastic scattering cross section based on various approximations, namely, non- relativistic form factor (NFF) [3], relativistic form factor (RF) [4], modified form factor (MFF) [5] and modified form factor (MFF) with anomalous scattering factor (ASF) [6] for various elements/compounds.

(b) The second computer program calculates the inelastic scattering cross section at momentum transfer $0.00001 \leq x \leq 10^9$ for elements/compounds in the atomic range $1 \leq Z \leq 92$. This program calculate the theoretical values of elastic scattering cross section based on result tabulated by various researchers, namely, Hubbell et. al [7] and Ribberfors et.al [8] , for various elements/compounds.

(c) To extract the various heavy elements from soil and flyash , zero valent nanoparticles stabilized with with carboxymethyl cellulose through chemical reduction by sodium borohydrid has been produced.

17.Technical Skills

(a) Operating System:

Windows XP/2000/Vista, Linux

(b) Software Knowledge:

1. X-ray fluorescence spectroscopy:

Spectrplus, Gupix, Candle, Gennie, PyMCA

2. X-ray Diffraction

Crystal impact (Match), XDML, Highscore

3. Simple data analysis software

Excel, Quatterpro, Origin

4. Graphics designer software

Corel Draw, Gimp

5. Documentation software

MS-Office, Latex,

(c) Programming Languages:

High Level Language: **C++,** FORTRAN.

Experimental Techniques

Experimental Techniques: SAXS**,** WDXAS**,** WDXRF**,** EDXRF, SXRF, XRD, SEM, Pelletizer, Thermal Evaporation Unit.

List of Publications

A. Publications in SCI Journals:

1. Contribution of near-edge processes to the L X-ray emission lines for various Lanthanum (III) compounds, *N. Rani, H.S. Kainth, S. Singh B.S.. Singh,* **Gurjeet Singh,** Radiat. Phys. Chem. 201 (2022) 110648.
2. Measurement of uranium in phosphate fertilizers for groundwater contamination employing X-ray and γ-ray spectroscopic techniques, ***Gurjeet Singh****, H.S. Kainth, G. Singh, N. Rani, H. Duggal, A. Upmanyu, A. Bhalla, S. Kumar, D. Mehta,* J. Radioanal. Nucl. Ch. 331 (2022) 1715.
3. Observation of chemical speciation on L X-ray emission spectra for gadolinium (III) materials, *N. Rani, H.S. Kainth, D. Khandelwal, R. Singh,* **Gurjeet Singh**, J. Alloys Compd. 902 (2022) 163783.
4. Influence of binding effects in cerium material for Lq (q =1, η and α_{12}) X-ray emission spectra, *N. Rani, H.S. Kainth, A. Garg, D. Khandelwal, S. Singh,* **Gurjeet Singh**, J. Alloys Compd. 881 (2021) 160617.
5. Rapid elemental composition analysis of spinach samples employing wavelength dispersive X-ray fluorescence spectroscopy, *H.S. Kainth, T. Singh, D. Khandelwal,* ***Gurjeet Singh****, S. Puri, I,* Spect. Lett. 54 (2021) 266, DOI: 10.1080/00387010.2021.1926286
6. Experimental and theoretical L-shell ionization cross sections of heavy atoms by impact of Si ions *M. Oswal, S. Kumar, U. Singh, S. Singh,* ***Gurjeet Singh,*** *K.P. Singh, D. Mehta, A.M.P Mendez, D.M. Mitnik, C.C. Montanari, D. Mitra, T. Nandi*, Radiat. Phys. Chem. 176 (2020) 108809.
7. Contribution of flyash from coal-fired thermal power plants to uranium contamination of ground water . *Gurjeet Singh, G. Singh, Nisha Rani, Atul Bhalla, Arun Upmanyu, S. Kumar, D. Mehta,* J. Radioanal. Nucl. Ch 318 (2018) 857
8. L x-ray production cross sections in high-Z atoms by 3–5 MeV/u silicon ion, *M. Oswal, S. Kumar, U. Singh,* ***Gurjeet Singh,*** *K.P. Singh, D. Mehta, C.C. Montanari, T. Nandi*, Nucl. Instrum. Meth.B 416 (2018) 110.
9. Alignment of L3 subshell vacancy states created without Coster-Kronig decay through the selective photoionization in 82Pb, 90Th and 92U and effect of external

magnetic field ***Gurjeet Singh***, *G. Singh, A. Upmanyu, S. Kumar, H.S. Kainth, D. Mehta*, Eur. Phys. J. D 71 (2017) 248.

10. L shell x ray production in high-Z elements using 4–6 MeV/u fluorine ions, S. Kumar, U. Singh, M. Oswal, ***Gurjeet Singh,*** N. Singh, D. Mehta, T. Nandi, G. Lapicki, Nucl. Instrum. Meth.B 395 (2017) 39.
11. Alignment of L_3 subshell vacancy states in Au, Bi, Th and U following photoionisation and effect of external magnetic field. *M. Alrakabi, S. Kumar, V. Sharma, **Gurjeet Singh** and D. Mehta*, Eur. Phys. J. D (2013) 67.
12. Fast ion surface energy loss and straggling in the surface wake fields. *T. Nandi, K. Haris, Hala, **Gurjeet Singh**, P. Kumar, R. Kumar, S.K. Saini, S. A. Khan, A. Jhingan, P. Verma, A. Tauheed, D. Mehta and H G Berry*, Phys. Rev. Lett. (PRL) 110 (2013) 163203.
13. Reply to query related to "Study of uranium contamination of ground water in Punjab state in India using X-ray fluorescence technique. *Gurjeet Singh, A. Bhalla, S. Kumar, M. Alrakabi, S. Kumar, A. Srivastava, B. Rai, N. Singh, J. S. Shahi and D. Mehta*, J. Radioanal. Nucl. Ch. 298 (2013) 731.
14. Influence of near-edge processes in the elemental analysis using X-ray emission based techniques. ***Gurjeet Singh***, *S. Kumar, N. Singh, J. Goswamy and D. Mehta*, Pramana-J. Phys. 76 (2011) 223.
15. Study of Uranium contamination of ground water in Punjab using X-ray fluorescence technique. *M. Alrakabi, Gurjeet Singh, A. Bhalla, S. Kumar, S. Kuma, A. Srivastava, B. Rai, N. Singh, J.S. Shahi and D. Mehta,* J. Radioanal. Nucl. Ch. 294 (2012) 221.
16. Influence of resonant Raman scattering in the elemental analysis using X-ray emission based techniques. *S. Kumar, **Gurjeet Singh**, S. Kumar, D. Mehta and N. Singh*, Nucl. Instrum. Meth. B 268 (2010) 2437.

B. Book Chapters

1. Role of trace elements in breast cancer and their characterization using X-ray fluorescence techniques *H.S. Kainth, D. Khandelwal, R. Singh, **Gurjeet Singh** and S. Puri,* IntechOpen 2021, 1-21, *DOI: http://dx.doi.org/10.5772/intechopen.95491*.
2. Investigation of photon atom interactions in various chemical materials employing X-ray spectroscopic techniques, *N. Rani, H.S. Kainth, A. Garg and G. Singh* , Nova Science Publisher, INC, New York, 2021. *http://doi.org/10.52305/ZDSJ28841*.

3. X-ray fluorescence spectroscopy: Rapid tool for assessment of elemental composition in various environmental samples, *N. Rani, H.S. Kainth, A. Garg and G. Singh* , Nova Science Publisher, INC, New York, 2021. *http://doi.org/10.52305/ZDSJ28841*
4. Lab-scale Wavelength Dispersive X-Ray Fluorescence Spectrometer and Signal Processing Evaluation *H.S. Kainth, T. Singh,*). **Gurjeet Singh**, *D Mehta* Wiley Online Library (2022) https://doi.org/10.1002/9781119645719.ch33. Book Title X-Ray Fluorescence in Biological Sciences (eds V.K. Singh, J. Kawai and D.K. Tripathi

C. Publications in conference proceeding:

1. Elemental analysis of ground water from different regions of Punjab state (India) using EDXRF technique and the sources of water contamination. *A. Bhalla,* ***Gurjeet Singh****, S. Kumar, J.S. Shahi and D. Mehta*, IPCBEE vol.19 (2011) IACSIT Press, Singapore.
2. N. Rani, S. Rani, K. Bansal, S. Singh and G. Singh, Characterization of fly ash using different techniques: A review. AIP Publishing LLC. 5th National E-Conference on Advanced Materials and Radiation Physics, November 9-11, 2020, Longowal, Punjab, India.
3. S. Rani, K. Bansal, N. Rani, M.T. Ilyas, G. Singh and S. Singh, Facile solution combustion based synthesis of V2O5 nanocrystals and size-strain study by XRD analysis, AIP Publishing LLC. 5th National E-Conference on Advanced Materials and Radiation Physics, November 9-11, 2020, Longowal, Punjab, India.
4. *K. Bansal, S. Rani, N. Rani, G. Singh and S. Singh, Physical and radiation shielding properties of tantalum-zinc-sodium-borate glasses. AIP Publishing LLC. 5th National E-Conference on Advanced Materials and Radiation Physics, November 9-11, 2020, Longowal, Punjab, India.*

D. Publications in Symposium/ Conferences:

1. Characterization of low energy germanium (LEGe) Detector. ***Gurjeet Singh****, S. Kumar, V. Sharma, S. Kumar, D. Mehta and N. Singh*, 3rd Chandigarh Science congress (2009).
2. Effect of Coster-Kronig transition on the L_3-subshell vacancy alignment in $_{58}$Ce, $_{59}$Pr and $_{60}$Nd following photoionization. ***Gurjeet Singh****, M. Alrakab, S. Kumar, A. Bhalla and S. Kumar*, 13th Punjab Science Congress (2010).

3. Effect of external magnetic field on the *L* x-ray emission in case of $_{79}$Au, $_{83}$Bi, $_{90}$Th, and $_{92}$U following photoionization. *M. Alrakabi, **Gurjeet Singh**, S. Kumar, D. Mehta and N. Singh*, 13th Punjab Science Congress (2010).
4. Study of Chemical Effect on Li subshell X-ray emission for $_{80}$Hg, $_{82}$Pb and $_{83}$Bi elements. *S. Kumar, **Gurjeet Singh**, S. Kumar, D. Mehta and N. Singh*, 4th Chandigarh Science Congress (2010).
5. Study of uranium contamination of ground water in Punjab using X-ray fluorescence technique. *M. Alrakabi, **Gurjeet Singh**, A. Bhalla, S. Kumar, S. Kumar, A. Srivastava, B. Rai, N. Singh, J.S. Shahi and D. Mehta*, Fourth International Symposium on Nuclear Analytical Chemistry (NAC-IV), 2010.
6. Investigations relevant to uranium contamination of ground water in malwa region of Punjab State. *A. Bhalla, M. Alrakabi, **Gurjeet Singh**, S. Kumar, S. Kumar, B. Rai, A. Srivastava, N. Singh, J.S. Shahi and D. Mehta*, International Conference on Environmental Challenges (ICEC-10).
7. Fly ash from thermal power plants as a possible source of uranium contamination of ground water. ***Gurjeet Singh**, A. Bhalla, M. Alrakabi, S. Kumar, S. Kumar, N. Singh, J.S. Shahi and D. Mehta*, International Conference on Environmental Challenges (ICEC-10).
8. Elemental analysis of water using EDXRF - need for chemical speciation of Br. *A. Bhalla, **Gurjeet Singh**, H. Duggal,, M. Alrakabi, J.S. Shahi and D. Mehta*, International Conference on Climate Change, Forest Resource and Environment (ICCFRE 2011).
9. Trace element analysis of aerosol samples using EDXRF and PIXE Technique. *M. Oswal, S. Kumar, B.P. Mohanty, R. Kaur, S. Kumar, B.R. Behera, A. Kumar, **Gurjeet Singh**, M.L. Garg and K.P. Singh*, National Symposium on Radiation Physics and Nanomaterials (NSRPN-11).
10. Measurements of *L* X-ray Intensity ratios for high-Z elements following ionization by ^{19}F ions. *S. Kumar, M. Oswal, **Gurjeet Singh**, G. Lapicki, S.C. Bedi, T. Nandi, N. Singh and D. Mehta*, National Symposium on Radiation Physics and Nanomaterials (NSRPN-11).
11. Elemental analysis of industrial waste water drained to Sutlej river and ground water from North-east region in Punjab. *A. bhalla, **Gurjeet Singh**, M. Alrakabi, R.*

Singh, H. Duggal, D. Mehta and N. Singh, National Symposium on Radiation Physics and Nanomaterials (NSRPN-11).

12. EDXRF monitoring of toxic elements in ground water of Malwa region in Punjab. *M. Alrakabi, **Gurjeet Singh**, A. Bhalla, S. Kumar, S. Kumar, N. Singh, J.S. Shahi and D. Mehta,* National Symposium on Radiation Physics and Nanomaterials (NSRPN-11).
13. Trace elemental analysis using a versatile and easy to handle EDXRF setup. ***Gurjeet Singh**, M. Alrakabi, S. Kumar, V. Sharma, D. Mehta and N. Singh*, National Symposium on Radiation Physics and Nanomaterials (NSRPN-11).
14. Elemental analysis of ground water from different regions of Punjab state (India) using EDXRF technique and the sources of water contamination. *A. Bhalla, **Gurjeet Singh**, S. Kumar, J.S. Shahi and D. Mehta*, International Conference on Environmental and Computer Science (ICECS-2011).
15. Sources of uranium contamination in ground waters of Malwa region, Punjab. *A. Bhalla, **Gurjeet Singh**, M. Alrakabi, J.S. Shahi and D. Mehta*, 2nd National Conference on Advanced Materials & Radiation Physics (AMRP-11).
16. Elemental analysis of marshes, rivers and ground water in Thi Qar region, Iraq. *Muhand Alrakabi, **Gurjeet Singh**, S. Kumar, N. Singh and D. Mehta*, 2nd National Conference on Advanced Materials & Radiation Physics (AMRP-11).
17. Selective absorption filters for enhancing detection limit in case of EDXRF analysis using bremsstrahlung radiation. ***Gurjeet Singh**, V. Gupta, G. Singh, S. Kumar and D. Mehta.* 2nd National Conference on Advanced Materials & Radiation Physics (AMRP-11).
18. Characterization of low energy Ge x-ray detector. *Gurjeet Singh, V. Gupta, S. Kumar and D. Mehta,* 2nd National Conference on Advanced Materials & Radiation Physics (AMRP-11).
19. *L* x-ray production cross sections for $_{78}$Pt, $_{79}$Au, $_{82}$Pb, $_{83}$Bi, $_{90}$Th and $_{92}$U elements using 76 – 114 MeV $F^{+6,7,8}$ ions. *S. Kumar, M. Oswal, **Gurjeet Singh**, G. Lapicki, S.C. Bedi, T. Nandi, N. Singh and D. Mehta*, 2nd National Conference on Advanced Materials & Radiation Physics (AMRP-11).
20. Earthenware cermic pottery: a potential remedial tool for decontaminating drinking water. *A. Bhalla, H. Duggal, **Gurjeet Singh**, J.S. Shahi and D. Mehta*, 6th Chandigarh Science Congress (2012).
21. Photoionisation-induced alignment of L_3 subshell vacancy state in uraniu *V. Gupta, **Gurjeet Singh**, A. Bhalla and D. Mehta,* 6th Chandigarh Science Congress (2012).

22. Elemental analysis of the Cr (III) and Fe (III) ion doped ZnO nano-material using EDXRF Technique. *S. Kumar,* ***Gurjeet Singh****, R. Singh and D. Mehta*, 6th Chandigarh Science Congress (2012).
23. Elemental analysis of some ceria-based synthesized catalyst particles using EDXRF technique. *G. Singh,* ***Gurjeet. Singh****, S. Mandal, B. Chowdhury and J.S. Shahi*, 6th Chandigarh Science Congress (2012).
24. Elemental analysis of fly ash from thermal power plants using EDXRF and WDXRF techniques. ***Gurjeet Singh****, T. Singh, N. Singh and D. Mehta*, 6th Chandigarh Science Congress (2012).
25. Determination of escape peak probability and efficiency of low energy germanium (LEGe) detector. ***Gurjeet Singh****, S. Kumar, S. Kumar and D. Mehta*, International Conference on Recent Trends in Nuclear Physics (2012).
26. Elemental analysis of Di-ammonium phosphate fertilizer using X-Ray fluorescence technique. ***Gurjeet Singh****, H. Duggal, G. Singh, V. Gupta and D. Mehta*, 7th Chandigarh Science Congress (2013).
27. Characterization of flyash and coal from thermal power plants. ***Gurjeet Singh****, G. Singh, V. Gupta and D. Mehta*, 7th Chandigarh Science Congress (2013).
28. Alignment of L_3 subshell vacancy states in $_{82}$Pb, $_{90}$Th and $_{92}$U following selective photoioization and effect of external magnetic fields. ***Gurjeet Singh****, V. Gupta, H. Duggal, G. Singh and D. Mehta*, 7th Chandigarh Science Congress (2013).
29. Measurements of scattering cross section for 5.895 keV photons from various elements/compounds in liquid phase, ***Gurjeet Singh****, G. Singh, S. Kumar and D. Mehta*, 8th Chandigarh Science Congress (2014).
30. Contribution of Di-ammonium phosphate fertilizer to ground water contamination, ***Gurjeet Singh****, H. Duggal, S. Kumar and D. Mehta*, 8th Chandigarh Science Congress (2014).
31. Measurements of elastic and inelastic scattering for 5.895 keV photon from various polymers, *H. Duggal,* ***Gurjeet Singh****, G. Singh, S. Kumar and D. Mehta*, 8th Chandigarh Science Congress (2014).
32. Measurements of total scattering for 5.895 keV photon from various polymers in liquid phase, *H. Duggal,* ***Gurjeet Singh****, S. Kumar and D. Mehta*, 8th Chandigarh Science Congress (2014).