

***Dr. MUMTAZ OSWAL***

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**Ph. No.:** 9988708584

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***EDUCATION:***

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- Ph.D. in **Experimental Atomic and Nuclear Physics** from Department of Physics, Panjab University, Chandigarh, INDIA in August 2012.
- **Thesis Title:** Investigations of Ion-atom collision processes through x-ray emission and analytical applications using x-ray emission techniques.
- **UGC NET June 2006 Qualified.**
- **M.Sc.-hons (physics), Department of Physics, Panjab University Chandigarh,**
- **B.Sc. (Computer Applications), MCM DAV College, Sec-36, Chandigarh**

***Ph.D. Guidance:*** Co-guiding a Ph.D. Student Mr. Shashank Singh from Department of Physics, Panjab University, Chandigarh.

***WORK EXPERIENCE***

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- Assistant Professor in GCG-11 Chandigarh from 18<sup>th</sup> Dec 2006 to 28<sup>th</sup> Feb 2007 on contract basis.
- Assistant Professor in MCM DAV, Sec-36, Chandigarh from 30<sup>th</sup> Aug 2010 to 28<sup>th</sup> Feb 2011 on adhoc basis.
- Assistant Professor in MCM DAV, Sec-36, Chandigarh from 15<sup>th</sup> July 2011 to 28<sup>th</sup> Feb 2012 on adhoc basis.
- Assistant Professor in MCM DAV, Sec-36, Chandigarh from 17<sup>th</sup> July 2012 to 28<sup>th</sup> Feb 2013 on adhoc basis.
- Assistant Professor in DAV, Sec-10, Chandigarh from 22<sup>nd</sup> July, 2013 to 28<sup>th</sup> Feb, 2014 on adhoc basis.
- Assistant Professor in GGSDS College, Sec-32, Chandigarh from 15<sup>th</sup> Jan, 2015 to 27<sup>th</sup> Apr, 2015 on adhoc basis.
- Assistant Professor in Dev Samaj College for Women, Sec-45/B, Chandigarh on Regular Basis from 17<sup>th</sup> Sept, 2015 to 27<sup>th</sup> April, 2021 (FN).
- Assistant Professor in DAV College, Sector 10, Chandigarh on permanent basis (Grant in aid) from 27<sup>th</sup> April, 2021 (AN) to till date.

## ***RESEARCH EXPERIENCE***

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- Operate cyclotron at Department of Physics, Panjab University, Chandigarh.
- PIXE experiments at Cyclotron Lab.
- Participated in installing Atomic Physics beam line at IUAC, New Delhi.
- Various types of sample preparation for PIXE, PIGE experiments.

## **LIST OF PUBLICATIONS**

1. Understanding the mechanisms of L-shell X-ray emission from Os atoms bombarded by 4-6 MeV/u fluorine ion Soumya Chatterjee, Sunil Kumar, Sarvesh Kumar, M Oswal, Biraja Mohanty, D. Mehta, D. Mitra, A. M. P. Mendez, D. M. Mitnik, C. C. Montanari, L. Sarkadi, and T. Nandi, *Physica Scripta* 97 (2022) Vol 4 045405.
2. K-shell ionization cross sections of Cu, Zn and Ge by 3–5 MeV/u Si-ion bombardment. Shashank Singh, Mumtaz Oswal, Sunil Kumar, K.P. Singh, D. Mitra, T. Nandi, *Nuclear Inst. and Methods in Physics Research B* 512 (2022) 21-27.
3. Significance of the high charge state of projectile ions inside the target and its role in electron capture leading to target-ionization phenomena. Soumya Chatterjee, Prashant Sharma, Shashank Singh, Mumtaz Oswal, Sunil Kumar, C. C. Montanari, D. Mitra, and T. Nandi, *PHYSICAL REVIEW A* 104, 022810 (2021).
4. Experimental and theoretical L-shell ionization cross sections of relativistic heavy atoms by impact of Si ions. **M. Oswal**, Sunil Kumar, Udai Singh, G. Singh, K. P. Singh, D. Mehta, A. Méndez, D. M. Mitnik, C. C. Montanari, D. Mitra, T. Nandi. *Radiation Physics and Chemistry* 176 (2020) 108809.
5. Chemical characterization of Indian coal and coal residues by PIGE and PIXE spectroscopy using proton beams from tandem particle accelerators. Shashank Singh, Mumtaz Oswal, Sk Wasim Raja, S Santra, R Acharya, BR Behera, Ashok Kumar, KP Singh. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 478 (2020) 205-217.
6. PIXE analyses of green and roasted coffee beans and filter coffee powder for the inter-comparison study of major, minor and trace elements. *AIP Conference Proceedings* 2220 (2020) 130032.
7. Study of Low-Lying States in  $^{69}\text{Ga}$ . Shashank Singh, Mumtaz Oswal, Ashok Kumar, Gulzar Singh, K.P. Singh. *Romanian Journal of Physics* **65**, 304 (2020).

8. Investigation on major, minor and trace elements in some medicinal plants using particle induced X-ray emission. Shashank Singh, **Mumtaz Oswal**, B.R. Behera, Ashok Kumar, S Santra, R Acharya, K.P Singh. Journal of Radio analytical and Nuclear Chemistry 323 (2020) 1443.
9. L X-ray production cross sections in high Z atoms by 3-5 MeV/u Silicon ions. **Mumtaz Oswal**, Sunil Kumar, Uday Singh, G. Singh, K.P Singh, D. Mehta, D. Mitnik, C. C. Montanari, T. Nandi. NIM B 416 (2018) 110-118.
10. L shell X-ray production in high Z elements using 4-6 MeV/u Fluorine ions. Sunil Kumar, Uday Singh, **Mumtaz Oswal**, G. Singh, N. Singh, D. Mehta, T. Nandi, G. Lapicki. NIM B 395 (2017) 39-51.
11. Measurement of multi-nucleon transfer cross sections in  $^{58}\text{Ni}$ ,  $^{56}\text{Fe}$  ( $^{12}\text{C}$ , X); X:  $^{13,11}\text{C}$ ,  $^{11,10}\text{B}$ ,  $^{10,9,7}\text{Be}$ ,  $^8\text{Be}_{\text{gs}}$ , and  $^{7,6}\text{Li}$  at  $E(^{12}\text{C}) = 60 \text{ MeV}$ ". B. J. Roy, A. Parmar, T. Nandi, Biraja Mohanty, **M. Oswal**, Sunil kumar, A. Jhingan, V. Jha, and D. C. Biswas. Pramana Journal of Physics, Vol 86, No. 1, January 2016, 97-108
12. Study of Lifetimes of Low-lying Levels in  $^{53}\text{Mn}$ . K.P. Singh, **Mumtaz Oswal**, B.R. Behera, Gulzar Singh, Ashok Kumar. European Physical Journal A - "Hadrons and Nuclei" (2015)51: 54
13. Elemental Analysis of Ground Water Using PIXE and PIGE Techniques. Rajbir Kaur, Ashok Kumar, B. P. Mohanty, **Mumtaz Oswal**, Navneet Kaur, K. P. Singh, B. R. Behera, Gulzar Singh, Sanjiv Kumar, Pritty Rao, S. Vikramkumar. International Journal of PIXE Vol. 22 Issue 3&4 (2012) 259.
14. Trace Element Analysis of Aerosol Samples Using PIXE Technique. **Mumtaz Oswal**, Rajbir Kaur, A. Kumar, K. P. Singh, Sunil Kumar, B. P. Mohanty and Sanjiv Kumar. International Journal of PIXE Vol. 22 Issue 3&4 (2012) 271.
15. Radiative resonant energy transfer: a new excitation process of beam-foil interaction, T. Nandi, **Mumtaz Oswal**, Sunil Kumar, Akhil Jhingan, S. R. Abhilash and S. Karmakar. Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 113 Issue 10 (2012) 783.
16. Investigation of major and trace elements in some medicinal plants using PIXE. R. Kaur, A. Kumar, N. Kaur, B. P. Mohanty, **M. Oswal**, R. Puri, S. Sharma, S. Kumar, P. Rao, S. Vikram Kumar, K. P. Singh, B. R. Behera and G. Singh. International Journal of PIXE Vol. 22 Issue 1-2 (2012) 113.
17. PIXE analysis of blood samples of orthodontic patients to detect Ni poisoning. P. Balouria, **Mumtaz Oswal**, Sunil Kumar, I.M Govil, B.P Mohanty, S.P Singh and M.L Garg. International Journal of PIXE Vol. 21 Issue 3-4 (2011) 95.

18. Trace elements of soil samples from mining area. **Mumtaz Oswal**, Harneet bedi, M. Hajivaliei, Ashok Kumar and K.P Singh. Nucl. Instrum. and Meth. B 268 (2010) 2138.
19. PIXE analysis of Sassanian period pottery glasses from the archaeological site of Tepe Hegmataneh (Iran). Verma, Shivcharan; Kapoor, Kushal; **Oswal, Mumtaz**; Singh, Karn Pal; Behera, B.R.; Kumar, Ashok; Mohanty, Biraja Prasad; Hajivaliei, Mahdi. Presented in international conference in nuclear physics with energetic heavy ion beams. Will be published in NIM B.

### **Papers published in conference proceedings**

1. Quantitative Analysis of soil samples using PIGE technique. R. Kaur, **M. Oswal**, A. Singh, N. Kaur, K.P Singh, B.R Behera, G. Singh and A. Kumar. Proceedings of DAE Symposium on Nuclear Physics 55 (2010) 778.
2. Study of the reactions  $^{56}\text{Fe}$ ,  $^{58}\text{Ni}$  ( $^{12}\text{C}$ ,  $\alpha\alpha$ ) and formation of fully stripped ions in multi-nucleon transfer reaction, T. Nandi, B. J. Roy, Biraja Mohanty, **Mumtaz Oswal**, V. Jha, D. C. Biswas, Akhil Jhingan, Sunil Kumar, V. Singh, B. Kumar and K. Haris, Proceedings of DAE Symposium on Nuclear Physics 56 (2011) 552.
3. Study of fission fragment angular distribution for  $^{19}\text{F}+^{194,196,198}\text{Pt}$  reactions at near and above barrier energies. Varinderjit Singh, B.R. Behera, Maninder Kaur, A. Jhingan, P. Sugathan, D. Siwal, **M. Oswal**, S. Goyal, K.P Singh, A. Saxena and S. Kailaish. Proceedings of DAE Symposium on Nuclear Physics 57 (2012) 400.
4. Systematic study of Multi-nucleon transfer reactions for  $^{12}\text{C}+^{58}\text{Ni}$  and  $^{12}\text{C}+^{56}\text{Fe}$  systems at  $E_{\text{lab}}(^{12}\text{C}) = 45$  and 60 MeV. B. J Roy, A. Parmar, V. Jha, D.C. Biswas, Biraja Mohanty, **M. Oswal**, Akhil Jhingan and T. Nandi. Proceedings of DAE Symposium on Nuclear Physics 58 (2013) 474.
5. Fission excitation function for  $^{19}\text{F} + ^{194, 196, 198} \text{Pt}$  at near and above barrier energies. V. Singh, B. R. Behera, Maninder Kaur, A. Jhingan, P. Sugathan, Santanu Pal, Davinder siwal, **M. Oswal**, K.P. Singh, S. Goyal, A. Saxena and S. Kailas. EPJ Web of Conferences 86 (2015) 00052.
6. Characterization of Al, Si and Mg in coal residues by Proton Induced Gamma Ray Emission Technique. Shashank Singh, **Mumtaz Oswal**, Sk Wasim Raja, Shivcharan Verma, B.R. Behera, A. Kumar, R. Acharya, S. Santra and K. P. Singh. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 1150.
7. Multi-Elemental Characterization of Coal and Coal Ash Samples by Non-destructive Particle Induced X- Ray Emission Technique. Shashank Singh, **Mumtaz Oswal**, Ashok Kumar, B.R. Behera, S. Santra and K.P.Singh. Proceedings of the DAE Symp. on Nucl. Phys. 63 (2018) 1150.

8. PIXE analysis of green and roasted coffee beans and filter coffee powder for inter-comparison study of trace and minor elements: Shashank Singh, **Mumtaz Oswal**, B R Behera, Ashok Kumar, S. Santra, R. Acharya and K P Singh: 14<sup>th</sup> Biennial DAE-BRNS symposium on Nuclear and radiochemistry (NUCAR-2019), January 15-17, 2019, Mumbai.

**List of papers presented/ Invited talks in conferences**

S. No.	Title of the paper presented	Title of the conference/ seminar	Date of the event	Organized by	Whether International/ National/ State/ Regional/ University or College level
1.	Study of X-ray production cross sections in Os-76 using 4-6 MeV Fluorine ions.	National Conference on Advances in Physical Science and Materials	May 11, 2021	JC DAV College Dasuya	National
2.	Elemental analysis of glass samples by PIXE technique.	National Seminar of Recent trends in Material Science	Sept 17, 2016	GGDSD College, Sec-32, Chandigarh	National
3.	PIXE Studies at Chandigarh Cyclotron.	One day seminar programme on Analytical techniques in Nuclear Science	January 27, 2012	Department of Physics, Panjab University, Chandigarh	National
4.	Trace element analysis of aerosol samples using PIXE technique	Chandigarh Science Congress IV	March 19 – 21, 2010	Panjab University, Chandigarh	Regional
5.	Radiative resonant energy transfer during beam foil excitation.	Topical conference on Atomic and Molecular Physics	March 3-6, 2010	RRCAT, Indore	National
6.	Environmental Applications of XRF Technique	19 <sup>th</sup> International conference on Ion Beam Analysis	September 7 – 11, 2009)	Cambridge University, UK	International

		(IBA 2009)			
7.	Analytical applications of EDXRF technique	Chandigarh Science Congress III	February 26-28, 2009	Panjab University, Chandigarh	Regional
8.	Study of low-lying levels in $^{69}\text{Ga}$ .	DAE- BRNS Symposium ISBN 81-8372-029-3	December 11-15, 2006	M.S. University, Baroda	National
9.	Lifetimes of low-lying states in $^{53}\text{Mn}$	DAE-BRNS Indian Particle Accelerator conference	November 1-4, 2006	Tata Institute of Fundamental Research	National
10.	Development of PIGE setup for light trace element analysis at cyclotron laboratory, Chandigarh	DAE-BRNS Indian Particle Accelerator conference	November 1-4, 2006	Tata Institute of Fundamental Research	National

**List of seminars/ conferences/ workshops/ summer school etc. Organised/ participated**

- (i) Attended one day National Seminar on Recent advances in Physics held at Department of Physics, GGSDS-32 College, Chandigarh on January 23, 2021.
- (ii) Attended one day National workshop on “Organic Farming & Waste Segregation” held at PGGC-46, Chandigarh on November 25, 2019.
- (iii) Attended one day state level training workshop on “Revised Assessment and Accreditation Framework” conducted by National Assessment and Accreditation Council, Bengaluru on April 29<sup>th</sup>, 2019.
- (iv) Attended International workshop on Shock Waves in Science, Engineering & Medicine held at Post Graduate Government College for Girls, Sector 11, Chandigarh, during February 23-24, 2018.
- (v) Attended one day National Seminar on “Teacher of the 21<sup>st</sup> Century: Quality Education for Quality teaching in North Western Region in India” held at Dev Samaj College of Education, Sector 36B, Chandigarh on 17<sup>th</sup> March, 2017.
- (vi) Attended one day National Seminar on “Developing E-learning Modules for teachers” held at Dev Samaj College of Education, Sector 36B, Chandigarh on 27<sup>th</sup> January, 2017.
- (vii) Organized and attended Faculty Development Programme in Dev Samaj College for Women Sector 45B Chandigarh from 14<sup>th</sup> Jan 2017- 20<sup>th</sup> Jan 2017.

- (viii) Attended one day college cluster workshop on “Management Information System” held at Post Graduate Govt. College, Sector 11, Chandigarh under the aegis of RUSA on 20<sup>th</sup> Oct, 2016.
- (ix) Attended one day panel discussion on “Choice Based Credit System” organized by GCCBA-50, Chandigarh on October 8, 2016.
- (x) **Organized** one day seminar on recent advances in materials science held at department of physics, GGSDS College, Sec-32, Chandigarh on 21<sup>st</sup> Feb, 2015.
- (xi) **Organized** one day workshop on Instrumentation held at department of physics, GGSDS College, Sec-32, Chandigarh on 23<sup>rd</sup> Feb, 2015.
- (xii) Attended Science Academies 72<sup>nd</sup> Refresher Course in Experimental Physics held at Department of Physics, Panjab University, Chandigarh from June 16, 2015 to July 01, 2015.
- (xiii) Attended one day seminar on Recent advances in material science and nanotechnology at GGSDS College, Sector 32, Chandigarh on 1<sup>st</sup> Feb 2014.
- (xiv) Presented a Talk Titled **PIXE Studies at Chandigarh Cyclotron** in One day Seminar programme on Analytical Techniques in Nuclear Science held at Department of Physics, Panjab University, Chandigarh on 27<sup>th</sup> January 2012.
- (xv) Attended 4<sup>th</sup> DAE-BRNS Theme meeting on EXFOR compilation of Nuclear Data at Department of Physics, Panjab University, Chandigarh during April 4-8, 2011.
- (xvi) Attended National Symposium on Radiation Physics and Nanomaterials (NSRPN-11) held at Physics Department, Panjabi University, Patiala during Feb 4-5, 2011.
- (xvii) Attended National Theme Workshop on Nuclear Reaction Mechanism (NTWNRM-2010) held at Department of Physics, Panjab University, Chandigarh during March 17-19, 2010.
- (xviii) Attended and presented poster in 19<sup>th</sup> International Conference on Ion Beam Analysis held at Cambridge, UK during September 7-11, 2009.
- (xix) Attended 1<sup>st</sup> SERC School on Atomic and Molecular Physics held at Physical Research Laboratory (PRL), Ahmadabad during April 15 to May 5, 2009.
- (xx) Attended 3<sup>rd</sup> Chandigarh Science Congress held at Panjab University, Chandigarh during February 26-28, 2009.
- (xxi) Attended 2<sup>nd</sup> Chandigarh Science Congress held at Panjab University, Chandigarh during March 14-15, 2008.
- (xxii) Attended Diamond Jubilee National Seminar on “Advances in Physics” held at Department of Physics, Panjab University, Chandigarh during Feb. 28<sup>th</sup> – Mar 1<sup>st</sup>, 2008.

(xxiii) Attended 18<sup>th</sup> International conference on Ion Beam Analysis (IBA 2007), held at University of Hyderabad, Hyderabad, INDIA during September 23-28, 2007.

(xxiv) Attended 1<sup>st</sup> Chandigarh Science Congress held at Panjab University, Chandigarh during March 10-11, 2007

(xxv) Attended mass awareness and faculty development programme regional symposium-cum- workshop on New and Renewable energy held at G.C.G, Sec-11, Chandigarh on February 9, 2007.

(xxvi) Attended DAE-BRNS Symposium on Nuclear Physics (SNP-2006) held at M.S University of Baroda, during December 11-15, 2006.

**Personal Development:**

(I) Attended 127 Faculty Induction Programme (Orientation course) held at HRDC, PU, Chandigarh from 17.12.2021 to 13.01.2022.