

## Assoc. Prof. Dr. Murat KURUDIREK

### **Murat Kurudirek, Ph. D.**

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### **Academic Background:**

- PhD (2011) Physics, Ataturk University, Erzurum, Turkey
- Assist. Prof. (2011), Ataturk University, Erzurum, Turkey
- Assoc. Prof. (2014), Ataturk University, Erzurum, Turkey
- Visiting Scientist, 2013-2015, Georgia Institute of Technology, USA

### **Administrative past:**

- Assistant President of the Physics Department, 2012-
- Coordinator of Farabi and Erasmus Exchange Programs, Physics Department, 2012-2013
- Head of High Energy and Plasma Physics Department, 2012-
- Member of the Board of Directors, Faculty of Science, 2013-2014
- Member of the Faculty Board, Faculty of Science, 2013-2014

### **Membership:**

- Member of the American Physical Society (APS)
- Member of the International Radiation Physics Society (IRPS)
- Member of the Turkish Physical Society (TPS)

### **Experience:**

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- X-ray fluorescence spectroscopy
- X-ray fundamental processes and photon-interaction cross-section data
- Photon interaction and photon energy absorption parameters
- The effective atomic number and related parameters in dosimetry and radiation protection
- The photon buildup factor
- Radiation Physics
- Radiation Shielding
- X-ray polarization and alignment phenomena

### **Current interests:**

- Fast neutron spectroscopy
- Integral testing of neutron cross sections
- Particle radiation interaction cross sections and related parameters in dosimetry and radiological protection
- Developing novel crystals for scintillation applications

### **Reviewer of Research Journal:**

- Journal of Nuclear Materials
- Nuclear Engineering and Design
- Materials Letters
- Journal of Hazardous Materials
- Applied Radiation and Isotopes
- Annals of Nuclear Energy
- Radiation Physics and Chemistry
- Progress in Nuclear Energy
- Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment
- Radiation and Environmental Biophysics

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- Indian Journal of Pure & Applied Physics
- Indian Journal of Physics
- Iranian Journal of Radiation Research
- Jordan Journal of Physics
- International Journal of Physical Sciences
- World Journal of Nuclear Science and Technology
- Journal of Nuclear Energy Science & Power Generation Technology
- World Journal of Medicine and Medical Science Research
- Journal of Nuclear Sciences

### **Awards/Grants:**

- The Encouragement Award for Independent Scientific Publications (1<sup>st</sup> Place) in Graduate School, Graduate School Of Natural Sciences, Ataturk University, 2010
- The Encouragement Award for Independent Scientific Publications (1<sup>st</sup> Place) in Department of Physics, Graduate School Of Natural Sciences, Ataturk University, 2010
- The Turkish Physics Association, Professor ŞevketErk Young Scientist Award, 2011
- The Encouragement Award for Publications in Science (1<sup>st</sup> Place), Ataturk University, 2012
- One of the Most Valued Reviewers in 2012, Radiation Physics and Chemistry, 2013
- Scientific Encouragement Awards, Best Ph. D. Thesis in Science, Ataturk University, 2013
- 2219-PostDoc Research Grant, The Scientific and Technological Research Council of Turkey (TUBITAK), 2013
- Excellence in Reviewing, Annals of Nuclear Energy, 2014

### **Research Publications:**

#### *Science Citation Index*

1. TaskinGurbuz, YukselOzdemir, Nihal Kara, CigdemZehir, **Murat Kurudirek**

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- Evaluation of Root Canal Dentin after Nd:YAG Laser Irradiation and Treatment with Five Different Irrigation Solutions: A Preliminary Study Journal of Endodontics 34 (2008) 318-321.
2. İbrahim Türkmen, YükselÖzdemir, **Murat Kurudirek**, FarukDemir, ÖnderSimsek, RamazanDemirboğa Calculation of radiation attenuation coefficients in Portland cements mixed with silica fume, blast furnace slag and natural zeolite Annals of Nuclear Energy 35 (2008) 1937-1943.
  3. **Murat Kurudirek**, İbrahim Türkmen, YükselÖzdemir A study of photon interaction in some building materials: High-volume admixture of blast furnace slag into Portland cement Radiation Physics and Chemistry 78 (2009) 751-759.
  4. YükselÖzdemir, BünyaminBörekci, AytaçLevet, **Murat Kurudirek** Assessment of trace element concentration distribution in human placenta by wavelength dispersive X-ray fluorescence: Effect of neonate weight and maternal age Applied Radiation and Isotopes 67 (2009) 1790-1795.
  5. YükselÖzdemir, **Murat Kurudirek** A study of total mass attenuation coefficients, effective atomic numbers and electron densities for various organic and inorganic compounds at 59.54 keV Annals of Nuclear Energy 36 (2009) 1769-1773.
  6. **Murat Kurudirek**, Mehmet Büyükyıldız, YükselÖzdemir Effective atomic number study of various alloys for total photon interaction in the energy region of 1 keV–100 GeV Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 613 (2010) 251-256.
  7. R. Durak, Y. Gülen, **Murat Kurudirek**, M. Kaçal and İ. Çapoğlu Determination of trace element levels in human blood serum from patients with type II diabetes using WDXRF technique: A comparative study Journal of X-Ray Science and Technology 18 (2010) 111-120.
  8. **Murat Kurudirek** and YükselÖzdemir Determination of effective atomic numbers in some compounds for photoelectric process at 59.54 keV by using different methods Journal of X-Ray Science and Technology 18 (2010) 183-191.
  9. **Murat Kurudirek**, Murat Aygun, SalihZekiErzeneoğlu Chemical composition, effective atomic number and electron density study of trommel sieve waste (TSW), Portland cement, lime, pointing and their admixtures with

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TSW in different proportions Applied Radiation and Isotopes 68 (2010) 1006-1011.

10. **Murat Kurudirek**, YükselÖzdemir, İbrahim Türkmen, AytaçLevet A study of chemical composition and radiation attenuation properties in clinoptilolite-rich natural zeolite from Turkey Radiation Physics and Chemistry 79 (2010) 1120-1126.
11. **Murat Kurudirek**, YükselÖzdemir, ÖnderŞimşek, RıdvanDurak Comparison of some lead and non-lead based glass systems, standard shielding concretes and commercial window glasses in terms of shielding parameters in the energy region of 1 keV–100 GeV: A comparative study Journal of Nuclear Materials 407 (2010) 110-115.
12. **Murat Kurudirek**, YükselÖzdemir A comprehensive study on energy absorption and exposure buildup factors for some essential amino acids, fatty acids and carbohydrates in the energy range 0.015–15 MeV up to 40 mean free path Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms 269 (2011) 7-19.
13. **Murat Kurudirek**, BekirDoğan, Metinİnceç, NeslihanEkinci, YükselÖzdemir Gamma-ray energy absorption and exposure buildup factor studies in some human tissues with endometriosis Applied Radiation and Isotopes 69, (2011) 381-388.
14. **Murat Kurudirek**, BekirDogan, YükselÖzdemir, Anderson Camargo Moreira, Carlos Roberto Appoloni Analysis of some Earth, Moon and Mars samples in terms of gamma ray energy absorption buildup factors: Penetration depth, weight fraction of constituent elements and photon energy dependence Radiation Physics and Chemistry 80 (2011) 354-364.
15. **Murat Kurudirek**, YükselÖzdemir Energy absorption and exposure buildup factors for some polymers and tissue substitute materials: photon energy, penetration depth and chemical composition dependence Journal of Radiological Protection 31 (2011) 117-128.
16. **Murat Kurudirek**, SinanTopcuoglu Investigation of human teeth with respect to the photon interaction, energy absorption and buildup factor Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms 269 (2011) 1071-1081.
17. Y. Özdemir, R. Durak, M.R. Kacal, **Murat Kurudirek** L-shell polarization and alignment of heavy elements induced by 59.54 keV photons Applied

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Radiation and Isotopes 69 (2011) 991-995.

18. **Murat Kurudirek**, Yüksel Özdemir, Ahmed Mahmoud El-Khayatt Analysis of some Pb, Th and U compounds in terms of photon interaction, photon energy absorption and fast neutron attenuation Radiation Physics and Chemistry 80 (2011) 855-862.
19. **Murat Kurudirek** Estimation of effective atomic numbers of some solutions for photon energy absorption in the energy region 0.2-1.5 MeV: an alternative method Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 659 (2011) 302-306.
20. Kulwinder Singh Mann, **Murat Kurudirek**, G.S. Sidhu Verification of dosimetric materials to be used as tissue-substitutes in radiological diagnosis Applied Radiation and Isotopes 70 (2012) 681-691.
21. M. Büyükyıldız , E. Baydaş, **Murat Kurudirek**, E. Öz Chemical shifts observed in  $L\alpha$  X-ray emission lines of elements in the range of  $26 \leq Z \leq 30$  in their halogen compounds Journal of Radioanalytical and Nuclear Chemistry 292 (2012) 467-472.
22. **Murat Kurudirek**, Alpdogan Çelik A simple method to determine effective atomic numbers of some compounds for multi-energetic photons Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 689 (2012) 75-78.
23. **Murat Kurudirek**, D. Sardari, N. Khaledi, C. Çakır, K.S. Mann Investigation of X- and gamma ray photons buildup in some neutron shielding materials using G.P. fitting approximation Annals of Nuclear Energy 53 (2013) 485-491.
24. **Murat Kurudirek** Water equivalence study of some phantoms based on effective photon energy, effective atomic numbers and electron densities for clinical MV X-ray and Co-60  $\gamma$ -ray beams Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 701 (2013) 268-272.
25. **Murat Kurudirek** Photon buildup factors in some dosimetric materials for heterogeneous radiation sources Radiation and Environmental Biophysics 53 (2014) 175–185.
26. **Murat Kurudirek**, A. M. El-Khayatt, L. Gerward Remarks on the extension

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and validity of an empirical formula for the fast-neutron removal cross-section: The effective atomic weight Annals of Nuclear Energy 70 (2014) 230-232.

27. **Murat Kurudirek**, M.E. Medhat Robust determination of mass attenuation coefficients of materials with unknown thickness and density Radiation Physics and Chemistry 100 (2014) 65-69.
28. **Murat Kurudirek** Effective atomic numbers and electron densities of some human tissues and dosimetric materials for mean energies of various radiation sources relevant to radiotherapy and medical applications Radiation Physics and Chemistry 102 (2014) 139-146.
29. **Murat Kurudirek** Effective atomic numbers of different types of materials for proton interaction in the energy region 1 keV–10 GeV Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms 336 (2014) 130-134.
30. **Murat Kurudirek** Effective atomic numbers, water and tissue equivalence properties of human tissues, tissue equivalents and dosimetric materials for total electron interaction in the energy region 10 keV–1 GeV Applied Radiation and Isotopes 94 (2014) 1-7.
31. **Murat Kurudirek** Radiation shielding and effective atomic number studies in different types of shielding concretes, lead base and non-lead base glass systems for total electron interaction: A comparative study Nuclear Engineering and Design 280 (2014) 440-448.
32. **Murat Kurudirek**, Sinem V. Kurudirek Collisional, radiative and total electron interaction in compound semiconductor detectors and solid state nuclear track detectors: Effective atomic number and electron density Applied Radiation and Isotopes 99 (2015) 54-58.
33. M. E. Medhat, W. Shan, **Murat Kurudirek** Modern utilization of an accurate method for detecting essential elements in whole blood using low energy photons X Ray Spectrometry 2015 (Accepted manuscript)

### *Other Publications (Peer Reviewed)*

1. Y. Özdemir, **Murat Kurudirek**, M. Kaçal, R. Durak, M. Ertuğrul “Angular dependence from L3-subshell M-shell vacancy transfer probabilities for heavy elements using EDXRF technique” Balkan Physics Letters 2008
2. **Murat Kurudirek**, İbrahim Türkmen, Yüksel Özdemir A study of photon

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interaction in some building materials: High-volume admixture of blast furnace slag into Portland cement Fuel and Energy Abstracts 51 (2010) 263.

3. **Murat Kurudirek**, İ. Türkmen, Y. Özdemir A study of photon interaction in some building materials: High-volume admixture of blast furnace slag into Portland cement Fuel and Energy Abstracts 51 (2010) 263.
4. D. Sardari, **Murat Kurudirek** A semi-empirical approach to the geometric progression (G-P) fitting approximation in estimating photon buildup factor in soft tissue, water and dosimetric materials International Journal of Physical Sciences 7 (2012) 5852-5860.
5. D. Sardari, **Murat Kurudirek** Studies on energy absorption and exposure buildup factors in some solutions of alkali metal chlorides International Journal of Physical Sciences 8 (2013) 481-491.

### **Presentations in National/International Conferences, Symposia & Workshops**

1. Y. Özdemir, M. Kaçal, **Murat Kurudirek**, D. Durna, A. Levet “Quantitative EDXRF Analysis of Ca, K, Mn and Na in Normal and Pathological Adult-Human Teeth” Turkish Physical Society 24. International Physics Conference held in Malatya, Turkey (2007)
2. Y. Özdemir, **Murat Kurudirek**, M. Kaçal, M. Ertuğrul “Angular Dependence from L3-Subshell to M-Shell Vacancy Transfer Probabilities for Heavy Elements Using EDXRF Technique” Turkish Physical Society 24. International Physics Conference held in Malatya, Turkey (2007)
3. **Murat Kurudirek**, Çoban, M., Canimkurbey, B., Aygün, M., Erzeneoğlu, S Radiation interaction with composite materials: building materials mixed with trommel sieve waste in different proportions Turkish Physical Society 26. International Physics Conference held in Bodrum, Turkey (2009)
4. **Murat Kurudirek**, Canimkurbey, B., Çoban, M., Aygün, M., Erzeneoğlu Effective atomic numbers and effective electron densities for trommel sieve waste and some commonly used building materials Turkish Physical Society 26. International Physics Conference held in Bodrum, Turkey (2009)
5. **Murat Kurudirek**, Y. Özdemir “A study of gamma spectrometric parameters in portland cement, silica füme, blast furnace slag and natural zeolite” Turkish Physical Society 26. International Physics Conference held in Bodrum,



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Turkey (2009)

6. **Murat Kurudirek**, Y. Özdemir “Photon interaction studies in some compounds of semi-conducting interest” Turkish Physical Society 26. International Physics Conference held in Bodrum, Turkey (2009)
7. **Murat Kurudirek**, B. Doğan, Y. Özdemir “Photon buildup studies in some neutron absorbent materials” Turkish Physical Society 26. International Physics Conference held in İstanbul, Turkey (2010).
8. **Murat Kurudirek**, M. Büyükyıldız, Y. Özdemir “Comparison of the methods available for calculation of effective atomic numbers in alloys for total photon interaction at the photon energies from 1keV to 100 GeV “NURER, The Second International Conference on Nuclear & Renewable Energy Resources, 4-7 July 2010, Ankara, Turkey
9. **Murat Kurudirek**, Y. Özdemir, R. Durak “Analysis of some glass systems with and without pb with respect to the radiation shielding properties in the energy region of 1keV-100GeV” NURER, The Second International Conference on Nuclear & Renewable Energy Resources, 4-7 July 2010, Ankara, Turkey.
10. **Murat Kurudirek**, Y. Özdemir, R. Durak “Assigning an effective atomic number in solutions for photon energy absorption based on mass attenuation coefficients in the energy region 200-1500 keV” Turkish Physical Society 28. International Physics Conference held in Bodrum, Turkey (2011).
11. K. Şerifoğlu, M. Koç, A. Gürol, Y. Özdemir, **Murat Kurudirek** “Radyasyonun neden olduğu saçdökülmesinde eserelementlerin rolü” XVII National Cancer Conference Yıl: 2007
12. T. Karatas, E. M. Kocaman, **Murat Kurudirek** “Hamsıbalığının (engraulis encrasicolus) kas dokusu ile deniz suyunun (karadeniz) mineral maddemiktarlarının karşılaştırılması” Turkish Physical Society 28. International Physics Conference held in Bodrum, Turkey (2011).
13. **Murat Kurudirek** Effective Atomic Number and Electron Density Studies in Some Water Equivalent Phantoms for MV X-Rays. ICAMDATA 2012 NIST, USA, September 30 - October 4, 2012 Eighth International Conference on Atomic and Molecular Data and Their Applications National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, USA
14. Mehmet Büyükyıldız, Elif Baydaş, **Murat Kurudirek** Analysis of Matrix

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Absorption Effects for Fe via WDXRF and EDXRF. ICAMDATA 2012 NIST, USA, September 30 - October 4, 2012 Eighth International Conference on Atomic and Molecular Data and Their Applications National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, USA

15. **Murat Kurudirek** 10th SESAME Users' Meeting 7 - 9 November 2012 - Amman, Jordan Workshop on XRF/XAFS
16. T. Karatas, **Murat Kurudirek** Determination of mineral, heavy metal and trace element levels in muscle tissues of cultured and wild rainbow trout via ICP-OES First International Fisheries Symposium Northern Cyprus 24-27 March 2013
17. **Murat Kurudirek** TRACE - Workshop on Development of New Radiotracers for PET Imaging and Targeted Radiotherapy 3-5 April 2013 Magurele, Romania
18. **Murat Kurudirek** Internationally Participated Electrochemistry Workshop Nanostructure Modified Electrochemical and Bioelectrochemical Systems 23-28 June 2013 Muğla, Turkey

### Book Chapters

1. Radiation Exposure in Medicine and the Environment: Risks and Protective Strategies, Editor: Nicole E. Parnell, Chapter IV: Radiation Interaction with Blast Furnace Slag: A Comparative Study from the Point of Radiation Shielding, **Murat Kurudirek**, Yüksel Özdemir, Ahmed Mahmoud El-Khayatt Series: Public Health in the 21st Century Environmental Health- Physical, Chemical and Biological Factors Binding: Hardcover Pub. Date: 2011 2nd quarter Pages: 7 x 10 (NBC - R) ISBN: 978-1-61209-827-2 Status: AV (Available) 2011 Nova Science Publishers, Inc. URL: [https://www.novapublishers.com/catalog/product\\_info.php?products\\_id=15773](https://www.novapublishers.com/catalog/product_info.php?products_id=15773)
2. Advances in Eye Research. Volume 1, Editor: William L. Thomsen, Chapter III: X- and Gamma Ray Interactions with Soft Contact Lenses, **Murat Kurudirek**, Bekir Doğan, Neslihan Ekinci Series: Advances in Eye Research Binding: Hardcover Pub. Date: 2011 3rd quarter Pages: 6 x 9 (NBC - R) ISBN: 978-1-61324-169-1 Status: AV (Available) 2011 Nova Science Publishers, Inc. URL: [https://www.novapublishers.com/catalog/product\\_info.php?products\\_id=23067](https://www.novapublishers.com/catalog/product_info.php?products_id=23067)
3. Horizons in World Physics. Volume 274, Editor: Albert Reimer, X- and Gamma Ray Interactions with Soft Contact Lenses, **Murat Kurudirek**, Bekir Doğan, Neslihan Ekinci Series: Horizons in World Physics Binding:

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