ClinicSearch

Journal of Clinical Anatomy

Alireza Heidari *

Open Access

Mini Review

Vibrational Quantum Dynamics of Complex Molecular Systems with Numerical Kinetic Energy Operators in Generalized Coordinates Using a Method to Obtain the Eckart Hamiltonian and The Equations of Motion of a Highly Deformable Polyatomic System in Terms of Generalized Coordinates

Alireza Heidari [1,2,3,4, *]

[1] Faculty of Chemistry, California South University, 14731 Comet St. Irvine, CA 92604, USA

[2] BioSpectroscopy Core Research Laboratory (BCRL), California South University, 14731 Comet St. Irvine, CA 92604, USA

[3] Cancer Research Institute (CRI), California South University, 14731 Comet St. Irvine, CA 92604, USA

[4] American International Standards Institute (AISI), Irvine, CA 3800, USA

***Corresponding Author:** Alireza Heidari, American International Standards Institute (AISI), Irvine, CA 3800, USA

Received date: September 05, 2023; Accepted date: September 15, 2023; Published date: September 22, 2023

Citation: Alireza Heidari, (2023). Vibrational Quantum Dynamics of Complex Molecular Systems with Numerical Kinetic Energy Operators in Generalized Coordinates Using a Method to Obtain the Eckart Hamiltonian and The Equations of Motion of a Highly Deformable Polyatomic System in Terms of Generalized Coordinates, *Journal of Clinical Anatomy*, 2(5) **DOI:**10.31579/2834-5134/033

A delivered collectively (as one) change of the entire (nonrelativistic) molecular Hamiltonian from Cartesian to generalized coordinates has been done. The change is pretty standard and may be carried out for random vibrational (twist/bend/alternate the form) actions in addition to most selections of shifting axes systems. Eckart's axis conference (and by that/in that way Hamiltonian) is discussed as an instance of application. The trade of the translational--rovibronic (non-relativistic) Hamiltonian from cartesian to generalized coordinates by means of the (related to tiny, weird actions of atoms)-mechanical route organized and listed in the previous paintings has been accomplished for linear molecules. The translational-rovibronic Hamiltonian for a non-linear polyatomic molecule is received/made from by means of using the Schrödinger equation in tensor shape and using the Eckart conditions (figuring out/identifying the nuclear- (stable basic shape on which bigger things may be constructed) rotational (numbers that change/matters that trade)). the existing derivation is an added collectively (as one) entire and thorough one with the aid of a (associated with tiny, bizarre actions of atoms)-mechanical pathway and is very different from (made of unconnected pieces) previous derivations thru a classical-intermediate route. The method offered presents a company concept-based photo of the character of the trade and the origin of coupling phrases, and avoids mathematical problems with their residue of being unknown. the best form of the full (the first-class of something it's turning wanting to hold turning) operators is likewise received/made from (associated with tiny, weird actions of atoms) robotically [1-114].

Acknowledgement:

This study was supported by the Cancer Research Institute (CRI) Project of Scientific Instrument and Equipment Development, the National Natural Science Foundation of the United Sates, the International Joint BioSpectroscopy Core Research Laboratory (BCRL) Program supported by the California South University (CSU), and the Key project supported by the American International Standards Institute (AISI), Irvine, California, USA.

References:

1. Heidari, (2017),."Different High–Resolution Simulations of Medical, Medicinal, Clinical, Pharmaceutical and Therapeutics Oncology of Human Lung Cancer Translational Anti–Cancer Nano Drugs Delivery Treatment Process under Synchrotron and X–Ray Radiations", J Med Oncol. Vol. 1 No. 1: 1

2. Heidari, (2017),."A Modern Ethnomedicinal Technique for Transformation, Prevention and Treatment of Human Malignant Gliomas Tumors into Human Benign Gliomas Tumors under Synchrotron Radiation", Am J Ethnomed, Vol. 4 No. 1: 10
3. Heidari, (2017),."Active Targeted Nanoparticles for Anti–Cancer Nano Drugs Delivery across the Blood–Brain Barrier for Human Brain Cancer Treatment, Multiple Sclerosis (MS) and Alzheimer's Diseases Using Chemical Modifications of Anti–Cancer Nano Drugs or Drug–Nanoparticles through Zika Virus (ZIKV) Nanocarriers under Synchrotron Radiation", J Med Chem Toxicol, 2 (3): 1–5
4. Heidari, (2017),."Investigation of Medical, Medicinal, Clinical and Pharmaceutical Applications of Estradiol, Mestranol (Norlutin), Norethindrone (NET), Norethisterone Acetate (NETA), Norethisterone Enanthate (NETE) and Testosterone Nanoparticles as Biological Imaging, Cell Labeling, Anti–Microbial Agents and Anti–Cancer Nano Drugs in Nanomedicines Based Drug Delivery Systems for Anti–Cancer Targeting and Treatment", Parana Journal of Science and Education (PJSE)–v.3, n.4, (10–19) October 12
5. Heidari, (2017),."A Comparative Computational and Experimental Study on Different Vibrational Biospectroscopy Methods, Techniques and Applications for Human Cancer Cells in Tumor Tissues Simulation, Modeling, Research, Diagnosis and Treatment", Open J Anal Bioanal Chem 1 (1): 014–020
6. Heidari, (2017),. "Combination of DNA/RNA Ligands and Linear/Non–Linear Visible–Synchrotron Radiation–Driven N–Doped Ordered Mesoporous Cadmium Oxide (CdO) Nanoparticles Photocatalysts Channels Resulted in an Interesting Synergistic Effect Enhancing Catalytic Anti–Cancer Activity", Enz Eng 6: 1
7. Heidari, (2017),. "Modern Approaches in Designing Ferritin, Ferritin Light Chain, Transferrin, Beta–2 Transferrin and Bacterioferritin–Based Anti–Cancer Nano Drugs Encapsulating Nanosphere as DNA–Binding Proteins from Starved Cells (DPS)", Mod Appro Drug Des. 1 (1). MADD.000504.
8. Heidari, (2017),. "Potency of Human Interferon β–1a and Human Interferon β–1b in Enzymotherapy, Immunotherapy, Chemotherapy, Radiotherapy, Hormone Therapy and Targeted Therapy of Encephalomyelitis Disseminate/Multiple Sclerosis (MS) and Hepatitis A, B, C, D, E, F and G Virus Enter and Targets Liver Cells", J Proteomics Enzymol 6: 1,
9. Heidari, (2017),. "Transport Therapeutic Active Targeting of Human Brain Tumors Enable Anti–Cancer Nanodrugs Delivery across the Blood–Brain Barrier (BBB) to Treat Brain Diseases Using Nanoparticles and Nanocarriers under Synchrotron Radiation", J Pharm Pharmaceutics 4 (2): 1–5
10. Heidari, C. Brown, (2017),. "Combinatorial Therapeutic Approaches to DNA/RNA and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine Nanocapsules with Surface Conjugated DNA/RNA to Targeted Nano Drugs for Enhanced Anti–Cancer Efficacy and Targeted Cancer Therapy Using Nano Drugs Delivery Systems", Ann Adv Chem. 1 (2): 061–069
11. Heidari, (2017),. "High–Resolution Simulations of Human Brain Cancer Translational Nano Drugs Delivery Treatment Process under Synchrotron Radiation", J Transl Res. 1 (1): 1–3
12. Heidari, (2017),."Investigation of Anti–Cancer Nano Drugs' Effects' Trend on Human Pancreas Cancer Cells and Tissues Prevention, Diagnosis and Treatment Process under Synchrotron and X–Ray Radiations with the Passage of Time Using Mathematica", Current Trends Anal Bioanal Chem, 1 (1): 36–41
13. Heidari, (2017),. "Pros and Cons Controversy on Molecular Imaging and Dynamics of Double–Standard DNA/RNA of Human Preserving Stem Cells–Binding Nano Molecules with Androgens/Anabolic Steroids (AAS) or Testosterone Derivatives through Tracking of Helium–4 Nucleus (Alpha Particle) Using Synchrotron Radiation", Arch Biotechnol Biomed. 1 (1): 067–0100
14. Heidari, (2017),."Visualizing Metabolic Changes in Probing Human Cancer Cells and Tissues Metabolism Using Vivo 1H or Proton NMR, 13C NMR, 15N NMR and 31P NMR Spectroscopy and Self–Organizing Maps under Synchrotron Radiation", SOJ Mater Sci Eng 5 (2): 1–6
15. Heidari, (2017),. "Cavity Ring–Down Spectroscopy (CRDS), Circular Dichroism Spectroscopy, Cold Vapour Atomic Fluorescence Spectroscopy and Correlation Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Enliven: Challenges Cancer Detect Ther 4 (2): e001
16. Heidari, (2017),. "Laser Spectroscopy, Laser–Induced Breakdown Spectroscopy and Laser–Induced Plasma Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Int J Hepatol Gastroenterol, 3 (4): 079–084
17. Heidari, (2017),. "Time–Resolved Spectroscopy and Time–Stretch Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Enliven: Pharmacovigilance and Drug Safety 4 (2): e001
18. Heidari, (2017),. "Overview of the Role of Vitamins in Reducing Negative Effect of Decapeptyl (Triptorelin Acetate or Pamoate Salts) on Prostate Cancer Cells and Tissues in Prostate Cancer Treatment Process through Transformation of Malignant Prostate Tumors into Benign Prostate Tumors under Synchrotron Radiation", Open J Anal Bioanal Chem 1 (1): 021–026
19. Heidari, (2017),. "Electron Phenomenological Spectroscopy, Electron Paramagnetic Resonance (EPR) Spectroscopy and Electron Spin Resonance (ESR) Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Austin J Anal Pharm Chem. 4 (3): 1091
20. Heidari, "Therapeutic Nanomedicine Different High–Resolution Experimental Images and Computational Simulations for Human Brain Cancer Cells and Tissues Using Nanocarriers Deliver DNA/RNA to Brain Tumors under Synchrotron Radiation with the Passage of Time Using Mathematica and MATLAB", Madridge J Nano Tech. Sci. 2 (2): 77–83
21. Heidari, (2017),. "A Consensus and Prospective Study on Restoring Cadmium Oxide (CdO) Nanoparticles Sensitivity in Recurrent Ovarian Cancer by Extending the Cadmium Oxide (CdO) Nanoparticles–Free Interval Using Synchrotron Radiation Therapy as Antibody–Drug Conjugate for the Treatment of Limited–Stage Small Cell Diverse Epithelial Cancers", Cancer Clin Res Rep, 1: 2, e001
22. Heidari, (2017),. "A Novel and Modern Experimental Imaging and Spectroscopy Comparative Study on Malignant and Benign

Human Cancer Cells and Tissues with the Passage of Time under White Synchrotron Radiation", Cancer Sci Res Open Access 4 (2): 1–8

23. Heidari, (2017),. "Different High–Resolution Simulations of Medical, Medicinal, Clinical, Pharmaceutical and Therapeutics Oncology of Human Breast Cancer Translational Nano Drugs Delivery Treatment Process under Synchrotron and X–Ray Radiations", J Oral Cancer Res 1 (1): 12–17
24. Heidari, (2017),. "Vibrational Decihertz (dHz), Centihertz (cHz), Millihertz (mHz), Microhertz (μHz), Nanohertz (nHz), Picohertz (pHz), Femtohertz (fHz), Attohertz (aHz), Zeptohertz (zHz) and Yoctohertz (yHz) Imaging and Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", International Journal of Biomedicine, 7 (4), 335–340
25. Heidari, (2017),. "Force Spectroscopy and Fluorescence Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", EC Cancer, 2 (5), 239–246
26. Heidari, (2017),. "Photoacoustic Spectroscopy, Photoemission Spectroscopy and Photothermal Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", BAOJ Cancer Res Ther, 3: 3, 045–052
27. Heidari, (2017),. "J–Spectroscopy, Exchange Spectroscopy (EXSY), Nucle¬ar Overhauser Effect Spectroscopy (NOESY) and Total Correlation Spectroscopy (TOCSY) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", EMS Eng Sci J, 1 (2): 006–013
28. Heidari, (2017),, "Neutron Spin Echo Spectroscopy and Spin Noise Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Int J Biopharm Sci, 1: 103–107
29. Heidari, (2017)., "Vibrational Decahertz (daHz), Hectohertz (hHz), Kilohertz (kHz), Megahertz (MHz), Gigahertz (GHz), Terahertz (THz), Petahertz (PHz), Exahertz (EHz), Zettahertz (ZHz) and Yottahertz (YHz) Imaging and Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Madridge J Anal Sci Instrum, 2 (1): 41–46
30. Heidari, (2017)., "Two–Dimensional Infrared Correlation Spectroscopy, Linear Two–Dimensional Infrared Spectroscopy and Non–Linear Two–Dimensional Infrared Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", J Mater Sci Nanotechnol 6 (1): 101
31. Heidari, (2018)., "Fourier Transform Infrared (FTIR) Spectroscopy, Near–Infrared Spectroscopy (NIRS) and Mid–Infrared Spectroscopy (MIRS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", Int J Nanotechnol Nanomed, Volume 3, Issue 1, Pages 1–6
32. Heidari, (2018)., "Infrared Photo Dissociation Spectroscopy and Infrared Correlation Table Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", Austin Pharmacol Pharm, 3 (1): 1011
33. Heidari, (2017)., "Novel and Transcendental Prevention, Diagnosis and Treatment Strategies for Investigation of Interaction among Human Blood Cancer Cells, Tissues, Tumors and Metastases with Synchrotron Radiation under Anti–Cancer Nano Drugs Delivery Efficacy Using MATLAB Modeling and Simulation", Madridge J Nov Drug Res, 1 (1): 18–24
34. Heidari, (2017)., "Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Open Access J Trans Med Res, 2 (1): 00026–00032, 2018.
35. M. R. R. Gobato, R. Gobato, A. Heidari, (2018)., "Planting of Jaboticaba Trees for Landscape Repair of Degraded Area", Landscape Architecture and Regional Planning, Vol. 3, No. 1, Pages 1–9
36. Heidari, (2018)., "Fluorescence Spectroscopy, Phosphorescence Spectroscopy and Luminescence Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", SM J Clin. Med. Imaging, 4 (1): 1018
37. Heidari, (2018)., "Nuclear Inelastic Scattering Spectroscopy (NISS) and Nuclear Inelastic Absorption Spectroscopy (NIAS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Int J Pharm Sci, 2 (1): 1–14
38. Heidari, (2018)., "X–Ray Diffraction (XRD), Powder X–Ray Diffraction (PXRD) and Energy–Dispersive X–Ray Diffraction (EDXRD) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", J Oncol Res; 2 (1): 1–14
39. Heidari, (2018)., "Correlation Two–Dimensional Nuclear Magnetic Reso¬nance (NMR) (2D–NMR) (COSY) Imaging and Spectrosco¬py Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", EMS Can Sci, 1–1–001
40. Heidari, (2018)., "Thermal Spectroscopy, Photothermal Spectroscopy, Thermal Microspectroscopy, Photothermal Microspectroscopy, Thermal Macrospectroscopy and Photothermal Macrospectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", SM J Biometrics Biostat, 3 (1): 1024
41. Heidari, (2018)., "A Modern and Comprehensive Experimental Biospectroscopic Comparative Study on Human Common Cancers' Cells, Tissues and Tumors before and after Synchrotron Radiation Therapy", Open Acc J Oncol Med. 1 (1)
42. Heidari, (2018)., "Heteronuclear Correlation Experiments Such as Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC), Heteronuclear Multiple–Quantum Correlation Spectroscopy (HMQC) and Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC) Comparative Study on Malignant and Benign Human Endocrinology and Thyroid Cancer Cells and Tissues under Synchrotron Radiation", J Endocrinol Thyroid Res, 3 (1): 555603
43. Heidari, (2018)., "Nuclear Resonance Vibrational Spectroscopy (NRVS), Nuclear Inelastic Scattering Spectroscopy (NISS), Nuclear Inelastic Absorption Spectroscopy (NIAS) and Nuclear Resonant Inelastic X–Ray Scattering Spectroscopy (NRIXSS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Int J Bioorg Chem Mol Biol. 6 (1e): 1–5
44. Heidari, (2018)., "A Novel and Modern Experimental Approach to Vibrational Circular Dichroism Spectroscopy and Video Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of

Time under White and Monochromatic Synchrotron Radiation", Glob J Endocrinol Metab. 1 (3). GJEM. 000514–000519

45. Heidari, (2018)., "Pros and Cons Controversy on Heteronuclear Correlation Experiments Such as Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC), Heteronuclear Multiple–Quantum Correlation Spectroscopy (HMQC) and Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", EMS Pharma J. 1 (1): 002–008, 2018.
46. Heidari, (2018)., "A Modern Comparative and Comprehensive Experimental Biospectroscopic Study on Different Types of Infrared Spectroscopy of Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", J Analyt Molecul Tech. 3 (1): 8
47. Heidari, (2018)., "Investigation of Cancer Types Using Synchrotron Technology for Proton Beam Therapy: An Experimental Biospectroscopic Comparative Study", European Modern Studies Journal, Vol. 2, No. 1, 13–29, 2018.
48. Heidari, (2018)., "Saturated Spectroscopy and Unsaturated Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Imaging J Clin Medical Sci. 5 (1): 001–007.
49. Heidari, (2018)., "Small–Angle Neutron Scattering (SANS) and Wide–Angle X–Ray Diffraction (WAXD) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Int J Bioorg Chem Mol Biol. 6 (2e): 1–6
50. Heidari, (2018)., "Investigation of Bladder Cancer, Breast Cancer, Colorectal Cancer, Endometrial Cancer, Kidney Cancer, Leukemia, Liver, Lung Cancer, Melanoma, Non–Hodgkin Lymphoma, Pancreatic Cancer, Prostate Cancer, Thyroid Cancer and Non–Melanoma Skin Cancer Using Synchrotron Technology for Proton Beam Therapy: An Experimental Biospectroscopic Comparative Study", Ther Res Skin Dis 1 (1)
51. Heidari, (2018)., "Attenuated Total Reflectance Fourier Transform Infrared (ATR–FTIR) Spectroscopy, Micro–Attenuated Total Reflectance Fourier Transform Infrared (Micro–ATR–FTIR) Spectroscopy and Macro–Attenuated Total Reflectance Fourier Transform Infrared (Macro–ATR–FTIR) Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", International Journal of Chemistry Papers, 2 (1): 1–12,
52. Heidari, (2018),. "Mössbauer Spectroscopy, Mössbauer Emission Spectroscopy and 57Fe Mössbauer Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Acta Scientific Cancer Biology 2.3: 17–20
53. Heidari, (2018),. "Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", Organic & Medicinal Chem IJ. 6 (1): 555676,
54. Heidari, (2018),."Correlation Spectroscopy, Exclusive Correlation Spectroscopy and Total Correlation Spectroscopy Comparative Study on Malignant and Benign Human AIDS–Related Cancers Cells and Tissues with the Passage of Time under Synchrotron Radiation", Int J Bioanal Biomed. 2 (1): 001–007
55. Heidari, (2018),."Biomedical Instrumentation and Applications of Biospectroscopic Methods and Techniques in Malignant and Benign Human Cancer Cells and Tissues Studies under Synchrotron Radiation and Anti–Cancer Nano Drugs Delivery", Am J Nanotechnol Nanomed. 1 (1): 001–009
56. Heidari, (2018),."Vivo 1H or Proton NMR, 13C NMR, 15N NMR and 31P NMR Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Ann Biomet Biostat. 1 (1): 1001
57. Heidari, (2018),."Grazing–Incidence Small–Angle Neutron Scattering (GISANS) and Grazing–Incidence X–Ray Diffraction (GIXD) Comparative Study on Malignant and Benign Human Cancer Cells, Tissues and Tumors under Synchrotron Radiation", Ann Cardiovasc Surg. 1 (2): 1006
58. Heidari, (2018),."Adsorption Isotherms and Kinetics of Multi–Walled Carbon Nanotubes (MWCNTs), Boron Nitride Nanotubes (BNNTs), Amorphous Boron Nitride Nanotubes (a–BNNTs) and Hexagonal Boron Nitride Nanotubes (h–BNNTs) for Eliminating Carcinoma, Sarcoma, Lymphoma, Leukemia, Germ Cell Tumor and Blastoma Cancer Cells and Tissues", Clin Med Rev Case Rep 5: 201
59. Heidari, (2018),." "Correlation Spectroscopy (COSY), Exclusive Correlation Spectroscopy (ECOSY), Total Correlation Spectroscopy (TOCSY), Incredible Natural–Abundance Double–Quantum Transfer Experiment (INADEQUATE), Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC), Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC), Nuclear Overhauser Effect Spectroscopy (NOESY) and Rotating Frame Nuclear Overhauser Effect Spectroscopy (ROESY) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Acta Scientific Pharmaceutical Sciences 2.5: 30–35
60. Heidari, (2018),. "Small–Angle X–Ray Scattering (SAXS), Ultra–Small Angle X–Ray Scattering (USAXS), Fluctuation X–Ray Scattering (FXS), Wide–Angle X–Ray Scattering (WAXS), Grazing–Incidence Small–Angle X–Ray Scattering (GISAXS), Grazing–Incidence Wide–Angle X–Ray Scattering (GIWAXS), Small–Angle Neutron Scattering (SANS), Grazing–Incidence Small–Angle Neutron Scattering (GISANS), X–Ray Diffraction (XRD), Powder X–Ray Diffraction (PXRD), Wide–Angle X–Ray Diffraction (WAXD), Grazing–Incidence X–Ray Diffraction (GIXD) and Energy–Dispersive X–Ray Diffraction (EDXRD) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Oncol Res Rev, Volume 1 (1): 1–10
61. Heidari, (2018),."Pump–Probe Spectroscopy and Transient Grating Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Adv Material Sci Engg, Volume 2, Issue 1, Pages 1–7
62. Heidari, (2018),."Grazing–Incidence Small–Angle X–Ray Scattering (GISAXS) and Grazing–Incidence Wide–Angle X–Ray Scattering (GIWAXS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Insights Pharmacol Pharm Sci 1 (1)
63. Heidari, (2018),." "Acoustic Spectroscopy, Acoustic Resonance Spectroscopy and Auger Spectroscopy Comparative Study on Anti–Cancer Nano Drugs Delivery in Malignant and Benign Human Cancer Cells and Tissues with the Passage of

Time under Synchrotron Radiation", Nanosci Technol 5 (1): 1–9

64. Heidari, (2018),." "Niobium, Technetium, Ruthenium, Rhodium, Hafnium, Rhenium, Osmium and Iridium Ions Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations", Nanomed Nanotechnol, 3 (2): 000138
65. Heidari, (2018),." "Homonuclear Correlation Experiments Such as Homonuclear Single–Quantum Correlation Spectroscopy (HSQC), Homonuclear Multiple–Quantum Correlation Spectroscopy (HMQC) and Homonuclear Multiple–Bond Correlation Spectroscopy (HMBC) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Austin J Proteomics Bioinform & Genomics. 5 (1): 1024
66. Heidari, (2018),."Atomic Force Microscopy Based Infrared (AFM–IR) Spectroscopy and Nuclear Resonance Vibrational Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", J Appl Biotechnol Bioeng. 5 (3): 142–148
67. Heidari, (2018),."Time–Dependent Vibrational Spectral Analysis of Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", J Cancer Oncol, 2 (2): 000124
68. Heidari, (2018),."Palauamine and Olympiadane Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations", Arc Org Inorg Chem Sci 3 (1)
69. R. Gobato, A. Heidari, (2018),."Infrared Spectrum and Sites of Action of Sanguinarine by Molecular Mechanics and Ab Initio Methods", International Journal of Atmospheric and Oceanic Sciences.
70. Heidari, (2018),."Angelic Acid, Diabolic Acids, Draculin and Miraculin Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations", Med & Analy Chem Int J, 2 (1): 000111
71. Heidari, (2018),."Gamma Linolenic Methyl Ester, 5–Heptadeca–5,8,11–Trienyl 1,3,4–Oxadiazole–2–Thiol, Sulphoquinovosyl Diacyl Glycerol, Ruscogenin, Nocturnoside B, Protodioscine B, Parquisoside–B, Leiocarposide, Narangenin, 7–Methoxy Hespertin, Lupeol, Rosemariquinone, Rosmanol and Rosemadiol Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations", Int J Pharma Anal Acta, 2 (1): 007–014, 2018.
72. Heidari, (2018),."Fourier Transform Infrared (FTIR) Spectroscopy, Attenuated Total Reflectance Fourier Transform Infrared (ATR–FTIR) Spectroscopy, Micro–Attenuated Total Reflectance Fourier Transform Infrared (Micro–ATR–FTIR) Spectroscopy, Macro–Attenuated Total Reflectance Fourier Transform Infrared (Macro–ATR–FTIR) Spectroscopy, Two–Dimensional Infrared Correlation Spectroscopy, Linear Two–Dimensional Infrared Spectroscopy, Non–Linear Two–Dimensional Infrared Spectroscopy, Atomic Force Microscopy Based Infrared (AFM–IR) Spectroscopy, Infrared Photodissociation Spectroscopy, Infrared Correlation Table Spectroscopy, Near–Infrared Spectroscopy (NIRS), Mid–Infrared Spectroscopy (MIRS), Nuclear Resonance Vibrational Spectroscopy, Thermal Infrared Spectroscopy and Photothermal Infrared Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", Glob Imaging Insights, Volume 3 (2): 1–14
73. Heidari, (2018),."Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC) and Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC) Comparative Study on Malignant and Benign Human Cancer Cells, Tissues and Tumors under Synchrotron and Synchrocyclotron Radiations", Chronicle of Medicine and Surgery 2.3: 144–156, 2018.
74. Heidari, (2018),. "Tetrakis [3, 5–bis (Trifluoromethyl) Phenyl] Borate (BARF)–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules", Medical Research and Clinical Case Reports 2.1: 113–126
75. Heidari, (2018),. "Sydnone, Münchnone, Montréalone, Mogone, Montelukast, Quebecol and Palau'amine–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules", Sur Cas Stud Op Acc J. 1 (3), 2018.
76. Heidari, "Fornacite, Orotic Acid, Rhamnetin, Sodium Ethyl Xanthate (SEX) and Spermine (Spermidine or Polyamine) Nanomolecules Incorporation into the Nanopolymeric Matrix (NPM)", International Journal of Biochemistry and Biomolecules, Vol. 4: Issue 1, Pages 1–19
77. Heidari, R. Gobato, (2018),. "Putrescine, Cadaverine, Spermine and Spermidine–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules", Parana Journal of Science and Education (PJSE)–v.4, n.5, (1–14) July 1
78. Heidari, (2018),."Cadaverine (1,5–Pentanediamine or Pentamethylenediamine), Diethyl Azodicarboxylate (DEAD or DEADCAT) and Putrescine (Tetramethylenediamine) Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations", Hiv and Sexual Health Open Access Open Journal. 1 (1): 4–11,
79. Heidari, "Improving the Performance of Nano–Endofullerenes in Polyaniline Nanostructure–Based Biosensors by Covering Californium Colloidal Nanoparticles with Multi–Walled Carbon Nanotubes", Journal of Advances in Nanomaterials, Vol. 3, No. 1, Pages 1–28
80. R. Gobato, A. Heidari, "Molecular Mechanics and Quantum Chemical Study on Sites of Action of Sanguinarine Using Vibrational Spectroscopy Based on Molecular Mechanics and Quantum Chemical Calculations", Malaysian Journal of Chemistry, Vol. 20 (1), 1–23
81. Heidari, "Vibrational Biospectroscopic Studies on Anti–Cancer Nanopharmaceuticals (Part I)", Malaysian Journal of Chemistry, Vol. 20 (1), 33–73
82. Heidari, "Vibrational Biospectroscopic Studies on Anti–Cancer Nanopharmaceuticals (Part II)", Malaysian Journal of Chemistry, Vol. 20 (1), 74–117, 2018.

83. Heidari, (2018),.“Uranocene (U(C8H8)2) and Bis(Cyclooctatetraene)Iron (Fe(C8H8)2 or Fe(COT)2)–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules”, Chemistry Reports, Vol. 1, Iss. 2, Pages 1–16
84. Heidari, (2018),.“Biomedical Systematic and Emerging Technological Study on Human Malignant and Benign Cancer Cells and Tissues Biospectroscopic Analysis under Synchrotron Radiation”, Glob Imaging Insights, Volume 3 (3): 1–7, 2018.
85. Heidari, (2018),.“ “Deep–Level Transient Spectroscopy and X–Ray Photoelectron Spectroscopy (XPS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation”, Res Dev Material Sci. 7(2). RDMS.000659
86. Heidari, (2018),. “C70–Carboxyfullerenes Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations”, Glob Imaging Insights, Volume 3 (3): 1–7
87. Heidari, (2018),.“The Effect of Temperature on Cadmium Oxide (CdO) Nanoparticles Produced by Synchrotron Radiation in the Human Cancer Cells, Tissues and Tumors”, International Journal of Advanced Chemistry, 6 (2) 140–156
88. Heidari, (2018),. “A Clinical and Molecular Pathology Investigation of Correlation Spectroscopy (COSY), Exclusive Correlation Spectroscopy (ECOSY), Total Correlation Spectroscopy (TOCSY), Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC) and Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC) Comparative Study on Malignant and Benign Human Cancer Cells, Tissues and Tumors under Synchrotron and Synchrocyclotron Radiations Using Cyclotron versus Synchrotron, Synchrocyclotron and the Large Hadron Collider (LHC) for Delivery of Proton and Helium Ion (Charged Particle) Beams for Oncology Radiotherapy”, European Journal of Advances in Engineering and Technology, 5 (7): 414–426
89. Heidari, (2018),. “Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations”, J Oncol Res; 1 (1): 1–20
90. Heidari, (2018),.“Use of Molecular Enzymes in the Treatment of Chronic Disorders”, Canc Oncol Open Access J. 1 (1): 12–15
91. Heidari, (2018),.“Vibrational Biospectroscopic Study and Chemical Structure Analysis of Unsaturated Polyamides Nanoparticles as Anti–Cancer Polymeric Nanomedicines Using Synchrotron Radiation”, International Journal of Advanced Chemistry, 6 (2) 167–189
92. Heidari, (2018),.“Adamantane, Irene, Naftazone and Pyridine–Enhanced Precatalyst Preparation Stabilization and Initiation (PEPPSI) Nano Molecules”, Madridge J Nov Drug Res. 2 (1): 61–67
93. Heidari, (2018),.“Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC) and Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation”, Madridge J Nov Drug Res, 2 (1): 68–74
94. Heidari, R. Gobato, (2018),.“A Novel Approach to Reduce Toxicities and to Improve Bioavailabilities of DNA/RNA of Human Cancer Cells–Containing Cocaine (Coke), Lysergide (Lysergic Acid Diethyl Amide or LSD), Δ^9–Tetrahydrocannabinol (THC) [(–)–trans–Δ^9–Tetrahydrocannabinol], Theobromine (Xantheose), Caffeine, Aspartame (APM) (NutraSweet) and Zidovudine (ZDV) [Azidothymidine (AZT)] as Anti–Cancer Nano Drugs by Coassembly of Dual Anti–Cancer Nano Drugs to Inhibit DNA/RNA of Human Cancer Cells Drug Resistance”, Parana Journal of Science and Education (PJSE), v. 4, n. 6, pp. 1–17
95. Heidari, R. Gobato, (2018),. “Ultraviolet Photoelectron Spectroscopy (UPS) and Ultraviolet–Visible (UV–Vis) Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation”, Parana Journal of Science and Education (PJSE), v. 4, n. 6, pp. 18–33, 2018.
96. R. Gobato, A. Heidari, A. Mitra, (2018),. “The Creation of C13H20BeLi2SeSi. The Proposal of a Bio–Inorganic Molecule, Using Ab Initio Methods for the Genesis of a Nano Membrane”, Arc Org Inorg Chem Sci 3 (4). AOICS.MS.ID.000167
97. R. Gobato, A. Heidari, (2018),.“Using the Quantum Chemistry for Genesis of a Nano Biomembrane with a Combination of the Elements Be, Li, Se, Si, C and H”, J Nanomed Res.7 (4): 241–252, 2018.
98. Heidari, (2018),. “Bastadins and Bastaranes–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules”, Glob Imaging Insights, Volume 3 (4): 1–7
99. Heidari, (2018),.“Fucitol, Pterodactyladiene, DEAD or DEADCAT (DiEthyl AzoDiCArboxylaTe), Skatole, the NanoPutians, Thebacon, Pikachurin, Tie Fighter, Spermidine and Mirasorvone Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations”, Glob Imaging Insights, Volume 3 (4): 1–8
100. E. Dadvar, A. Heidari, (2018),.“A Review on Separation Techniques of Graphene Oxide (GO)/Base on Hybrid Polymer Membranes for Eradication of Dyes and Oil Compounds: Recent Progress in Graphene Oxide (GO)/Base on Polymer Membranes–Related Nanotechnologies”, Clin Med Rev Case Rep 5: 228
101. Heidari, R. Gobato, (2018),. “First–Time Simulation of Deoxyuridine Monophosphate (dUMP) (Deoxyuridylic Acid or Deoxyuridylate) and Vomitoxin (Deoxynivalenol (DON)) ((3α,7α)–3,7,15–Trihydroxy–12,13–Epoxytrichothec–9–En–8–One)–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations”, Parana Journal of Science and Education (PJSE), Vol. 4, No. 6, pp. 46–67
102. Heidari, (2018),.“Buckminsterfullerene (Fullerene), Bullvalene, Dickite and Josiphos Ligands Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Hematology and Thromboembolic Diseases Prevention, Diagnosis and Treatment

under Synchrotron and Synchrocyclotron Radiations", Glob Imaging Insights, Volume 3 (4): 1–7

103. Heidari, (2018),. "Fluctuation X–Ray Scattering (FXS) and Wide–Angle X–Ray Scattering (WAXS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Glob Imaging Insights, Volume 3 (4): 1–7
104. Heidari, (2018),. "A Novel Approach to Correlation Spectroscopy (COSY), Exclusive Correlation Spectroscopy (ECOSY), Total Correlation Spectroscopy (TOCSY), Incredible Natural–Abundance Double–Quantum Transfer Experiment (INADEQUATE), Heteronuclear Single–Quantum Correlation Spectroscopy (HSQC), Heteronuclear Multiple–Bond Correlation Spectroscopy (HMBC), Nuclear Overhauser Effect Spectroscopy (NOESY) and Rotating Frame Nuclear Overhauser Effect Spectroscopy (ROESY) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Glob Imaging Insights, Volume 3 (5): 1–9
105. Heidari, (2018),."Terphenyl–Based Reversible Receptor with Rhodamine, Rhodamine–Based Molecular Probe, Rhodamine–Based Using the Spirolactam Ring Opening, Rhodamine B with Ferrocene Substituent, Calix[4]Arene–Based Receptor, Thioether + Aniline–Derived Ligand Framework Linked to a Fluorescein Platform, Mercuryfluor–1 (Flourescent Probe), N,N'–Dibenzyl–1,4,10,13–Tetraraoxa–7,16–Diazacyclooctadecane and Terphenyl–Based Reversible Receptor with Pyrene and Quinoline as the Fluorophores–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules", Glob Imaging Insights, Volume 3 (5): 1–9
106. Heidari, (2018),."Small–Angle X–Ray Scattering (SAXS), Ultra–Small Angle X–Ray Scattering (USAXS), Fluctuation X–Ray Scattering (FXS), Wide–Angle X–Ray Scattering (WAXS), Grazing–Incidence Small–Angle X–Ray Scattering (GISAXS), Grazing–Incidence Wide–Angle X–Ray Scattering (GIWAXS), Small–Angle Neutron Scattering (SANS), Grazing–Incidence Small–Angle Neutron Scattering (GISANS), X–Ray Diffraction (XRD), Powder X–Ray Diffraction (PXRD), Wide–Angle X–Ray Diffraction (WAXD), Grazing– Incidence X–Ray Diffraction (GIXD) and Energy–Dispersive X–Ray Diffraction (EDXRD) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Glob Imaging Insights, Volume 3 (5): 1–10
107. Heidari, (2018),. "Nuclear Resonant Inelastic X–Ray Scattering Spectroscopy (NRIXSS) and Nuclear Resonance Vibrational Spectroscopy (NRVS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Glob Imaging Insights, Volume 3 (5): 1–7
108. Heidari, (2018),."Small–Angle X–Ray Scattering (SAXS) and Ultra–Small Angle X–Ray Scattering (USAXS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation", Glob Imaging Insights, Volume 3 (5): 1–7
109. Heidari, (2018),."Curious Chloride (CmCl3) and Titanic Chloride (TiCl4)–Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules for Cancer Treatment and Cellular Therapeutics", J. Cancer Research and Therapeutic Interventions, Volume 1, Issue 1, Pages 01–10
110. R. Gobato, M. R. R. Gobato, A. Heidari, A. Mitra, (2018),. "Spectroscopy and Dipole Moment of the Molecule C13H20BeLi2SeSi via Quantum Chemistry Using Ab Initio, Hartree–Fock Method in the Base Set CC–pVTZ and 6–311G**(3df, 3pd)", Arc Org Inorg Chem Sci 3 (5), Pages 402–409
111. Heidari, (2018),."C60 and C70–Encapsulating Carbon Nanotubes Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations", Integr Mol Med, Volume 5 (3): 1–8
112. Heidari, (2018),."Two–Dimensional (2D) 1H or Proton NMR, 13C NMR, 15N NMR and 31P NMR Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time", Glob Imaging Insights, Volume 3 (6): 1–8
113. Heidari, (2018),."FT–Raman Spectroscopy, Coherent Anti–Stokes Raman Spectroscopy (CARS) and Raman Optical Activity Spectroscopy (ROAS) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues with the Passage of Time under Synchrotron Radiation", Glob Imaging Insights, Volume 3 (6): 1–8
114. Heidari, (2018),."A Modern and Comprehensive Investigation of Inelastic Electron Tunneling Spectroscopy (IETS) and Scanning Tunneling Spectroscopy on Malignant and Benign Human Cancer Cells, Tissues and Tumors through Optimizing Synchrotron Microbeam Radiotherapy for Human Cancer Treatments and Diagnostics: An Experimental Biospectroscopic Comparative Study", Glob Imaging Insights, Volume 3 (6): 1–8