THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

Abstract Book

7th Annual International Conference on Physics

22-25 July 2019, Athens, Greece

Edited by
Gregory T. Papanikos

2019

Abstracts
7th Annual International Conference on Physics
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(In Alphabetical Order by Author's Family name)

Preface

This book includes the abstracts of all the papers presented at the *7th Annual International Conference on Physics (22-25 July 2019)*, organized by the Athens Institute for Education and Research (ATINER).

In total 24 papers were submitted by 25 presenters, coming from 17 different countries (Australia, China, Egypt, France, Hungary, India, Iraq, Israel, Japan, Qatar, Romania, Russia, Saudi Arabia, Spain, Turkey, UK, and USA). The conference was organized into 10 sessions that included a variety of topic areas. A full conference program can be found before the relevant abstracts. In accordance with ATINER's Publication Policy, the papers presented during this conference will be considered for inclusion in one of ATINER's many publications.

The purpose of this abstract book is to provide members of ATINER and other academics around the world with a resource through which to discover colleagues and additional research relevant to their own work. This purpose is in congruence with the overall mission of the association. ATINER was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet to exchange ideas on their research and consider the future developments of their fields of study.

It is our hope that through ATINER's conferences and publications, Athens will become a place where academics and researchers from all over the world regularly meet to discuss the developments of their discipline and present their work. Since 1995, ATINER has organized more than 400 international conferences and has published nearly 200 books. Academically, the institute is organized into 6 divisions and 37 units. Each unit organizes at least one annual conference and undertakes various small and large research projects.

For each of these events, the involvement of multiple parties is crucial. I would like to thank all the participants, the members of the organizing and academic committees, and most importantly the administration staff of ATINER for putting this conference and its subsequent publications together. Specific individuals are listed on the following page.

Gregory T. Papanikos
President

7th Annual International Conference on Physics
22-25 July 2019, Athens, Greece

Scientific Committee

All ATINER's conferences are organized by the Academic Council. This conference has been organized with the assistance of the following academics, who contributed by a) setting up the program b) chairing the conference sessions, and/or c) reviewing the submitted abstracts and papers:

1. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, UK.
2. Ethel Petrou, Professor and Chair, Department of Physics, Erie Community College South, State University of New York, USA.
3. Bala Maheswaran, Professor, Northeastern University, USA.
4. Itzhak Orion, Head, Department of Nuclear Engineering, Ben-Gurion University of the Negev, Israel.
5. Salaheldin Doma, Professor, Alexandria University, Egypt.
6. Ellene Tratras Contis, Professor of Chemistry, Eastern Michigan University, USA.
7. Mustafa Bakkal, Professor, Istanbul Technical University, Turkey.
8. Alexander Mustafaev, Professor of Physics & Head, Department of General and Technical Physics, Head, Plasma Nanotechnology Laboratory, Saint Petersburg Mining University, Russia.
9. Attila Kovari, Associate Professor, Head of Department, University of Dunaujvaros, Hungary.
10. Kirill Levine, Associate Professor, Department of General & Technical Physics, St. Petersburg Mining University, Russia.
11. Athina Meli, Academic Member, ATINER, Visiting Scientist and Research Scholar, University of Gent & University of Liege, Belgium and Ronin Institute Montclair, USA.
12. Olga Gkounta, Researcher, ATINER.

FINAL CONFERENCE PROGRAM
7th Annual International Conference on Physics, 22-25 July 2019, Athens, Greece

Conference Venue: Titania Hotel, 52 Panepistimiou Avenue, Athens, Greece
(close to metro station *Panepistimio*)

Monday 22 July 2019

07:50-08:40 Registration and Refreshments

08:50-09:20 (Room A - 10th Floor): Welcome and Opening Address by Gregory T. Papanikos, President, ATINER.

09:30-11:00 Session I (Room B - 10th Floor): Physics I

Chair: Ethel Petrou, Professor and Chair, Department of Physics, Erie Community College South, State University of New York, USA.

1. Itzhak Orion, Head, Department of Nuclear Engineering, Ben-Gurion University of the Negev, Israel & Jonathan Walg, Ben-Gurion University of the Negev, Israel. Evidence of Neutrino Flux Effect on Alpha Emission Radioactive Half-Life.
2. Salaheldin Doma, Professor, Alexandria University, Egypt. Large Basis Unitary Scheme Model Calculations for the Mirror Nuclei with A = 7.
3. Ping Zhu, Professor, Puer University, China. Field Spatial Distributions Generated by an Elliptic Ring Uniformly Charged.
4. Deniz Yilmaz, Associate Professor, Ankara University, Turkey. Combined Effect of NSI and SFP on Dirac Type Solar Electron Neutrinos.

11:00-12:30 Session II (Room A - 10th Floor): Teaching & Learning

Chair: Olga Gkounta, Researcher, ATINER.

1. Costas Efthimiou, Associate Professor, University of Central Florida, USA, Elena Flitsiyan, Associate Lecturer, University of Central Florida, USA & Talat Rahman, Professor, University of Central Florida, USA. Assessment of the Effect of Service Learning in Introductory Physics on Students Learning and Critical Thinking.
2. Attila Kovari, Associate Professor, Head of Department, University of Dunaujvaros, Hungary. Education Perspectives of Human-Computer Interfaces.
3. Manuel Condoleon, Lecturer, Australian Catholic University (ACU), Australia. Talk The Tok and Walk The Wok: How International Baccalaureate Subject Teachers Integrate Theory of Knowledge in their Teaching (Case Studies in India, Thailand and China).

12:30-13:30 Session III (Room A - 10th Floor): STEAM: Institution Experiences

Chair: Attila Kovari, Associate Professor, Head of Department, University of Dunaujvaros, Hungary.

1. Andreas Karatsolis, Associate Director of Writing, Rhetoric and Professional Communication, Massachusetts Institute of Technology (MIT), USA. Integrating Communication and STEM through Stasis Theory at MIT.
2. Aymen Elsheikh, Instructional Assistant Professor, Texas A&M University at Qatar, Qatar. STEAM Education at an American Branch Campus in Qatar.

13:30-14:30 Lunch

14:30-16:00 Session IV (Room A - 10th Floor): Materials

Chair: Salaheldin Doma, Professor, Alexandria University, Egypt.

1. Hussein Motaweh, Professor, Damanhour University, Egypt & Marwa Nabil, Associate Professor, Advanced Technology and New Materials Research Institute, Egypt. Porous Silica as a Master Material in Various Applications.
2. Madalina Simona Baltatu, Assistant Professor, "Gheorghe Asachi" Technical University of Iaşi, Romania. Electrochemical Behaviour of New Ti-based Alloys, Ti-Mo-Zr-Ta vs. Ti-Mo-Si.
3. Adam Lantos, Postgraduate Student, The University of Edinburgh, Scotland, UK & Konstantinos Moulopoulos, Associate Professor, University of Cyprus, Cyprus. Topology in Modern Solid State Physics: From Topological Insulators to Weyl Semimetals.

16:00-18:00 Session V (Room A - 10th Floor): ATINER's 2019 Series of Academic Dialogues: The Future of STEAM (Sciences, Technology, Engineering, Arts and Mathematics) Education

Chairs: Olga Gkounta, Researcher, ATINER.

1. Bala Maheswaran, Professor, Northeastern University, USA. STEAM Education through Experiential Learning.
2. Ellene Tratras Contis, Professor of Chemistry, Eastern Michigan University, USA. Community-based/STEM Experiential Learning: Is it STEAM?
3. Nikos J. Mourtos, Professor & Chair, Aerospace Engineering, San Jose State University, USA. STEAM Education in the 21st Century: Are we Neglecting the "A"?
4. Ethel Petrou, Professor and Chair, Department of Physics, Erie Community CollegeSouth, State University of New York, USA. The Many Faces of STEAM at a Community College in Western New York.

21:00-23:00 Greek Night and Dinner

Tuesday 23 July 2019

07:45-10:45 Session VI: An Educational Urban Walk in Modern and Ancient Athens

Group Discussion on Ancient and Modern Athens.
Visit to the Most Important Historical and Cultural Monuments of the City (be prepared to walk and talk as in the ancient peripatetic school of Aristotle)

11:15-13:00 Session VII (Room B - 10th Floor): Chemistry

Chair: Ellene Tratras Contis, Professor of Chemistry, Eastern Michigan University, USA.

1. Essam Al-Jumaili, Professor, University of Baghdad, Iraq, Abdal-Kader Saeed Latif, University of Baghdad, Iraq & Redha Al-Bayati, University of Baghdad, Iraq. In Silico Molecular Docking Study of New Quinoline -2-one Derivatives for Inhibition *Pseudomonas Aeruginosa's* Growth Isolated from Iraqi Patients.
2. Ayman El-Faham, Professor, King Saud University, Saudi Arabia. Chemoselectivity of Cyanuric Chloride (TCT) as a Trifunctional Linker with Different Nucleophiles.
3. Naglaa El-Sayed, Associate Professor, National Research Centre, Egypt, Ewies Fawzy Mahmoud, Associate Professor, National Research Centre, Egypt & Marwa El-Hussieny, Associate Professor, National Research Centre, Egypt. One-Pot Three-Component Kabachnik–Fields, Synthesis of α-Aminophosphonates Bearing Oxadiazole Using Iron Triflate.

13:00-14:30 Session VIII (Room B - 10th Floor): Physics II

Chair: Itzhak Orion, Head, Department of Nuclear Engineering, Ben-Gurion University of the Negev, Israel.

1. Vladimir Nikolaenko, Senior Physicist, National Research Center «Kurchatov Institute», Russia. New Measurement of CP-violating Phase phi_sin Decay of Bs Mesons in ATLAS.
2. Ciprian Sporea, Research Assistant, West University of Timisoara, Romania. Quantum Fields Scattered by a Charged Black Hole with Quintessence.
3. Roger Anderton, Independent, UK. Einstein's Relativity from Perspective of Boscovich's Theory.

14:30-15:30 Lunch

15:30-16:30 Session IX (Room A - 10th Floor): STEAM: Special Topics

Chair: Bala Maheswaran, Professor, Northeastern University, USA.

1. Angel Vazquez-Alonso, Professor and Researcher, University of the Balearic Islands, Spain & Maria-Antonia Manassero-Mas, Professor and Researcher, University of the Balearic Islands, Spain. An Elaboration on the Interface between STEM and Art Searching for Convergences.
2. Eunyoung Kim, Associate Professor, Japan Advanced Institute of Science and Technology, Japan. STEAM Education in the Context of the Educational Innovations in Graduate Schools.

16:30-18:00 Session X (Room A - 10th Floor): Manufacturing & Materials

Chair: Mustafa Bakkal, Professor, Istanbul Technical University, Turkey.

1. Steven Le Corre, Professor, University of Nantes, France. Residual Stresses Prediction in Composite Materials Manufacturing: A Multiscale Combined Experimental and Numerical Approach.
2. Muthuramalingam Thangaraj, Associate Professor, SRM Institute of Science and Technology, India. Multi Criteria Decision Making of Power Diode based Process Parameters in Laser Beam Machining Using Taguchi–DEAR Methodology.
3. Ahmed Sabry Abdel-Rahman, Associate Professor, Cairo University, Egypt. Measuring the Internal Friction of some Rubber Composites doped Nanocarbon using the Laser Shadowgraphy Pulse Excitation Technique.
4. Marwa Elnady, Researcher Assistant, Central Metallurgical Research and Development Institute, Egypt, Gamal Saad, Professor, Cairo University, Egypt, Alaa Eid, Researcher, Central Metallurgical Research and Development Institute, Egypt & Malak Abou El-khair, Professor, Central Metallurgical Research and Development Institute, Egypt. Effect of PP Grafted p-Hydroxy-N- Phenyl Maleimide Comptabilizer and Organoclay Percent on the Properties of Polypropylene/Organoclay Nanocomposites.

20:30-22:00 Dinner

Wednesday 24 July 2019
Mycenae and Island of Poros Visit
Educational Island Tour

Thursday 25 July 2019
Delphi Visit

Friday 26 July 2019
Ancient Corinth and Cape Sounion

Ahmed Sabry Abdel-Rahman
Associate Professor, Cairo University, Egypt

Measuring the Internal Friction of some Rubber Composites doped Nanocarbon using the Laser Shadowgraphy Pulse Excitation Technique

Internal friction is a very important mechanical property of matter which can be determined by many techniques, such as the pulse excitation technique and the torsional pendulum. In this paper we used the pulse excitation technique as it is non-contact, easy used and not affecting the sample, reliable, low cost, and accurate and suiting a wide variety of rubbery materials and elastomers. The samples chosen for this work is made of butadiene acrylonitrile rubber (NBR), which are loaded by different phr of N774 nanocarbon. The measured sample is prepared in form of 200 mm long string, having a homogenous circular cross-section of 3 mm diameter. A mechanical pulse is produced and delivered to the fixed end sample by mean of a punch from a small solenoid motor plunger. To generate a shadowgraph for the vibrating sample on a silicone photodiode, a laser beam is used. A storage oscilloscope is used to capture the natural resonance amplitude decay profile of the test sample from the obtained electric signal. The internal friction is obtained by mathematical analysis of the acquired data.

Essam Al-Jumaili
Professor, University of Baghdad, Iraq
Abdal-Kader Saeed Latif
University of Baghdad, Iraq
&
Redha Al-Bayati
University of Baghdad, Iraq

In Silico Molecular Docking Study of New Quinoline -2-one Derivatives for Inhibition *Pseudomonas Aeruginosa's* Growth Isolated from Iraqi Patients

The study dealt with a design and synthesis of new Quinoline-2-one derivatives as antibacterial agents. Design of these chemical compounds was conducted by computational methodologies *'In silico'*. The 3 dimensional (3D) structure model of DNA gyrase enzyme of *Pseudomonas aeruginosa* was built by Homology Modeling method as target protein and the active site was visualized. All 3D information of the active site of target protein were exploited to design six molecules (Q2-Q7). The computational prediction showed compound (Q3) had highest binding score (-45 Kcal/mol) with active site of target protein and compound (Q2) showed lowest binding score (-12.81 Kcal/mol) with target protein. Incorporation of different Heterocyclic, Schiff bases and benzene sulfonamides moieties with Quinoline-2-one molecule was an attempt to synthesize a potential antibacterial agent, the generation of six molecules was accomplished by multi steps reaction procedure. All six molecules were examined for their purity and identity and confirmed by their melting points, FT-IR and Ultraviolet spectrum. Forty-three pathogenic bacterial isolates were identified as *P. aeruginosa* which were isolated from seventy-five patients suffering from various infections. Only three of six synthesized molecules (Q3, Q4 and Q6) showed highest level of antibacterial activity at (256µg/ml) concentration, meanwhile compounds (Q5, Q7) show moderate activity at (512µg/ml) concentration. The compound (Q2) showed no antibacterial activity against clinical *P. aeruginosa*. DNA gyrase enzyme was purified from clinical *P. aeruginosa* isolate by 75% saturation of ammonium sulphate, DEAE-cellulose column and gel filtration column. Purified DNA gyrase showed activity against kinetoplast DNA (KDNA) substrate on agarose gel 0.9%. The molecular weight of purified DNA gyrase was determined by Sepharose 6B and was (199 KD). The inhibition study of synthesized compound (Q3) showed full inhibition against purified DNA gyrase at (1000 µg/ml) concentration. The *In vivo* studies for determining the toxicity profile of synthesized compound (Q3) was done, lethal dose 50% (LD50) was conducted on Albino Swiss mice with subcutaneous injections, the LD50% was (1124 mg/kg) of animal weight. Histopathology studies of liver and kidney

tissue of dead and treated mice and illustrated that compound (Q3) had no significant effect on histological pattern of liver and kidney of the animal at dose (727 mg/kg) during 24 hours of experiment.

Roger Anderton
Independent, UK

Einstein's Relativity from Perspective of Boscovich's Theory

Between Galileo and Einstein there were others working on the relativity issue, such as Boscovich (1711-1787) dealt with the relativity issue notably in his paper De Spatio ac Tempore (On Space and Time 1755). Although Einstein does not mention Boscovich in his 1905 paper on Special Relativity, there are remarkable similarities which give insights into relativity. Silberstein in 1924 directed attention to the neglect of Boscovich's "remarkably clear and radical ideas regarding the relativity of space, time and motion". (See his "*Theory of Relativity*", 2nd edit., p. 38 (1924).) While on the issue of development of Quantum mechanics there are also insights from Boscovich as to how classical physics transitions from considering repulsive and attractive forces on particles leads to stable and unstable orbits. (Dragoslav Stoiljkovic: Roger Boscovich- the founder of modern science ISBN 978-86-7861-043-1). Augustus Prince deals with An Analytical Form of the Boscovich Curve with Applications http://vixra.org/abs/1801.0116 and says: "Using an analysis from a physical and phenomenological viewpoint employing the renowned and recognized continuity of Boscovich's force curve, a new paradigm is formulated to explicate various physical phenomena in both the microworld and the macro-world." Einstein attempted to form a unified theory incorporating relativity with quantum physics and is deemed to have failed, but classical physics development under the idea of Newtonian-Boscovichian point-particles (bodies represented by centres of mass) seems to have been the basis for such research.

Madalina Simona Baltatu
Assistant Professor, "Gheorghe Asachi" Technical University of Iaşi, Romania

Electrochemical Behaviour of New Ti-based Alloys, Ti-Mo-Zr-Ta vs. Ti-Mo-Si

Ti-based alloys are widely used in medical applications, in the last decade. In order not to produce side effects,many kinds of titanium alloys must be composed with different non-toxic elements (Zr, Ta, Mo, Si, Nb etc.), thus interact well with adjacent bone tissues. The present study explores the electrochemical responses of different Ti-based alloys as Ti-Mo-Zr-Ta or Ti-Mo-Si systems designed for medical applications. The alloys electrochemical corrosion resistance was determined in Ringer solution using linear potentiodynamic polarization tests (LPP). For the new materials was identified a spontaneously passivation oxide film on their surface and they remained stable for polarizations. No localized breakdown of the oxide layers could be evidenced.

This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0239 / 60PCCDI 2018, with in PNCDI III.

Manuel Condoleon
Lecturer, Australian Catholic University (ACU), Australia

Talk The Tok and Walk The Wok: How International Baccalaureate Subject Teachers Integrate Theory of Knowledge in their Teaching (Case Studies in India, Thailand and China)

This study explored how teachers of the International Baccalaureate Diploma Programme integrated the Theory of Knowledge (TOK) course in their teaching. The inter-disciplinary nature of TOK embraces STEAM for it explores questions about the nature of knowledge with a particular focus on the connections between ways of knowing and areas of knowledge such as Arts, Mathematics and the Natural Sciences. It is a compulsory element of the International Baccalaureate Diploma Programme (IBDP) as all teachers are expected to include TOK in their teaching, however teachers have often expressed a sense of confusion and lack of confidence when teaching TOK. Education scholars have also questioned the appropriateness of TOK for students of non-Western cultures considering it has grown from a programme with a strong Western humanist tradition and dominated by the Western languages. Against this backdrop, however, the International Baccalaureate (IB) is experiencing its strongest growth in the Asia-Pacific region. This study therefore sought to explore some of the ways in which TOK is interpreted, adapted and implemented in the IBDP across non-Western contexts. A qualitative case study methodology was employed focusing on three international schools, one in India, one in Thailand and one in China. The study considers the views and practices of subject teachers relating to TOK across the multiple case study schools, which in turn raises issues for future pedagogical practice such as strategies for the successful collaboration of educators in promoting STEAM especially from a more critical and epistemological standpoint.

Salaheldin Doma
Professor, Alexandria University, Egypt

Large Basis Unitary Scheme Model Calculations for the Mirror Nuclei with A = 7

The unitary scheme model with bases corresponding to number of quanta of excitations N = 3, 5, 7, 9 and 11 is used to construct the ground and excited state wave functions of the four mirror nuclei with A = 7; namely the nuclei ^{7}He, ^{7}Li, ^{7}Be, and ^{7}B. The binding energies, the spectra, the root mean square radii of these nuclei are calculated. The nuclear supermultiplet model is then applied to calculate the nuclear magnetic dipole moments of the four nuclei and the *ft*-value of the allowed β-decay in the case of the electron capture in the transmutation of ^{7}Be into ^{7}Li. The calculations were performed using the GPT and the Av8' nucleon-nucleon interactions together with the Urbana IX three-body interaction. Variations of the different characteristics of the four nuclei with respect to the number of quanta of excitations N and the oscillator parameter $\hbar\omega$ are also calculated. Excellent convergences between the calculated values and the corresponding experimental values are obtained.

Costas Efthimiou
Associate Professor, University of Central Florida, USA
Elena Flitsiyan
Associate Lecturer, University of Central Florida, USA
&
Talat Rahman
Professor, University of Central Florida, USA

Assessment of the Effect of Service Learning in Introductory Physics on Students Learning and Critical Thinking

Course-related Service Learning Project: "Physics of the Car Accident: Building a Safe Campus by Solving Physics Problem" was developed and implemented into an existing introductory physics course (Physics for Scientists and Engineers I, PHY 2048) and is focused on analyzing the Physics of the car accident. The project was supported by UCF Police Department, UCF Office of Service Learning, and Faculty Center for Teaching and Learning. The project pursues the double role: to show the students how the law of physics can help them to build a safer campus and to stimulate their interest in study physics by bringing it closer to everyday life.

The project is integrated to meet pre-defined course objectives. In other words, the service activity is fully integrated and designed to facilitate a course identified learning goals, as opposed to being only an add-on activity.

The development of this active engagement curricula based on the constructive model of student thinking and learning allows diversity in approach to suit student/instructor styles, provide data base for assessment of comparative gains in student learning, and same time help address the specific issue – to improve the safety of young community members driving skills.

The objectives of the project are:

- To integrate theory, problem-solving and experiments in mechanics course with accent on car motion related topics;
- To optimize student engagement (by fostering collaborative learning, providing immediate feedback, adapting activities to students' state of knowledge, and shifting the focus of control from teacher to students);
- To optimize integration of technology into the physics curriculum by using the active in-class demonstrations, animated figures, student's presentation posted on you tube, etc.

An important aspect that sets course-related Service Learning apart from simple service is that participants are expected to learn as much from

reflecting on their service as they do from performing the actual activity in the class. Reflection often includes student-to-student discussions, journaling, or writing a report/paper describing the impacts of the service activity.

For this project we conduct an assessment study in which the progress of the project attendees was compared to a control group from the same class section of the previous semester.

Results from the pre- and post-tests shows that there is a correlation between students' interest in the subject matter and their grasp and retention of the physics concept. One of the main goals of the physics course, and the main motivation for the creation of alternative curricula, such as service learning approach, is to increase the science literacy of the students graduating from the university. To this end, the course appears to reach the goal. A student understanding of the role of the Physics in everyday life has improved through the course. Student's attitude toward science has also improved greatly. This is evident from the large improvement of confidence rankings from pre- to post-test.

Ayman El-Faham
Professor, King Saud University, Saudi Arabia

Chemoselectivity of Cyanuric Chloride (TCT) as a Trifunctional Linker with Different Nucleophiles

Given the efficient of TCT to reacts with a variety of nucleophiles, it is often used as an organic synthetic building core or pattern to access more complicated molecular structure, which they are used in medicinal and industrial applications. TCT is an attractive molecule due to its low cost, commercial availability, and ease of stepwise substitution of the three chlorine under temperature control.

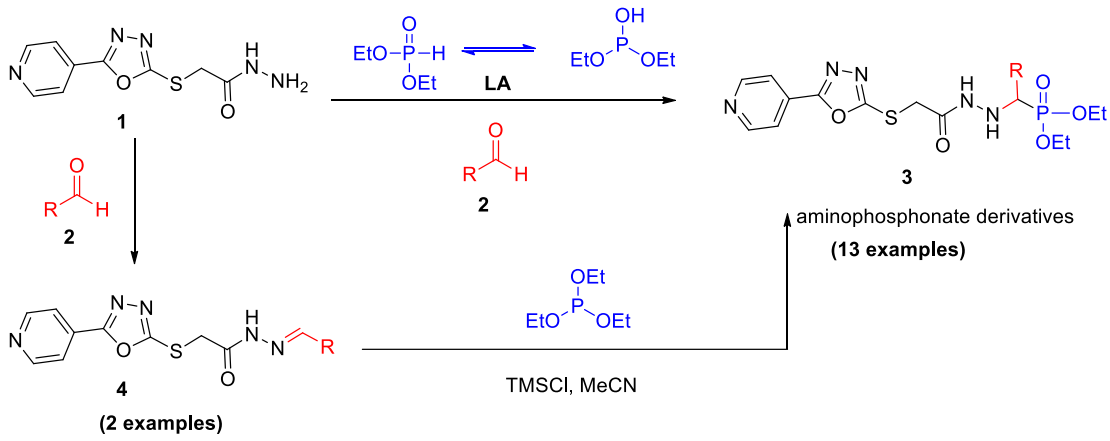
The uniqueness of TCT is that it reacts with almost all types of nucleophiles (S, O, N). Furthermore, the three reactive points are connected as after the introduction of first nucleophile the reactivity of the other remaining Cl changes. It is known that the basic character of the incoming nucleophile that replaces the second and third chlorine is weakened due to the present substituent's in TCT, of the triazine ring through loss of σ-bond electron withdrawal of a chlorine atom and gain of π-orbital electronic donation of the added nucleophiles. Thus, the incorporation of the first nucleophile into TCT can be performed at different temperature.

Due to the importance of triazine different filed of applications, we explored here the scope and limitation of *chemoselectivity* for different nucleophile N, O, and S) which exist in many biological activity molecules and applied to TCT. The preferential order of incorporation of different nucleophiles (such as alcohol, thiol, and amine) was addressed both experimentally and theoretically. The preferential order for incorporating nucleophiles in TCT was found to be alcohol > thiol > amine.

Naglaa El-Sayed
Associate Professor, National Research Centre, Egypt
Ewies Fawzy Mahmoud
Associate Professor, National Research Centre, Egypt
&
Marwa El-Hussieny
Associate Professor, National Research Centre, Egypt

One-Pot Three-Component Kabachnik–Fields, Synthesis of α-Aminophosphonates Bearing Oxadiazole Using Iron Triflate

Kabachnik-Fields (Phospha-Mannich) reaction is an extremely efficient one-pot, three-component reaction for the synthesis of α-aminophosphonates that are phosphorus analogs of amino acids, which have been widely used as imaging agents and as antitumor, antihypertensive, and antibacterial agents. The aim of our work herein to synthesize a new series of α-aminophosphonate derivatives that containing 1,3,4-oxadiazole and pyridine moieties and to screen in vitro the activity of the new products as antitumor agents against liver; HepG2 and breast; MCF-7 human solid tumor cell lines. Benzaldehyde, diethyl phosphite and 1,3,4-oxadiazole acetohydrazide derivative were stirred at 80°C in 1,2-dichloroethane (DCE) without any catalyst, the target product **3** isolated as traces. For optimization, reactions of different 13 aldehydes and 1,3,4-oxadiazole acetohydrazide derivative **1** with diethyl phosphite in presence of different solvents using Metal-Triflate catalysts were conducted. For confirmation of the reaction procedure, the reaction of two examples of aldehyde **2** and acetohydrazide derivative **1** was proceed to give the imine products **4** in good yield. For confirmation of these compounds, two selected examples of the synthesized compound **4** reacted with triethyl phosphite in the presence of trimethylsilane chloride to afford the target products **3** in a moderate yield (Scheme 1). Structure assignments and mechanisms of the new products were discussed.



Marwa Elnady
Researcher Assistant, Central Metallurgical Research and Development Institute, Egypt
Gamal Saad
Professor, Cairo University, Egypt
Alaa Eid
Researcher, Central Metallurgical Research and Development Institute, Egypt
&
Malak Abou El-khair
Professor, Central Metallurgical Research and Development Institute, Egypt

Effect of PP Grafted p-Hydroxy-N- Phenyl Maleimide Comptabilizer and Organoclay Percent on the Properties of Polypropylene/Organoclay Nanocomposites

Polypropylene /clay nanocomposites have been used extensively in a wide range of applications due to their enhanced properties compared to the properties of both the polypropylene and the clay each alone. The degree of enhancement in their properties depends on the extent to which the polymer and the clay are compatible with each other. In the present work the problem of incompatibility between polypropylene and natural clay has been overcomed by using PP grafted p-hydroxy-N-phenyl maleimide(PP-g-pHPMA) as a comptabilizer and clay that has been organically modified using hexadecyltrimethyl ammonium bromide surfactant in the polymer nanocomposites synthesis process. The nanocomposites were synthesized by melt reactive extrusion in a twin screw extruder. Two series have been prepared; one in presence of comptabilizer (fixed percent 3%); the other one in absence of comptabilizer and the amount of added organoclay is varied in both series from 1%wt up to 7%wt. The effect of the comptabilizer and the organoclay percent have been studied using X-ray Diffraction Analysis(XRD), Melt Flow Index measurements(MFI), Thermogravemetric Analysis(TGA), Differential Scanning Calorimetry(DSC), Dynamic Mechanical Analysis(DMA), Scanning Electron Microscope(SEM), Gas Transmission Rate (GTR) and Water Vapor Transmission Rate measurements (WVTR). The XRD diffractograms suggests the exfoliation of the prepared nanocomposites. The melt flow index results shows a great increase in the value of the MFI by increasing the organoclay content and the increase is higher in the presence of comptabilizer. The TGA results shows that both the presence of comptabilizer and the organoclay content enhances the thermal stability of the formed nanocomposites. It was found that both the comptabilizer and the organoclay content have an impact on the barrier properties.

Aymen Elsheikh
Instructional Assistant Professor, Texas A&M University at Qatar, Qatar

STEAM Education at an American Branch Campus in Qatar

Many researchers argue for the importance of using STEAM skills, which include arts activities, such as visual, aural, verbal, and somatic thinking, to aid in the development of students' creativity and imagination (Babaci-Wilhite, 2019). Therefore, the purpose of this presentation is to report on the STEAM initiative at Texas A&M University at Qatar (TAMUQ) and its role in developing such skills. The goal of the initiative is to integrate the arts and design skills into the STEM curriculum offered at the university. It also aims to raise awareness about and shows the importance and relevance of the arts to a STEM-based education and research (Bickham, 2016) in a transnational education setting. TAMUQ is a US branch campus of A&M flagship campus in Texas and is housed in Qatar Foundation's Education City in Qatar. The Education City is home to six American branch campuses, a British university, a French university, and a Qatari university and has a student body which hails from over 50 countries. Each university offers a different type of specialization. TAMUQ is an engineering university where students major in one of four engineering programs. The university also provides instruction in science, mathematics, liberal arts through its science and liberal arts programs and the curriculum offered in Qatar is similar to that of the main campus' in College Station, Texas. As the liberal arts program is committed to providing a state-of-the-art instruction in the humanities and social sciences to engineering students, it sought the integration of the Arts in the STEM-based curriculum through its STEAM initiative which was established in 2014.

After offering a brief background about Texas A&M University at Qatar, the STEAM initiative, and the relevant literature on STEAM education, the presenter will share, using text and visuals, the different learning opportunities the STEAM initiative afforded to the students, which include activities inside and outside of the classroom. The liberal arts faculty encouraged their engineering students to use research, communication, and critical thinking skills in their technology and engineering projects. The initiative then provided the students a platform to share their projects with a wider audience through the organization of a university-wide STEAM showcase twice a year. The students' projects featured in the showcases included poster presentations, drawings, prototypes, and videos/movies. The importance of this learning opportunity lies in the students' realization that these are important skills to have not only for the workplace but also to develop as an individual. The presentation concludes with highlighting the challenges of the STEAM initiative and inviting the participants to reflect and share their

own experiences with STEAM education. It will also outline implications for future research and professional development in an era of globalization and hegemonic transnational education discourses.

Andreas Karatsolis
Associate Director of Writing, Rhetoric and Professional Communication,
Massachusetts Institute of Technology (MIT), USA

Integrating Communication and STEM through Stasis Theory at MIT

Over the past twenty years in the United States, most Science and Engineering programs have taken steps to incorporate communication courses in their curriculum, driven either by accreditation requirements (e.g. ABET) or by alumni surveys in which graduates typically assert the importance of communication for advanced participation in the field. Within this context, courses on Scientific and Engineering Communication have been developed, either in-house, by the disciplinary faculty drawing on best practices in their field, or by English and/or Technical Writing faculty in the institution. In both models, however, the instruction students receive treats communication as an activity which follows the scientific or engineering work, and is aimed at making the content of the work accessible and effectively presented to multiple audiences. Yet, we know from research in disciplinary communication (Winsor 2013, Poe et al 2013) that the effective formulation of a disciplinary scientific argument relies on understanding both of the disciplinary content, as well as the rhetorical frameworks used to formulate and communicate the argument.

This presentation reports on an innovative approach to integrating communication within disciplinary STEM courses, using a rhetorical framework for instruction, practice and feedback. Using examples from an advanced graduate level seminar on Aero-Astro and an undergraduate lab subject in Materials Science and Engineering at MIT, we discuss an instructional model which is based a contemporary reformulation of Stasis Theory, both as a heuristic and an analytical tool. This framework allows us to help students not only formulate audience-appropriate research questions, but also have a clear, disciplinary-based path to inform the progression of their argument. Using analyses of student performances (both written texts and oral presentations), we intend to provide evidence of the effectiveness of integrating this model into STEM curricula in higher education. Our larger goal is to argue for the need to bring such integrated models into STEM classrooms so that students can be enculturated in the disciplinary reasoning and communication practices of their field.

Eunyoung Kim
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STEAM Education in the Context of the Educational Innovations in Graduate Schools

The educators in higher education are facing several challenges due to diverse changes in the social systems that support the institutions. In addition, learning styles have changed drastically from generation to generation, and it is required to innovate pedagogical approaches. In this regards, numbers of graduate schools have launched educational program including STEAM education to foster the creative leaders of our future.

Recently, there have been numbers of research regarding STEAM education, however there are not enough research on STEAM education for the graduate school level education. Beside the STEAM education, higher education institutes have been trying a numbers of educational program such as CDIO in Engineering school, entrepreneurship education in business school, design workshop program in multidisciplinary schools and numerous programs regarding the initiative to innovate the education in universities and graduate schools.

This study is to review the existing STEAM education and its similar programs in higher education, analyze the content of each type of program through building a framework that include the perspective of both faculty and students, and propose the future direction for STEAM education.

To review the educational programs in graduate schools, this study compares the educational system among Asia, Europe, and the USA, to understand how the STEAM education or similar kind of programs have been developed. In addition, we list up the current projects regarding the STEAM education in the world-class graduate schools, e.g. the STEAM networks in the USA, CDIO network initiated by MIT and Scandinavian countries, and several multidisciplinary educational program for enhancing creativity and innovation skills. As this area is relatively newer than the fields of the study where the participating faculties used to belong to, moreover, they are from such a diverse fields, there is an increasing need of highlighting the distinctions and similarities among various educational programs.

By reviewing the related projects and educational programs, we can position the STEAM education in the context of the educational innovations in graduate schools. Also we can give a set of dimensions to build a framework that can be utilized to describe and compare the existing educational programs developed for innovating the education in graduate school. Finally, this study will help to explain how to identify the

opportunities for directing the future STEAM education that balances the needs among society, faculty and our future leaders - students.

Attila Kovari
Associate Professor, Head of Department, University of Dunaujvaros, Hungary

Education Perspectives of Human-Computer Interfaces

Modern computer interfaces are becoming more and more common in engineering studies and applications. In the development of these technologies the human-computer interaction is also greatly evolving. Some typical areas of the developments are brain-computer interfaces, eye-tracking, gesture control systems or even virtual 3D, extended reality. Human-computer interfaces also could support the education and learning process in many approaches. The paper presents, review and analyze the possibilities of this topic, the results of some related researches and present the new research possibilities.

Adam Lantos
Postgraduate Student, The University of Edinburgh, Scotland, UK
&
Konstantinos Moulopoulos
Associate Professor, University of Cyprus, Cyprus

Topology in Modern Solid State Physics: From Topological Insulators to Weyl Semimetals

Topological materials is one of the hottest fields in the wide arena of solid state physics. Even though the field has gone through various 'revolutions', it is still bombarded by a seemingly endless stream of important new discoveries that offer insight on the fundamentals of it.

These exotic materials have their properties deeply rooted in ideas of topology, hence the talk will naturally begin from topological ideas, mostly in the context of the Berry phase, which is a fundamental ingredient that was added to the basic theory of Quantum Mechanics many years after the latter was formed by its famous fathers.

The talk will then move on to Topological Insulators, which is the first class of topological materials discovered in Nature. The topological invariants that described them will be presented. These include the Chern number and the Z2 index, both of which have different areas of applicability, depending on the (effective/approximate) dimension of the material and its symmetry properties. Famous site-models will be presented, which have played a catalytic role in the development of the field and were realized as models describing real, experimentally discovered topological insulators. Such site-models include the Haldane model and Kane-Mele model, both of which have been essential in the theoretical study of graphene.

After being done with Topological Insulators, the talk will proceed to the more modern and recently-discovered topological materials called Weyl semimetals. This section will be almost entirely driven by the now-famous Burkov-Balents model in order to showcase, by example, the unique properties of these exotic materials. Recent experimental observations of these materials will be briefly mentioned.

The talk will conclude with a swift presentation of some of the most recent theoretical and experimental advancements of this booming field.

Steven Le Corre
Professor, University of Nantes, France

Residual Stresses Prediction in Composite Materials Manufacturing: A Multiscale Combined Experimental and Numerical Approach

Due to their outstanding specific mechanical properties, composite materials have received a growing interest during the last decades, in particular in the industrial sectors of transportation. One particular feature of those materials is that the material and the part are created at the same time, so that the fabrication processes involve coupled mechanical, thermal and chemical evolutions, as it is the case for thermoset composites. The mechanical state of any produced part is therefore strongly dependent on the thermal history that systematically results in residual stresses and possibly in shape distortions with respect to the initially expected design. This key issue of the composite manufacturing processes has been paid a lot of interest along years, and many models exist in the field. Nevertheless, due to the difficulty of a proper identification of mechanical changes during curing, no one of them is really satisfactory at this day.

In this work, an experimental device called PVT-HADDOC was developed in order to measure anisotropic shape changes of thermosetting composites under homogeneous thermal and mechanical conditions, all over a curing stage, from the liquid state to the solid state during heating and/or cooling steps (200°C, 10bars, +/- 5 $K.min^{-1}$). This device also enables to measure the heat flux between the mold and the sample which provides the degree of cure and the dimensional variations simultaneously. Results on two thermosetting composites are presented, one on a high performance SMC and the other on an aeronautic unidirectional carbon/epoxy. Anisotropic CTE and shrinkage tensors are shown to be obtained with a reasonable precision.

On the other hand, a multiscale approach was developed. It is based on the theoretical framework of periodic homogenization with multiple scale asymptotic expansions which was derive here for the coupled chemical, thermal and mechanical problem. It was then applied to the case of a unidirectional composite. The compressive behavior of the matrix was measured from advanced PVTα measurements realized in our lab whereas its deviatoric behavior makes use of one thermoelastic model of the literature. Homogenization predictions, computed in a 3D FEM code, and experimental measurement are finally in excellent agreement for the prediction of the anisotropic dimensional variations of the composite during its curing cycle.

Hussein Motaweh
Professor, Damanhour University, Egypt
&
Marwa Nabil
Associate Professor, Advanced Technology and New Materials Research Institute, Egypt

Porous Silica as a Master Material in Various Applications

In this study, the production of different architectures of porous silica is shown, using simple and inexpensive alkali chemical technique. The chemical, physical and morphological properties are the master factors, which produce a variety of applications. It has been decided the importance degree of the porous spherical shape; as one of the most important architectures, that assist the dyes adsorption process in various industrial fields as (foods, pharmaceutics industries, and the textile industry).

As it increases the breadth of the surface area of the material and it can also be used as thermal insulation due to increased electrical resistance and thermal material as well as chemical stability. Thus, we demonstrated the importance of devising different properties of the material for reuse in different applications in many applied fields. Therefore, the study reviewed many sizes and shapes of porous silica in different buildings, which opens the way for us to use in new applications.

Vladimir Nikolaenko
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New Measurement of CP-violating Phase phi_sin Decay of Bs Mesons in ATLAS

A measurement of Bs decay parameters using data collected by the ATLAS detector in pp collisions at 13 TeV in 2015-2017 years is performed. Integrated luminosity of this sample is 80.5 fb^{-1}. The measurement of physical parameters are statistically combined with results obtained from Run 1 data at 7 and 8 TeV. The measured value of CP-violating phase phi_s = -0.076+-0.034(stat) +-0.019(syst) is obtaived, which is significantly better precision in comparison with Run 1 result. Precision of other physicsl parameters is also improved, including the decay width difference \Delta\Gamma. Further improvement is expected from the use of full Run 2 statistics, as well as from modifications in the analysis.

Itzhak Orion
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&
Jonathan Walg
Ben-Gurion University of the Negev, Israel

Evidence of Neutrino Flux Effect on Alpha Emission Radioactive Half-Life

Radioactive sources presented annual periodical half-life changes in several accurate measurements, although customary practice claims that radioactive decay should be a physical constant for each radionuclide. Besides that, the Purdue measurements of Mn-54 decay-rates indicated response to solar X-ray flare events in 2006 (J. H. Jenkins and E. Fischbach 2009). The Mn-54 source emits neutrino from the nucleus and therefore allows interpreting those solar neutrinos can interact with this radiation source.

In order to track more radiation count-rate responses to solar flare events, we built two experimental detector systems for gamma radiation count-rates measurements, one facing an Am-241 source, and two in front of a Rn-222 gas container. The two systems were tracking gamma rays that follow an alpha particle emission. The two systems were placed at an underground laboratory, permanently locked to avoid any influence by unexpected radiation perturbations, and environmentally controlled in means of temperature and clean-air flow, in order to maintain detectors stabilization. The detectors were consist of NaI(Tl) scintillators for gamma radiation and total-counting reader devices for remote counting. Each radiation counting system was shielded by a 5 cm lead.

One month prior to flare events from the Sun, all three detectors showed reasonably stable count-rates, which were tallied every 15 minutes. Five solar-flares occurred and reported by the SpaceWeatherLive website on 12th to 13th of October 2018. The Rn-222 system responded to each of the five solar-flares by counting-rate decreases eventuated a few hours after the flares incident time. The Am-241 system response to solar flares found to be with a delay of around 20 days, however its response shape is in higher significance.

We conclude that also for alpha emitter radioactive sources, the half-life altered due to changes of neutrino flux from the Sun.

Several geological radiometric dating methods, such as the U-235 chain, U-238 chain, and Th-232 chain, that emit alpha particles are in use. Our measurements indicated that an alpha emitter was affected by the neutrino flux change from the Sun. Our new findings should question the reliability of these dating methods since the solar activity varies

throughout time as the Sun has been going through an evolutionary process.

Ciprian Sporea
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Quantum Fields Scattered by a Charged Black Hole with Quintessence

The problem of black hole scattering of quantum fields with spin one half was the subject of many research papers in the last years [1-9]. A combination of analytical and numerical methods were used to compute the absorption and scattering cross sections. In our previous papers [4-9] we used the partial wave method to derive for first time an analytical formula for the phase shifts associated to fermion scattering by several types of black holes with spherical symmetry. In the present work we extend those studies and compute, using the partial wave method, the differential scattering cross section of fermions scattered by a Kiselev black hole, which is an exact solution of the Einstein equations for a black hole surrounded by quintessential matter. Our results indicate the presence of glory and spiral/orbital scattering phenomena. Furthermore, the induced polarization after the interaction with the black hole is also studied.

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Muthuramalingam Thangaraj
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Multi Criteria Decision Making of Power Diode based Process Parameters in Laser Beam Machining Using Taguchi–DEAR Methodology

Conventional technology for leather processing comprises leather cutting which operates at slower speeds, less in quality and involves high manpower resources. As a result it drastically restrains the development of the leather industry. Due to small size and low power consumption, diode lasers can process leather rapidly, efficiently and continuously. In the present work, an attempt has been made to analyze the machinability of cow leather using 445nm blue diode based laser beam machining (LBM) process. Since the process related with more than one performance measure, it is essential to establish the multiple response decision making for optimizing the process parameters in this process. Taguchi's L25 orthogonal array was used to design experimental trials with different levels of input parameters such as frequency, amplitude, duty cycle, standoff distance and cutting speed. Taguchi – Data Envelopment Analysis based Ranking methodology has been used to enhance the performance measures such as geometrical inaccuracy and carbonization in the present study.

Angel Vazquez-Alonso
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&
Maria-Antonia Manassero-Mas
Professor and Researcher, University of the Balearic Islands, Spain

An Elaboration on the Interface between STEM and Art Searching for Convergences

The STEAM movement steps up by including the 'A' for arts into STEM (science, technology, engineering, and maths) education. STEAM promotes curiosity (asking questions), communication (creating answers, designing solutions) and artistic skills across the transdisciplinary of disciplines. STEAM focuses not just on making it interesting, but on really achieving engagement, relevance, innovation, and real-world learnings.

This paper aims to reflect on the intersection between STEM and Arts to elaborate some additional coincidences beyond the few that usually are advocated (questioning, creativity, design and communication). Further, some exemplary artworks are taken together to illustrate these coincidental aspects and the power of Art to plastically impact on STEM learning.

The starting point of the elaboration is the conceptualization on the specific traits of STEM, and specially science, as a way of knowing, through the 3-world/NoS&T (nature of science and technology) model and its graded taxonomy that develops some strands and topics. First, science traits are classified in two broad strands: epistemic-cognitive and social-institutional. The epistemic and cognitive strand involves the definitions and relationships of science and technology and the epistemic traits on the nature of the scientific and technological knowledge. The social-institutional strand involves the external and internal sociology of science; the external sociology involves the topics about the influences between society and the science / technology system, and the triadic science-technology-society relationships; the internal sociology of science involves the characteristics of scientists, the social construction of the scientific and technological knowledge.

The former taxonomy is used as a methodological tool to guide the analysis and reflection on the shared traits between art and STEM. The results of the comparative analysis between STEM and art are summarized through the following convergent aspects for each of the big strands.

Epistemic-cognitive

- Posing big questions about the world
- Observation, especially visual perception
- Imagination and creativity
- Change along time

- Science and art share technology
- Experimental focus of activities
- Artworks account for scientific and technological knowledge

Social-institutional

- Historical dimension
- Importance of commissioned work
- Science and technology provide themes for artists
- Interactions with society
- Influences on/from society
- Science and art education share goals and competences of curriculum
- Human enterprises
- Role of genial individualities
- Cooperation and team work
- Creation of professional organizations
- Norms and values
- Social construction

The in-depth justification, explanation and consequences of the former elaboration items will be further developed at the Symposium.

Deniz Yilmaz
Associate Professor, Ankara University, Turkey

Combined Effect of NSI and SFP on Dirac Type Solar Electron Neutrinos

In this study, the combined effect of nonstandard neutrino interactions (NSI) and spin flip precession (SFP) is examined for the Dirac type solar electron neutrino oscillation in the case of two neutrino generations. Furthermore, the allowed regions are also examined in the (ε11, μB) and (ε12, μB) planes at 90% CL. The best fit LMA values are used for neutrino parameters. It is shown that the neutrino survival probability curves get close to the standard MSW curve when both effects are combined for some values of the parameters (ε11, ε12, and μB). Therefore, one can say that the combined effect of them needs to be taken into account when the solar electron neutrino data obtained by the new neutrino experiments is investigated.

Ping Zhu
Professor, Puer University, China

Field Spatial Distributions Generated by an Elliptic Ring Uniformly Charged

Because the polar radius of an elliptic ring uniformly charged is not a constant, for arbitrary spatial positions, the field distribution of which cannot transform into an elliptic integrals problem. It is extremely difficult or even impossible for us to obtain the analytic spatial distribution functions of the elliptic ring uniformly charged. Using methods of the computer numerical simulation we investigates the spatial electric field distribution of a uniformly charged elliptic ring, and point out the important properties of the field spatial distribution of a uniformly charged elliptic ring. The comparison of the field distributions on the central axis line obtained by the computer simulation with the field distributions gained by analytic distribution function establishes both results are in good agreement. It is important and interested to solve and to discuss the problem.