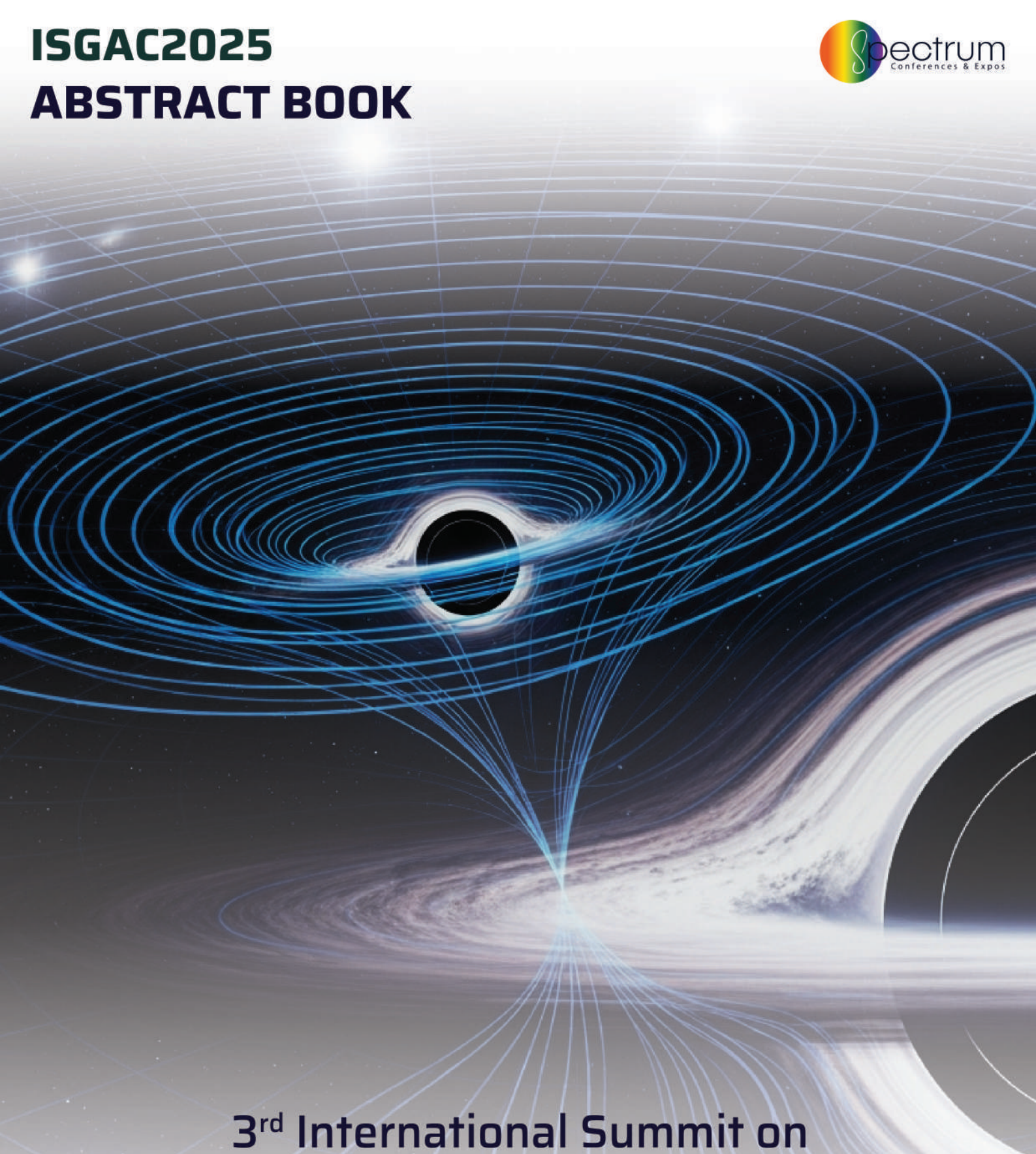
ISGAC2025
ABSTRACT BOOK



3rd International Summit on

Gravitation, Astrophysics and Cosmology

March 13-14, 2025 | Valencia, Spain

TABLE OF CONTENT

FOREWORD

Dear Colleagues,

It is our pleasure to extend a warm invitation to all scientists, academicians, young researchers, business delegates, and students from around the globe to participate in the **3rd International Summit on Gravitation, Astrophysics and Cosmology (ISGAC2025)**, scheduled to take place in **Valencia, Spain** from **March 13-14, 2025.**
ISGAC2025 will provide a platform to explore recent research and cutting-edge technologies, attracting a diverse and enthusiastic audience of young and talented researchers, business delegates, and student communities.

The primary objective of **ISGAC2025** is to bring together a multidisciplinary gathering of scientists from across the globe to share and exchange groundbreaking ideas in the fields of Gravitation, Astrophysics and Cosmology. The summit aims to foster high-quality research and international collaboration, facilitating discussions and presentations that are globally competitive and highlighting recent notable achievements in these fields.

We're looking forward to an excellent meeting with scientists from different countries around the world and sharing new and exciting results in Gravitation, Astrophysics and Cosmology.

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Rahmani Yassine	Center of Research on Astronomy, Astrophysics & Geophysics

Day 1 Speakers

ISGAC2025

He-BEC Isotropic Singularity and the Theoretical Identification of Dark Energy and Dark Matter

Keryn Johnson

Quantum Biology, Quantum Technologies Ltd, 39a Bombay Street, Ngaio, Wellington6035, New Zealand

ABSTRACT

A theoretical model for the initial structure of the universe has been developed. The He-BEC model was developed using comparative analysis of atomic theory with cosmological composition. The revision of quark charge calculation was used to identify the missing antimatter in cosmology. The Boson quark charge calculations identified neutrons as having a negative charge (anti-matter). The neutralization of the negatively charged neutron was achieved by the introduction of the positron. This provided an overall charge for the neutron that is identical to the current atomic theory. The inclusion of positrons in atomic theory generates a Baryonic symmetry Boson framework for atom structure. This provided an atomic super symmetry (SUSY) inversion model allowing comparative analysis of atomic theory with cosmological composition. This new model was used to identify a potential process that generates dark energy and dark matter from the He-BEC singularity, an initial homogeneous suniverse. A new atomic model identified 16particles per atom of helium (2protons (6 quarks), 2 electrons, 2 neutrons (6 quarks), and 2 positrons).

This Baryonic symmetry model for atoms formed the basis of exploring cosmological processes associated with isotope decay and how That resulted in our current known composition of the universe based on dark energy 68%, dark matter 27%, and matter 5%. Alpha particle emission half-life timings were investigated from 1E+6 s to 1E+18 s, where a half-life of 1E+18 seconds and its relationship to the universe age of 4.36E+17 seconds, which gave a decay of 7.26% of the alpha particles (dark energy). The He-BEC model predicted an initial separation of the Bose Einstein Condensate into (12/16) 75% dark energy (alpha particles) and (4/16) 25% dark matter at time 0 s.The decay of 7.26% alpha particles over the lifetime of the universe generated 67.74% dark energy, 27.42% dark matter, and 4.84% matter.

The model provided a high degree of correlation to the proposed composition of the universe as described by the current cosmological model. Dark matter comprises 85% of the total amount of matter. The model demonstrates dark matter + matter = 32.26% and matter comprises (4.84/32.26) 15.00% and dark matter (27.42/32.26) 84.9969%. The initial structure and alpha particle emission velocity was modelled using a wavelength distance of 4E-14 meters. The corresponding alpha particle decay velocity was calculated to be 2990700000 kJ/mole (m/s), which is 9.97 times faster than c, and proposed to be responsible for cosmic inflation. The radius of the He-BEC corresponding to c (299792458m). A larges ingularity with zero viscosity. The generation of dark matter in animplosive (gravitational) process generating an inward trajectory from4E-14m to1.6E-35m (Planck) Δ4E-22. Energy conservation rules of $\sqrt{v} / v = 1/\sqrt{v}$ were developed based on Newtonian inverse square law, where the $\sqrt{v}$ = 54687.29 kJ/mole (m/s). From these initial conditions a differential velocity model was developed to explore the functionality of the He-BEC model and the atomic decay processes associated with the proposed composition of the universe. Further details of the He-BEC model will be presented.

Keywords: *He-BEC; Singularity; SUSYinversion; Darkenergy;*

BIOGRAPHY:

Dr Keryn Johnson PhD MSc BSc is a quantum biologist developing a singularity physics model for the purposes of the exploration of transcendent experiences beyondthe limitations of material is mand reductionist measurement-based models currently used in biological sciences. Dr Johnson has developed the He-BEC singularity physics model to explore the role of individual unstable atoms associated with neurotransmitter function. The SUSY inversion model for Boson statistics and revision of quark charge calculations is an exploratory tool for sub atomic physics of isotope processes that appear to be fundamentally connected to the function of the human unconscious mind. The cosmological model developed attempts to use comparative analysis of atomic theory with cosmological composition to explorethe undefined and unmeasurableaspects of subatomic theory in a deterministic way using half-lifeand bindingenergy for timings and momentum. Dr Johnson uses a new technology to support his exploration of subatomic physics associated with nootropic benefits of Manuka honey. Having worked in a research organization for 18 years in 2019 Dr Johnson resigned and started his company Quantum Technologies Ltd (A Quantum Biology Regenerative Medicine company based in Wellington, New Zealand) and has been developing a new science model called SUSY inversion and the He-BEC isotropic singularity since 2019. Expanding from a Biochemistry and enzymology background into subatomic physics has been incredibly rewarding.

Gravitation and Fluid Gauge Theory Unraveling the Dynamical Mystery of Galaxies

Tsutomu Kambe
Former Professor (Physics), University of Tokyo, Tokyo, Japan

ABSTRACT

This is a novel approach to the cosmological issue of the so-called dark matter effect observed in rotating galaxies. Dynamical structures of spiral galaxies are mysterious in the outer parts. One of the keys for its unravelling would be to recognize that there exist (at least) two dominant fields in the outer halo part of a galaxy interested: one is the gravitational field, needless to say, and the other a gauge field (i.e. a fluid Maxwell field) generated by abundant gas clouds moving at high-speeds. Motions of gas-clouds are viewed as flows of continuous fluids in the space surrounding the galaxy. The view of a continuous-fluid flow would be justified if we contemplate that the galactic structures are the outcomes of events after uncountably long times within immeasurably large scales of cosmic space. A new physics of a fluid-Maxwell-mechanism is working in real world of galaxies, which has been found by Kambe [1] and Kambe & Hashiguchi [2].

According to Einstein [3], the gravity field has the character of a tensor field, not a scalar one. The tensor field is described by the components of the metric tensor, regarded as mechanical potentials. The theory of general relativity makes it probable that mutual action of matters existing in cosmic space is an important player of galaxy dynamics, complying with the principle of relativity in its broadest meaning (Einstein). This is consistent with the Mach's principle (Mach, 1883) and the gravito-electro-magnetic field (Einstein [3]; Thirring & Lense [4]). A material body must experience an accelerating force when neighbouring masses are accelerated (Einstein [5]).

A particularly notable finding of the present study is the excellent matching of its theoretical prediction with the observed data, implying that this approach has captured an essential aspect of the dark matter effect. This matching not only contributes to a new understanding of the dynamical feature of galaxies, but also states the validity of the new physical law of fluid-Lorentz-force. This law predicts that a fluid current (electrically neutral) acts as a source generating a fluid gauge field, which reacts on the fluid-flow field back as a fluid-Lorentz-force. This is deduced from the anisotropic stress tensor predicted by the fluid gauge theory. The observed fact that gas-clouds in the halo are moving at hyper-speeds of about 100 km/s states true evidence that the fluid-Lorentz-force is working in real cosmic space.

Keywords: *Gravity; Galaxy-halo; High-speed gas-flow; Fluid Lorentz force.*

BIOGRAPHY:

Dr. Tsutomu Kambe, born in 1940 in Japan and residing in Tokyo, is a physicist specializing in fluid mechanics. He is a Dr. of Physics from the University of Tokyo and has been a Guest Scholar at the Meiji University Institute for Advanced Study of Mathematical Sciences (MIMS) since 2023. His work on Fluid Gauge Theory (2021) stems from his

study of rotational flows satisfying Euler's equation of motion (2013), and in 2022, his theory successfully retrodicted the dust striations observed in Kundt's resonance tube (1866). Dr. Kambe is an Honorary Member of the Japan Society of Fluid Mechanics, previously served as Chairman of the Japan National Committee for Theoretical and Applied Mechanics (1997–2003), and was a Bureau Member of IUTAM (2004–2008). He has held academic positions as a Visiting Professor at the Chern Institute of Mathematics, Nankai University (2003–2009) and was a British Council Scholar at the University of Cambridge (1974–75). During his undergraduate years, he studied astrophysics and astronomy at the University of Tokyo.

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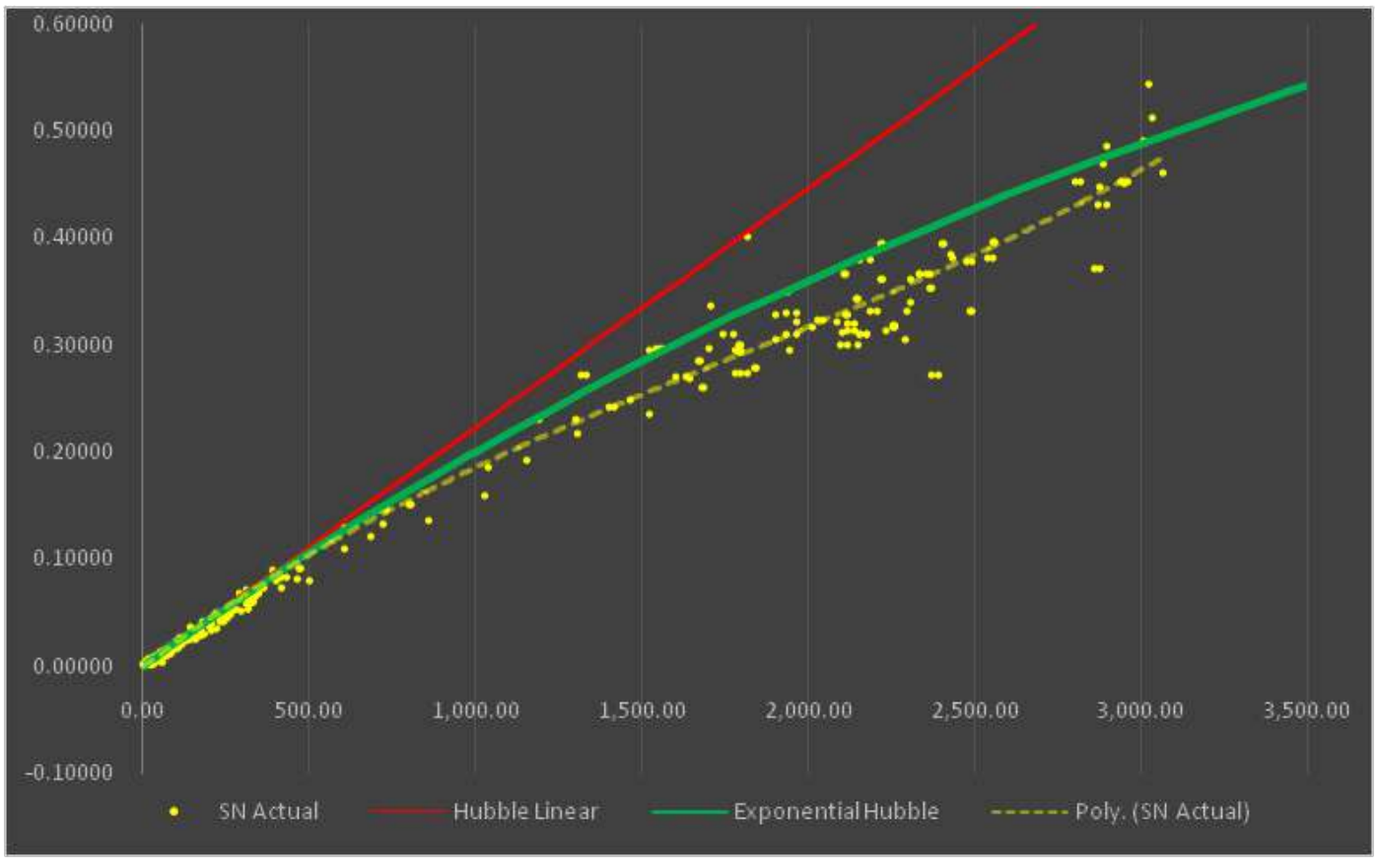
Testing Standard Electromagnetic Radiation Transport against the Hubble Term

Paul Stowe
Independent Researcher, USA

ABSTRACT

We compare the plot of the observational measurements of 240 SNIA events to a tired light model using the standard radiation transport equation E = Eoe--ud. Utilizing the Hubble Term as the linear attenuation coefficient (μ) we demonstrate that the result obtained correlates well to the observed profile and naturally predicts the non-linearity observed.



BIOGRAPHY

Mr. Paul Stowe is a nuclear engineer and independent researcher with more than 40 years of experience in theoretical physics studying the causal nature of both gravity as well as electromagnetism. He has had articles published on the physical nature of gravitation and a physical model that can derive all of the major constants of physics from a common basis of moment and length parameters. From a very early age I have been interested in how the universe works. Upon graduation from High School I joined the Navy specifically to be on nuclear submarines and to get the education that I knew I could not afford on my own. In 1979, the Three Mile Island nuclear accident occurred and the nuclear industry was in dire need of skilled/educated individuals to address the issues resulting from that event. I called the local offices of EDS Nuclear in New York while visiting my wife's family and was hired as a principal engineer. The hiring managers there knew that Rickover's naval nuclear program provided the equivalent education to that of a nuclear education at a typical college/university. The radiological background that I received from my nuclear training influenced my perspective on basic physical processes, leading to my work on gravitation. As a result of that effort, I teamed up with a work colleague Barry Mingst.

We realized that the background field of gravitation must also be the background of everything else, leading us back to Helmholtz/Faraday/Maxwell/Kelvin's works. This in turn lead us to an extensive review of the history of scientific development and the realization that, in many cases, scientific history as taught today has undergone transitions similar to a game of "telephone". Changes in focus and interpretation over time means that what is taught today is often much different from its original factual history. For me at least this has led to a realization that much has been lost. Rediscovering these lost or forgotten elements can be essential in understanding nature and moving the field forward.

Surprises in the Return Rates of Photons from a Mirror on the Moon

Hans Deyssenroth
Senior Scientist, Germany

ABSTRACT

The analysis of the return rates of photons from a mirror on the Moon revealed that the velocities of the Earth in the Universe can be determined very precisely, among others the velocity of the Great Attractor. And in addition that R.Feyman's conclusion is confirmed that photons are not reflected in a mirror. A far reaching result is that there is no length contraction in the direction of velocity and that therefore Einstein's space-time idea is wrong. Gravity must be explained differently.

BIOGRAPHY

Dr. Hans Deyssenroth was born in 1937 and studied electrical engineering at the TH Karlsruhe in Germany and physics with a Diploma degree at the University of Basel in Switzerland. He worked as an IT-manager und biometrician in the Pharma industry in Switzerland and was the co-author of about 20 publications. After retirement he studied again the basics of physics and got more and more doubts that the existing models are correct, though they have been verified by many and varied experiments.

The Universe in the Lab the new International Facility for Antiproton and Ion Research in Europe

Belias Anastasios
GSI Helmholtz Center for Heavy Ion Research GmbH, Germany

ABSTRACT

Will be Updated Soon

BIOGRAPHY

Dr Anastasios Belias, born in1969 of Greek decent in Düren, Germany, studied Physics in Jülich, Aachen and Bochum in Germany and obtained his PhD in Particle Physics at Royal Holloway, University of London (UK) in 2000. His research in experimental physics ranges from particle physics at high energies to neutrino physics at accelerators and also neutrino astronomy as well as nuclear and hadron physics at lower energies, including the use of AI methods in fundamental Physics. His expertise lies in levereging experimental physics to actual instruments and methods for scientific research and in coordination toward experiments in large Research Infrastructres from accelerator beams to astroparticle physics facilities. To date, he is vigorously pursuing the unique anti-matter experiment PANDA at the new accelerators complex of the international Facility for Antiproton and Ion Research in Europe, currently under construction in Germany.

A Digital Revolution Upends Einstein's Gravity

David Alex Levitt
Pantomime Corporation, 10650 Green Valley Road, Sebastopol California, United States

ABSTRACT

The modern revolution in digital technology provides new, clearer ways to finally understand Einstein's theory of gravity and spacetime curvature. It is now straightforward both to measure and to visualize Einstein's all time "happiest thought" from elevator rides in 1907 — to see just how the dynamic stretching of lengths in space makes it look like objects in free fall are being pulled toward earth by an invisible force.

Two main digital technologies enable this deeper understanding:

1: Mobile accelerometers— measuring the proper acceleration of earth's surface and of free falling objects — confirm Einstein's idea that gravity is a fictitious force experienced by observers who assume earth's surface is an unaccelerated reference frame.

2: Meanwhile 3D computing and animation systems like Mathematica let us directly see what happens when the lengths of meters and seconds are stretching, and how that causes gravity.

With this new perspective, general relativity can no longer be viewed as a tweak of Newton's theory relevant mainly to light beams, fast moving objects and black holes. It's more like the opposite of Newton's theory, where rigid objects and planets stretch outward, and space is not conserved. We'll see that while this radically simplifies explanations of relativity, it also upends a century of prejudices so profoundly, it can look like an exciting and barely unexplored new theory of gravity.

We see how Newton's and Gauss's gravity laws arise naturally from the continuous stretching of space. This includes classic questions such as how a satellite whose instruments say it is traveling in a straight line alongside a mass, with no forces on it, nonetheless is seen traveling in a nearly elliptical orbit from other points of view, directly using Einstein's spacetime curvature to prove Kepler's orbit law. Such demonstrations provide new intuitive links between classical physics and relativity that are often opaque or missing in 20th century relativity curricula.

Keywords: *gravity, spacetime curvature, proper acceleration, Mathematica language.*

BIOGRAPHY

Prof. David Levitt is a cognitive and computer scientist, experimental and theoretical physicist, software engineer, virtual and augmented reality innovator, entrepreneur, musician, and writer. He earned his B.S. in Engineering and Applied Science from Yale, followed by an M.S. in Electrical Engineering and Computer Science and a Doctor of Science in

Artificial Intelligence from MIT. A co-founder of the MIT Media Lab, he led MIT's first Mac lab, pioneering real-time media, graphical programming, and music applications. He was also part of the team that invented virtual reality at VPL Research, where he created the first VR world with realistic gravity, object collisions, and 3D sound.

Prof. David Levitt is the Founder, President, and CEO of Pantomime Corporation, which won the Silicon Valley Tech Challenge World Cup (2014). He developed Pantomime's Reality Construction Kit, leveraging LiDAR depth sensors in iPhone Pro and iPad Pro to create interactive augmented reality with realistic physics. He also founded the Gravity Channel at Wolfram Research Community and is passionate about rethinking relativity and gravity. An expert in algorithmic music generation, he co-edited Machine Models of Music (MIT Press) with Stephan Schwanauer and contributed his thesis A Representation for Musical Dialects. He has taught computing, AI, and media at MIT and NYU and has been an invited speaker at international physics conferences, including ACP 2023 and ISGAC 2024. He will serve as Keynote Speaker and Co-Chair at the 3rd International Summit on Gravitation, Astrophysics, and Cosmology (ISGAC 2025).

Near Horizon Geometries and Tangent Spacetimes: Implications for Extremal Black Hole Entropy

Sean Stotyn
Department of Physics & Astronomy, University of Calgary, 2500 University Drive NW, Calgary, AB, Canada, T2N 1N4

ABSTRACT

There is a well-defined procedure for obtaining the so-called near horizon geometry of an extremal black hole. This involves performing a diffeomorphism at the same time a parameter limit is taken to extremality. This leads to a near horizon geometry of AdS2xS2, which is due to a symmetry enhancement of the geometry near the extremal horizon. However, in this limiting procedure the coinciding horizons paradoxically appear to remain separated, despite the extremal limit requiring them to overlap. Additionally, it is unclear what the timelike AdS2 boundary maps to in the full extremal solution, yet the AdS/CFT correspondence is often invoked to assign the Bekenstein-Hawking entropy to an extremal black hole. In this talk, I will carefully show that the near horizon geometry is not quite what it was previously thought to be: the extremal limit is not Hausdorff, which allows for unexpected and exotic things to occur, and in the strict limit the region between the two horizons becomes a separate, disconnected spacetime with no connection to the extremal black hole. Instead, I will introduce the novel proximal horizon geometry, which is a tangent spacetime to the degenerate black hole horizon endowed with the same enhanced spacetime symmetry of AdS2xS2 but which has a manifest geometric connection to the extremal black hole. This new picture readily allows a mapping of geometrical data from the proximal horizon geometry to the full black hole geometry and vice versa. Of particular importance are the Killing vectors that generate the various horizon structures in the (near) extremal black hole and in AdS2xS2. Namely, the degenerate Killing horizon in the extremal black hole geometry directly maps to a degenerate Killing horizon in the proximal horizon geometry, whereas the non-degenerate Killing horizons in the near horizon geometry do not map to any corresponding structure in the extremal black hole geometry. Lastly, I will argue why this subtle conceptual shift from the near horizon geometry to the proximal horizon geometry is important for properly defining entropy of extremal black holes and why the commonly employed AdS/CFT calculations are ill-suited for such a definition.

Keywords: *Near horizon geometry; entropy; black holes; degenerate horizons.*

BIOGRAPHY:

Dr. Sean Stotyn is an Associate Professor in the Department of Physics & Astronomy at the University of Calgary in Alberta, Canada. He obtained his Ph.D. from the University of Waterloo in 2012, and was awarded the W.B. Pearson Medal for creativity in a doctoral thesis. He has also received numerous teaching awards at the University of Calgary since joining the faculty in 2015. Dr. Stotyn's primary research interests are in black hole stability and black hole thermodynamics.

Extracting Raw Data from Cosmological Model-Dependent Astronomy Papers

Barry Mingst
Independent Researcher, Bellevue, WA, USA

ABSTRACT

For 25 years, observations of Type Ia Supernovae have underpinned and been heavily examined within the current Lamba-Cold Dark Matter (ΛCDM) cosmological paradigm (the Big Bang). Reducing the observations to useful representations is a complex task, in which many astronomers and theorists have applied careful thought and ingenuity. Almost all of these papers assume the Big Bang is correct, and apply model-dependent adjustments to the data. These studies initiated the concept of Dark Energy.

The discovery by the Webb telescope of well-developed galactic structures at redshifts that imply a too-young universe has created the possibility that the ΛCDM paradigm should be re-examined. Since most papers summarizing the SNIa observations were developed specifically for ΛCDM, the underlying data cannot always be used as presented in the original papers. These adjustments may be considered arcane to may potential theorists, so this paper examines the most common theory-dependent adjustments made in the standard references. It also explains the underlying theory supporting the adjustments and suggests types of cosmological or astronomical models the adjustments may still apply, and where the adjustments should be removed. This may allow more diverse theoretical analyses of the SNIa data.

Keywords: *SNIa; Data Reduction; Observation*

BIOGRAPHY

Dr. Barry Mingst is a nuclear engineer with a lifelong passion for physics and astronomy, spanning over 50 years. He began his journey in astronomy as an undergraduate, conducting observations and data reduction at James Lick Observatory. He holds a B.A. in Physics and an M.S. in Nuclear Engineering from the University of California, Berkeley. As a specialist in radiation transport and simulation of physical materials and systems, he has made significant contributions to the field.

Dr. Barry Mingst has made significant contributions to both theoretical and applied physics. His independent research encompasses a diverse range of topics, including the derivation of Newton's law of gravity, the analysis of galactic rotation, and a modern reevaluation of James Clerk Maxwell's seminal 1861-62 work On Physical Lines of Force. His scholarly contributions include The Atomic Vortex Hypothesis, a Forgotten Path to Unification (2013, co-authored with Paul Stowe) and Deriving Newton's Gravitational Law from a LeSage Mechanism (published in the anthology Pushing Gravity, 2002).

Beyond his research, Dr. Mingst has been deeply committed to education. From 1997 to 2022, he served as an astronomy instructor at Sierra College, where he inspired generations of students through courses in introductory and observational astronomy. His dedication to teaching and scientific inquiry continues to shape the next wave of thinkers in physics and astronomy.

Application of A Unified Theory Based on Holographic Principle in Cosmology

Rulin Xiu
Hawai Theoretical Physics Research Centre, USA

ABSTRACT

Holographic principle and the related self-similarity symmetry are observed widely in nature.Research in black hole, string theory and quantum theory of gravity suggests that holographicprinciple can be an important symmetry for solving challenging problems in theoretical physics, such as finding the grand unification theory (GUT). In this paper, we derive a quantum theoryincorporating the holographic principle by introducing the new concept and elementary information. The derived quantum action incorporating holographic principle, holographic action, turns out to be the generalized action encompassing string theory, general relativity andthermodynamics.

This holographic quantum theory indicates that phenomena and laws ofphysics emerge from the holograms represented by the holographic action. Specifically, it predictsthe following:

(1) Elementary particles, gravity and gauge interactions and the classicalequations of motion are the emergence of the hologram due to Poincaré symmetry, diffeomorphic symmetry and Weyl symmetry, respectively.
(2) Dark matter and dark energy are thevibrations on the horizon scale of the universe.
(3) Cosmological constant is calculated to be in agreement with the cosmological constant deduced from astro-physical observation
(4) The observed space-time is flat in 4-dimension, negatively curved if its dimension is greaterthan 4, positively curved if its dimension is less than 4.
(5) It givesthe mathematical formula to derive the entropy of black hole and study the internal dynamics ofblack hole.
(6) It provides the mathematical framework to study the dynamics of spacetimecompactification and the large hierarchy between Planck scale and electroweak scale. One mayconclude that the holographic quantum theory based on holographic principle may be not only aGUT but also able to tackle some of the problems impossible to be addressed before.

This presentation will outline the key theoretical foundations, mathematical derivations, and potential implications of this approach for future research in cosmology, astrophysics, and quantum gravity.

Publication:
Sha, ZG. and Xiu, R. Derivation of a Unified Theory from the Holographic Principle. Reports in Advances of Physical Sciences. Vol. 07, 2350007 (2023) https://doi.org/10.1142/S2424942423500007X

BIOGRAPHY

Dr. Rulin Xiu is a Hawaii Theoretical Physics Research Center 2013-Now Kapoho, Hawaii, USA Founder and Research Director Tao Academy 2017- Now Toronto, Canada Faculty Pharm East, Inc 1997- 2017 Kapoho, HI, USA Founder and CEO Lyman Laboratory of Physics, Harvard University 1995-1996 Cambridge, Massachusetts, USA Research staff member I studied string phenomenology and grand unification theory Houston Advanced Research Center 1994-1995 Houston, Texas, USA String Phenomenology Postdoc I did string phenomenology research study at Houston Advanced Research Center. I gave seminars at Physics Department, University of Texas and at Physics Department, University of A & M in Texas. University of California, Berkeley 1989-1994 Berkeley, CA, USA Grand Unification Theory PhD I received a doctorate degree from the Physics Department, UC, Berkeley for my study and research on string theory and grand unification theory. Chinese Academy Institute of Physics in Beijing 1987-1989 Beijing, China Condensed matter physics I studied and did research on condensed matter physics University of Science and Technology of China 1982-1987 Hefei, Anhui, China Laser physics and condensed matter physics Bachelor

Entanglement Islands and the Page Curve in the Framework of Horndeski Gravity

Fabiano F Santos
Federal University, Brazil

ABSTRACT

In this speak, I will present recent investigation about entanglement islands and the Page curve in the framework of Horndeski gravity on a Karch-Randall braneworld background. For this investigation, we treating the holographic boundary conformal field theory analytically we find that the Horndeski parameters significantly alter the behavior of the Page curve compared to standard general relativity, a feature caused by the nontrivial geometry induced by the Horndeski scalar field.

BIOGRAPHY

Dr. Fabiano F. Santos, a Class C Visiting Professor (Adjunct I) in the Department of Physics at the Federal University of Maranhão, holds a Ph.D. in Elementary Particle Physics and Fields from the Federal University of Paraíba and completed his postdoctoral research at the Physics Institute of the Federal University of Rio de Janeiro. His broad and impactful research spans black holes, holographic complexity, string theory, entanglement entropy, AdS/BCFT correspondence, and Horndeski gravity. Currently, he is leading a project titled “Information and Holographic Transport in Black Holes Using Scalar-Tensor Theories,” which investigates modifications to General Relativity through scalar-tensor couplings, aiming to understand information dynamics in black holes via the Complexity=Action (CA) conjecture and holographic transport within the frameworks of AdS/CFT and AdS/BCFT dualities.

The Nature of the Force and the Dark Matter

XingWu Xu
Research Institute of Hefei Guoxuan High-Tech, China

ABSTRACT

There are different approaches for investigating the force as well as the gravity. Newton emphasized the mathematical meaning of gravity. Einstein's gravity is geometry. The physical exploring for the gravity is still on the way. Le Sage investigated the nature of gravity, but his theory has many defects. This paper gives out a physical chemistry approach for the nature of force,which bases on gravitons' reaction by introducing the concepts of Gibbs free energy change and holographic screen. The change of the Gibbs free energy results in the imbalance on the two sides of the holographic screen, it is the force. The change of force as the distance depends on the distribution of gravitons. For solar system, the graviton gas distributes in center-radical pattern, so the inverse-square law is applicable. But in the galaxies, the distribution of the graviton gas is not in center-radical, therefore the acceleration is just inversely proportional to the distance (not square of distance), which is equivalent to the centripetal force.The flatness of rotation curve can be explained without dark matter.

Keywords: *Nature of Force, Gravity, Gibbs free energy, Dark Matter*

BIOGRAPHY

Dr. Xingwu XU,. Professor-level senior engineer, the direction of research: battery science and technology for EV, cosmology etc. In cosmology area, many research articles were published. One of them is The Nature of Force and the Dark Matter, in which the aothor puts forward a physical chemistry approach for the nature of force that bases on gravitons' reaction by introducing the concepts of Gibbs free energy change and holographic screen. This viewpoint can explain the phenomenon of the Dark Matter. This work was commended by Prof. Anne Hofmeist, famous physicist of Washiton University of United States. A book, On the Cycling model of the Twin Universes, was published on Jan. 2021. In this book, the nature of force and the relation of Dark Matter, the nature of heat and the relation of Dark Energy, the origin of the universe, the cycling twin universes were researched in detail.

Shockwave Cosmology: The Foundation of Universal Physics and Dynamic Quantum Gravity

Jack Kiperman
USA

ABSTRACT

Shockwave Cosmology introduces a revolutionary paradigm for understanding the evolution of the universe, serving as the foundation for Universal Physics—a unified framework addressing the most profound challenges in quantum mechanics, general relativity, and cosmology. At its core are shockwaves: high-energy perturbations propagating through spacetime that drive inflation, seed cosmic structures, and couple dynamically to scalar fields. From this foundation emerges Dynamic Quantum Gravity (DQG), seamlessly integrating quantum corrections into spacetime curvature and linking quantum phenomena to large-scale astrophysical dynamics.

Key Contributions:
1. Unified Framework: Shockwaves bridge the divide between quantum mechanics and general relativity, offering a cohesive understanding of phenomena across all energy scales.
2. Structure Formation and CMB Signatures: Shockwaves seed density perturbations, with observable imprints in the Cosmic Microwave Background (CMB), including enhanced B-mode polarization and non-Gaussian features.
3. Dynamic Dark Energy: Scalar fields dynamically drive cosmic acceleration, providing a time-dependent model of dark energy evolution, reconciling observations from DESI, Euclid, and supernova surveys.
4. Gravitational Wave Predictions: Shockwaves and scalar fields produce quantum-modulated gravitational wave signatures, detectable via LISA, Advanced LIGO, and the Einstein Telescope, offering direct tests of quantum corrections.
5. Foundational Problem Solutions: The framework resolves key theoretical challenges, including the Yang-Mills mass gap, Navier-Stokes regularity, and black hole information conservation. These solutions naturally arise from the stabilizing and energy redistribution mechanisms of shockwaves.
6. Expanding Astrophysical Horizons: Shockwave Cosmology redefines our understanding of entropy, the arrow of time, and cyclic cosmic evolution, linking theoretical insights to observable astrophysical phenomena.

This talk will present how Shockwave Cosmology unifies disparate domains of physics into a single, coherent framework. By bridging theory with extensive empirical testability across scales, it offers a comprehensive pathway for advancing cosmology, quantum mechanics, and gravitational wave physics. From the earliest moments of the universe to its largest-scale structures, Shockwave Cosmology redefines how we explore and understand the cosmos.

Keywords: *Shockwave Cosmology, Dynamic Quantum Gravity, Cosmic Structure Formation, Gravitational Wave Predictions.*

BIOGRAPHY

Jack Kiperman is a pioneering theoretical physicist dedicated to bridging quantum mechanics, general relativity, and cosmology into a unified framework known as Universal Physics. His innovative research introduces Shockwave Cosmology, a revolutionary paradigm that explains cosmic evolution, gravitational waves, and dark energy dynamics through the interplay of shockwaves and scalar fields. By addressing foundational challenges such as the unification of forces, the nature of dark energy, and the structure of spacetime, his work provides extensive testable predictions that reshape our understanding of the universe. With a commitment to rigorous mathematics and deep physical intuition, Kiperman's groundbreaking solutions span large-scale structure formation, gravitational wave signatures, and solutions to key problems like the Yang-Mills mass gap and Navier-Stokes regularity. His contributions pave the way for advancements in astrophysics, quantum gravity, and cosmology, inspiring collaboration between theorists and experimentalists to explore the frontiers of modern science.

Quantum Transmission Through Two-Dimensional Self-Similar Structure

Aparna Nihaldaran
Physics Department, Loughborough university, Loughborough, Leicestershire, United Kingdom

ABSTRACT

Quantum transmission plays a vital role in many applications from condensed matter physics to quantum computing. One of the significances is in the study of quantum effects in the Bethe lattice structure. Bethe lattice structure is an infinite Cayley tree structure used to model lattices and disordered systems and to calculate order-disorder properties of ferromagnet. Useful applications of such structure include studying electron transport and other particle effects such as ions or quasiparticles in lattice structure. Another application includes quantum error correction codes such as surface code using lattice structure. In my project, I study the effects of quantum transmission using different permutation of for two-layer and three-layer Cayley tree structure such as quasiperiodic, symmetrical and irregular structure and also study the effects of transmission in one-dimensional Cayley tree structure. Scattering matrices following unitary condition were used throughout the nodes in the structure and study was done on transmission and reflection wave amplitudes of the given structures.

Keywords: *Quantum transmission; Cayley Tree structure; Scattering matrix; Quasiperiodic.*

BIOGRAPHY

I am currently studying a master's in advanced physics in Loughborough university. My current master's research project is on analysing soliton waves in the non-linear Schrödinger equation using the Koopman operator. My aim from this project is to find a mathematical method that can characterise any given localised (especially time-localised or even spatial-localised) and extended fields which would not only have an impact in the field of optics when using high powered lasers with characteristics such as varying intensity but also in having a deeper understanding various physical phenomena in quantum physics with localised and extended quantum fields and localisation. Even extended to condensed matter physics would give a better understanding of electron localisation, energy band structure and study of quasiparticles in solids. Some of my past undergraduate projects were in quantum transmission in a crystal structure, application of quantum anomaly detection algorithms and wind turbine blade design analysis.

Does the Synchrotron External Forward Shock Model fit multiband of Gamma-Ray Burst Afterglow Light Curves

Yassine Rahmani
Center of Research on Astronomy, Astrophysics & Geophysics, Algeria

ABSTRACT

The XRT and UVOT telescopes aboard the Swift Gamma-Ray Burst satellite have provided us with exceptionally high-quality X-ray and optical afterglow data for Gamma-Ray Bursts (GRBs). This presents an intriguing opportunity to evaluate the effectiveness of the external forward shock model in providing a unified fit for both X-ray and optical observational data across a specific selection of GRB afterglows. To pursue this goal, we conducted numerical calculations to simulate the dynamic evolution of the fireball synchrotron model, generating corresponding theoretical light curves. We employed a Monte-Carlo multiband fitting analysis tool, utilizing the $\chi 2$ minimization approach, to compare these theoretical light curves with the observed data. The results of the fitting process and the correlations among various physical parameters are presented and extensively discussed.

Keywords: *GRbs; Afterglows; Light curves; Swift;*

BIOGRAPHY

Yassine Rahmani is an accomplished researcher in Astronomy and Astrophysics, currently working at the CRAAG. As the head of the High-Energy Astrophysics research team, his focus lies in the afterglows of gamma-ray bursts. Yassine's research is centered on the modeling of the external shock. With a keen interest in unraveling the complexities of astrophysical phenomena, Yassine contributes significantly to the field through his dedicated work.

Day 2 Speakers

ISGAC2025

A Space Warpage Vocabulary Clarifies Einstein's Gravity

David Alex Levitt
Pantomime Corporation, 10650 Green Valley Road, Sebastopol California,United States

ABSTRACT

For over a century, physicists and educators have struggled to make Einstein's gravity and spacetime curvature theory intuitively understandable, with limited success. Einstein's all time "happiest thought" from 1907 elevator rides — that the apparent pull of earth's gravity is a fictitious force, with the implication that earth's surface really accelerates outward — is barely understood. When asked how a mobile accelerometer will behave, general relativity graduates often guess wrong — the math can become divorced from measurement and physics.

Artificial Intelligence pioneer Marvin Minsky points out that to fully understand complex concepts, one must consider it from many points of view.

Here we outline new curricula where measuring the real forces of gravity, and addressing how meters and rigid objects are continuously stretched by matter, provides surprising but intuitive understanding of the role of metric tensors and spacetime curvature in gravity.

We focus on developing a clearer vocabulary for how gravity results from the continuous stretching of space — what Einstein and Thorne call space warpage. We emphasize underused terms like fictitious force; distinguish easily measured proper acceleration from observer-dependent coordinate acceleration; and balance the real outward proper force exerted by massive objects with the fictitious, equal-but-opposite reactive counterpart we call weight. We call out metric tensor 4-pressure coefficients that describe the outward acceleration of rigid objects, and adopt terms like volume acceleration to describe how matter M continuously stretches the space that contains it at 4πGM meter3/second2.

In contrast, we'll see how traditional curricula that avoid these terms offer more abstract, complicated explanations of gravity that make the role of spacetime curvature hard to visualize and understand. Thus the new digitally inspired approaches may allow our understanding of gravity and relativity to lurch forward suddenly by a century.

Keywords: *gravity, spacetime curvature, proper acceleration, Mathematica language.*

BIOGRAPHY

Prof. David Levitt is a cognitive and computer scientist, experimental and theoretical physicist, software engineer, virtual and augmented reality innovator, entrepreneur, musician, and writer. He earned his B.S. in Engineering and Applied Science from Yale, followed by an M.S. in Electrical Engineering and Computer Science and a Doctor of Science in Artificial Intelligence from MIT. A co-founder of the MIT Media Lab, he led MIT's first Mac lab, pioneering real-time media, graphical programming, and music applications. He was also part of the team that invented virtual reality at VPL Research, where he created the first VR world with realistic gravity, object collisions, and 3D sound.

Theory of Everything

Dennis Zamudio Flores
Independent Researcher, Philippines

ABSTRACT

A man's love for nature could turn out to be the greatest love for humanity, and such a fondness could ultimately pave the way on his quest to enlighten and encourage everyone about the essence of that love- to passionately save the earth and its biodiversity from destruction. By saving the earth from the ravages of anthropogenic climate change-deforestation, peak oil, and rising seas-a love for nature can reverse the trends and therefore prolong life for not only the planet but for human being as well.

The Theory of Everything is the origin, operation and evolution of Universe. A unified, tailor made and logical model of a planet, moon and stars and the whole of the cosmoses. Design to answer every query, it's purpose therefore is to uncover the secret of the universe - universal gravitation, cryogenic theory, quantum/dark matter/energy, big bang, black holes and galaxy/ star nuclear energy production and reproduction (sun as galaxy's offspring by schizogenesis). In addition, one of the most fascinating idea is the QUADRUPLE LAW OF MOTIONS OF MOON. While this model argues that moon isn't tidal locked, Moon is also had nothing to do with the tide on the sea or oceans and this idea may vindicate the famous Italian sage Galileo. The Law vantage point is to mathematically predict an incoming earthquake/ tsunami with 99% accuracy. The culminating point is the ultimate theory of climate change and global warming wherein this model tells us that it is the fatal attraction of sun upon the earth that causes climate change thus global warming. In a new concept of earth strata, this model tells us that each layer has its own function and that protect us from the thermal convection of the core. The gas beneath the earth help levitate the planet thus orbit at ease. This model trying to say is to remove these elements from performing their respective task is to put the planet in peril and eventually its death. "THE THEORY OF EVERYTHING" may provide a panacea in a world troubled by uncertainty and academic and science miscues.

BIOGRAPHY

Mr. Dennis Zamudio Flores is an Electro mechanic and Scholar of Hanseidel Stiftung Foundation of Germany.

Resolving the Dark Matter-Spiral Galaxy Rotation Paradox Via Stellar Evolution

Barry Mingst
Independent Researcher, Bellevue, WA, USA

ABSTRACT

Will be Updated Soon

BIOGRAPHY

Dr. Barry Mingst is a nuclear engineer with a lifelong passion for physics and astronomy, spanning over 50 years. He began his journey in astronomy as an undergraduate, conducting observations and data reduction at James Lick Observatory. He holds a B.A. in Physics and an M.S. in Nuclear Engineering from the University of California, Berkeley. As a specialist in radiation transport and simulation of physical materials and systems, he has made significant contributions to the field.

Dr. Barry Mingst has made significant contributions to both theoretical and applied physics. His independent research encompasses a diverse range of topics, including the derivation of Newton's law of gravity, the analysis of galactic rotation, and a modern reevaluation of James Clerk Maxwell's seminal 1861-62 work On Physical Lines of Force. His scholarly contributions include The Atomic Vortex Hypothesis, a Forgotten Path to Unification (2013, co-authored with Paul Stowe) and Deriving Newton's Gravitational Law from a LeSage Mechanism (published in the anthology Pushing Gravity, 2002).

Beyond his research, Dr. Mingst has been deeply committed to education. From 1997 to 2022, he served as an astronomy instructor at Sierra College, where he inspired generations of students through courses in introductory and observational astronomy. His dedication to teaching and scientific inquiry continues to shape the next wave of thinkers in physics and astronomy

The Truth behind the Solar System in the Universe

Rami Ayoob

Founder-Astro Tech Hub, Behrain

ABSTRACT

Will be Updated Soon.

BIOGRAPHY

Dr. Rami Ayoob, a national of the Kingdom of Bahrain, is an innovative and result-oriented professional with over 18 years of executive-level experience in strategic technology planning and enterprise development. As the CEO of Spark Information Technology, he leads the creation of innovative solutions addressing modern business challenges. With a proven track record in the technology industry, Dr. Ayoob has successfully managed projects and teams while driving innovation through Artificial Intelligence and Machine Learning.

He is also the Founder of Astro Tech Hub, dedicated to conducting research on various aspects of the universe. His work includes designing and performing experiments, data analysis, theoretical model development, and publication of research to explain celestial phenomena using mathematical simulations and predictive modeling.
Dr. Ayoob earned his Ph.D. in Astrophysics from Selinus University (Italy), a Master's in Computer Science (Information Technology) from City University of New Orleans, and a Bachelor's in Electronics Engineering from the University of Bahrain.

Passionate about Astrophysics and Astronomy, he has published several peer-reviewed papers that have received notable feedback from professors, astronomers, and research centers for their innovative approach in reshaping classical astronomy and space exploration.

His publications include:

- The Truth Behind the Solar System in the Universe – SCIRP Journal
- The Journey of Life Creation – Global Journals

Hypotheses for a Unified Wave function for Entangled Quantum Particles

Paul Hasselbring
CEO and Founder-NPM, USA

ABSTRACT

Will be Updated Soon

BIOGRAPHY

Mr. Paul L. Hasselbring is an independent quantum physics theorist and engineer with expertise in complex systems analysis and artificial intelligence. His recent work, "Hypotheses for a Unified Wavefunction for Entangled Quantum Particles," explores novel interpretations of quantum entanglement and wavefunction collapse mechanics. With a Master of Science in Electrical Engineering Controls from the University of South Florida and a Bachelor of Science in Electrical Engineering from the Missouri University of Science and Technology, Paul combines his engineering background with theoretical physics research to approach quantum mechanical problems from a unique systems perspective. His current research focuses on quantum circuit development and AI-driven error correction in quantum computing systems, including work on a DARPA-funding proposal for Scalable Quantum Circuits for Fault-Tolerant Quantum Computing. His technical experience includes significant contributions to aerospace systems at NASA's Johnson Space Center and Ames Research Center, where he developed complex simulation systems and led an AI project to detect on-orbit failures of the Shuttle propulsion system. As founder and CEO of NPM, he continues to bridge theoretical physics concepts with practical technological applications.

Neutron PeV jet in SS433

Rami Ayoob
Rome University, Italy

ABSTRACT

The unexplained and separated SS433 TeV jet could be understood by a PeV neutron jet emitted last century, by an early Nova explosive jet event.

BIOGRAPHY

Daniele Fargion is Theoretical Physicist and Astrophysicist Research Fields Theoretical Physics High-Energy Astrophysics Cosmology Particle Physics in Astrophysical Contexts
Key Contributions and Research Exact Solutions in Cosmology: Pioneering work with V. Belinsky (Landau Institute) on solitonic solutions (1981).

Neutrino Models:

Z-Burst Model, addressing relic photon opacity for UHECR propagation (over 400 citations). “Earth-Skimming Neutrinos” and horizontal air showers from UHE tau neutrinos (over 120 citations).

Neutrino Mass: Studies on time delays between neutrino and gravitational wave bursts from supernovae to estimate neutrino mass (1981, 2002).

Spiral Galaxy Rotation Profiles in Shadow Gravity

Paul Stowe
Independent Researcher, USA

ABSTRACT

Will be Updated Soon

BIOGRAPHY

Mr. Paul Stowe is a nuclear engineer and independent researcher with more than 40 years of experience in theoretical physics studying the causal nature of both gravity as well as electromagnetism. He has had articles published on the physical nature of gravitation and a physical model that can derive all of the major constants of physics from a common basis of moment and length parameters. From a very early age I have been interested in how the universe works. Upon graduation from High School I joined the Navy specifically to be on nuclear submarines and to get the education that I knew I could not afford on my own. In 1979, the Three Mile Island nuclear accident occurred and the nuclear industry was in dire need of skilled/educated individuals to address the issues resulting from that event. I called the local offices of EDS Nuclear in New York while visiting my wife's family and was hired as a principal engineer. The hiring managers there knew that Rickover's naval nuclear program provided the equivalent education to that of a nuclear education at a typical college/university. The radiological background that I received from my nuclear training influenced my perspective on basic physical processes, leading to my work on gravitation. As a result of that effort, I teamed up with a work colleague Barry Mingst.

We realized that the background field of gravitation must also be the background of everything else, leading us back to Helmholtz/Faraday/Maxwell/Kelvin's works. This in turn lead us to an extensive review of the history of scientific development and the realization that, in many cases, scientific history as taught today has undergone transitions similar to a game of "telephone". Changes in focus and interpretation over time means that what is taught today is often much different from its original factual history. For me at least this has led to a realization that much has been lost. Rediscovering these lost or forgotten elements can be essential in understanding nature and moving the field forward.

Is It Dark Matter That Stabilizes Galaxy

Mei Yin
Nanjing, China

ABSTRACT

Is it dark matter that stabilizes galaxy structures? The paper aims to clarify how a galaxy evolves from formation to stability until collapse by finding root causes of galaxy formation, its structure stability and final collapse based on related physical theories including atomic movement and electromagnetic theories, etc. and decides whether dark matter brings galaxy structure stability. It concludes that it is inferred that whatever new particles presenting dark matter or dark matter itself in case they were discovered in the future must be connected with stars, planets, and small and tiny objects and other substances via electromagnetic forces and that they would never be something irrelevant to the other of the universe. It is the invisible magnetic field with attractive and repulsive forces that stabilizes galaxy structures.

Keywords:
Galaxy formation, stability and collapse; magnetic fields; electromagnetic forces; black hole; cosmic formation; neutrino; quark, electron, proton, nucleus and atom; planet, Sun and the solar system; dark matter

Introduction

Some scholars' experimental studies suggested that there was no dark matter in the galaxy which stabilizes the galaxy (e.g., Oliveira, 2007, Davidsen et al., 1991). However, from the early 20th century up to now, other scholars suggested that there should be large amounts of dark matter consisting of new elementary particles in the galaxy, which kept galaxy structures stable (see Baudis, 2016). Other research on galaxy movement showed that planets which were situated the farthest away from the center of a galaxy had the almost same movement speed as planets which lied near the center of the galaxy, indicating the role of dark matter in keeping them move in the almost same speed (Zanella, 2014). It argued that it was not consistent with the Newton's law of gravity, which indicated that planets which were farther away from the center of the galaxy should have received smaller gravitations and thus slower speed than those near the center of the galaxy if the weight of the galaxy focused on the center of the galaxy (see Zanella, 2014). As such, it was inferred that there is dark matter in the universe, accounting for the very majority of the weight of the universe while other planets, stars and small and tiny objects and other substances 5% (Sus, 2014). At present it has become a controversial mainstream hypothesis that there are large amounts of dark matter in the galaxy to bind the galaxy. The paper aims to clarify how a galaxy forms and why a galaxy structure is stable and final collapse of galaxy structure by finding root causes of galaxy formation and its structure stability and final collapse based on related physical theories including atomic movement and electromagnetic theories, etc. and decides whether dark matter brings galaxy structure stability.

1. How Did Galaxies Form?

When a black hole exploded into a universe under incredibly high temperatures (Hawking, 1974), all types of liquid and solid substances spewing out of the black hole had been in gaseous phase and instantly spread to the whole universe

together with original gases from the black hole (Yin, 2020). At this time, the universe consisted of light, neutrinos, antineutrinos (Weinberg, 1981), photons, electrons, electromagnetic fields, different types of quarks and some other particles smaller than the atom. With temperature dropping sufficiently, adjacent quarks were extremely rapidly mutually combined into corresponding types of protons and neutrons under the gravitational forces of quarks with positive and negative electric charges. Severino (2017) noted that proton consists of 2 up quarks with 2/3 positive electric charge each and 1 down quark with 1/3 negative electric charge and neutron consists of 1 up quark with 2/3 positive electric charge and 2 down quarks with 1/3 negative electric charge each. Almost simultaneously up quarks and down quarks between proton(s) & adjacent neutron(s), between two or more adjacent protons and between two or more adjacent neutrons attracted mutually under the roles of attractive forces of their respective electromagnetic fields and formed relatively stable nucleus. Subsequently, one positively charged nucleus attracted one or more adjacent negatively charged electrons to form a corresponding type of atom with atomic magnetic fields under the gravitational forces from the electromagnetic fields of the nucleus and the adjacent electron(s). Any atom has magnetic property (Xing et al., 2007). Atom consists of one or more negatively charged electrons and one positively charged nucleus (Caruso and Oguri, 2008, Blank, Giovinazzo and Pfützner, 2003), which form electric field(s) and subsequently generate magnetic field(s) based on electromagnetic theory (Dorfmann and Ogden, 2014). Some atoms formed by nuclear fusion or nuclear fission or decay, which means that two or more atomic nuclei in extremely high temperatures fused into a new heavier nucleus leading to a new atom or a nucleus splits or decays into two or more new nuclei leading to two or more new atoms or new atom(s) and ion(s), etc. when a large amount of energy is released (Severino, 2017). For example, inside the Sun with extremely high temperatures, the hydrogen fusion into helium released the total energy, which accounted for around 2.8% of the proton mass (Severino, 2017). This study indicated that hydrogen atomic nucleus fusion under extremely high temperatures produced the new atom helium and simultaneously released a great deal of energy. Gamow (1933) demonstrated that an α-particle can escape from the atomic nucleus. Each of alpha particles which released from the nucleus decay of the radioactive element such as uranium, thorium, radium, etc. consists of 2 protons and 2 neutrons and is consistent with helium nucleus with 2 positive electric charges, which indicates that the nucleus decays into new nuclei and a corresponding new atom and ion, etc. (Scott, 2014, Scott and Guilmette, 2005). Besides, one negatively charged electron was attracted to one adjacent positively charged proton and formed one hydrogen atom (Severino, 2017) also under the gravitational force from the electromagnetic field of the electron and the adjacent proton. Same or similar cases happened to other atoms of same or different types. A large amount of atoms of different types formed at a similar, different or greatly different time based on their respective required temperatures (and other conditions). Under the gravitational forces from the electromagnetic field of atoms, two or more adjacent atoms attracted one another and formed one molecular or complicated or multiple molecular gaseous lump or even a gaseous lump with a large or even an enormous quantity of molecules and molecular structures of different types. Similar cases happened to other atoms. Thus, there were a large number of gaseous lumps formed with all kinds of weights and sizes, which were distributed across the universe (Yin, 2020). These gaseous lumps also attracted one another by the gravitational forces from the electromagnetic fields of atoms. If two or more adjacent gaseous lumps had enough great gravitational forces, they gradually approached and connected and finally fused with each other and formed one bigger gaseous lump. If a gaseous lump was farther from other gaseous lumps or had no enough gravitational force to merge with another or more gaseous lumps, it would independently exist from the beginning or other time of period of the universe or the galaxy. If it is located in a galaxy, it belongs to the galaxy. Otherwise, it floated between galaxies. When gaseous lumps with their respective small weights and sizes and a gaseous lump with a gigantic weight and size are situated not far away from one another, the small gaseous lumps were attracted to the gigantic gaseous lump due to the strong attractive force of the gigantic gaseous lump, but simultaneously were repelled enough strongly so that they rotated and revolved around the

gigantic gaseous lump rather than be connected or even fused with the gigantic gaseous lump under the repulsive force of the gigantic gaseous lump. The rotation and revolution of the small gaseous lumps around the gigantic gaseous lump displayed that the gigantic gaseous lump and small gaseous lump were mutually attracted and repelled by the forces of attraction and repulsion from their respective electromagnetic fields. If the gaseous lump had the same compositions as a Jupiter or earth or the Sun, the Jupiter, earth or the Sun was born (Yin, 2020). With temperature persistently dropping, the gaseous lump formed a planet- or star-like object (Yin, 2020). Similar cases also happened to other stars, planets (Mercury, Venus, Mars, Saturn, Uranus and Neptune, etc.), asteroids, small and tiny objects, etc. in the solar systems and other galaxies (Yin, 2020). As such, the solar system and other galaxies formed. When two or more adjacent galaxies gradually approached and finally mixed mutually under the roles of attractive and repulsive forces of their respective electromagnetic fields, they formed a bigger galaxy. If two or more adjacent galaxies had no enough attractive forces to merge, they would exist independently. When two or more small galaxies (e.g., the solar system) were situated near a gigantic galaxy (e.g., the Milky Way), they rotated and revolved around the center of the gigantic galaxy also under the forces of attraction and repulsion of their respective electromagnetic fields and became a part of the gigantic galaxy. Similar cases happened to other gigantic or even much larger galaxy or galaxy clusters. A galaxy cluster is made up of massive galaxies merged in a hierarchy (see Capak et al., 2011) and massive clusters of galaxies consist of smaller galaxy clusters and galaxies (Mushotzky, 1997). When a large number of galaxies and clusters of galaxies formed, the universe became in order.

2. The Relative Stability and Final Collapse of the Galaxy Structure

According to the electromagnetic theory (Dorfmann and Ogden, 2014), an electron in an atom spins and revolves around the nucleus (Jerabek et al., 2018, Califano, 2012) and the nucleus spins (Hansen, 1925). Electron rotation and revolution are primarily under the forces of attraction and repulsion from electromagnetic fields of electron and nucleus. Similarly, planets in the solar systems also spin and revolve around the Sun and the Sun spins (Cang et al., 2016). Planet rotation and revolution must be caused also primarily by the forces of attraction and repulsion from electromagnetic fields of planets and the Sun. That is to say that the attractive and repulsive forces from electromagnetic fields of electrons and nucleus enable the electron to produce such motions of spinning and revolving around the nucleus. Similarly, it must be the forces of attraction and repulsion from electromagnetic fields of planets and the Sun enable planets to produce such motions of spinning and revolving around the Sun. In other words, spinning and revolution simultaneously happens to a planet, or an object, etc. only under the roles of electromagnetic forces (Yin, 2024). In addition, as far as the solar system and other galaxies are concerned, though planets in the solar system rotated and revolved around the Sun under the gigantic attractive and repulsive forces from electromagnetic fields of the Sun, these planets attract and constrain one another also under the attractive and repulsive forces from their respective magnetic fields and other magnetic fields. That is to say that each planet in the solar system receives the gigantic attractive and repulsive forces of the Sun, but also the attractive and repulsive forces of electromagnetic fields of planets near it inside the solar system and of other stars and planets near it outside the solar system and possibly very weak attractive and repulsive forces of some of those farther away from it (See Yin, 2024). As such, the planets which were situated the farthest away from the center of a galaxy had the almost same movement speed as the planets which lied near the center of the galaxy (Zanella, 2014) obviously due to the result of roles of gravitational and repulsive forces of multiple electromagnetic fields from related stars, planets, asteroids, small and tiny objects, etc. inside and outside the galaxy. In other words, multiple electromagnetic forces promote these planets to have similar movement speed whether they are situated the farthest away from or near the center of a galaxy but also keep the galaxy structure in a relatively stable state. The solar system forms a relatively

stable structure just due to the roles of attractive and repulsive forces of multiple electromagnetic fields inside and outside the solar system (Yin, 2024).

If a planet in a galaxy is located far from the center of the galaxy, but close to another galaxy, it is possible that the planet can divorce from the galaxy where it is located and enter another galaxy someday in the future when the attractive force of another galaxy close to it becomes stronger or much stronger than the total attractive forces from electromagnetic fields of the galaxy where it is located for it just as an electron leaves one atom and enters another atom under the stronger or much stronger attractive force of electromagnetic fields of another atom adjacent to it. Similarly, a planet which is located in another galaxy, but close to this galaxy (e.g., the solar system) can also enter this galaxy (e.g., the solar system) when the total attractive forces from electromagnetic fields of this galaxy (e.g., the solar system) close to it become stronger or much stronger than those of that galaxy for it. Similar cases also can happen to asteroids, small objects, etc. Besides, such cases were very likely to have once happened when there were conditions similar to that above-mentioned, e.g., at the early period of the universe. In fact, the universe is always in motion. The strengths of the attractive and repulsive forces of electromagnetic fields of planets and stars or galaxies which are always in motion are also changing more or less over time just as the atom, electrons and nucleus are always in motion and the strengths of electromagnetic fields of electrons and nucleus or the atom which are in motion are also always changing over time due to constant interactions with related electromagnetic fields based on the electromagnetic theory (Dorfmann and Ogden, 2014). In general cases, the sufficient increase in electromagnetic fields of a galaxy can significantly strengthen the forces of attracting a planet, asteroid or/and small objects, which are close to it, but located in other galaxies and far from the centers of those galaxies, to succeed in entering it. In spite of this, the primary structure of the galaxy losing or increasing a planet, or/and asteroid, or/and small objects have no obvious change at this time. However, if the strength of electromagnetic fields of a galaxy drops to a sufficiently low extent, e.g., the star located in the center of a galaxy releases heat no longer and gradually becomes colder and lighter sufficiently and hence has enough much weaker attractive forces from electromagnetic fields than before, some planets, asteroids, etc. in the galaxy leave it and enter another or other galaxies with sufficiently strong attractive forces from magnetic fields. Finally, planets, asteroids, small objects and star, etc. in the whole galaxy leave their original places. How many, e.g., some, more, or most or even almost of them gradually merging into one or another galaxy near it depend on the strength of attractive forces from electromagnetic fields of that galaxy or those galaxies near it for each planet, asteroid, and small object, etc. in the galaxy. When the galaxy finally collapsed and was destroyed and merged into one or another galaxy, one or more new galaxy structures formed. Since what one or more galaxies got from the collapsed galaxy had a small or big impact on their respective original galaxy structures, there was small, big or even remarkable change in the structures of that or those affected galaxies. Despite the galaxy collapse leading to one or more new galaxy structure formation, this process is an extremely long-lasting. It maybe takes numerous (e.g., millions or even billions of) years to witness the decline and collapse of a galaxy currently in a normal state. Time length for decline and collapse of a galaxy depends on the compositions, amounts, sizes of star and planets, etc. in the galaxy and interactions with other galaxies near it or/and overall situation of the universe. That is to say that different galaxies collapse unnecessarily at the same or similar time. Some galaxies collapse earlier than others. One or more galaxies can persist almost similarly until the whole universe collapses. On the whole, galaxy structure which remains in a normal or stable state we can observe through telescopes and other related technologies is relatively stable for current human life experiences.

Conclusions

From above discussions, we can see that galaxy formation, stability and final collapse are closely correlated with the strength of multiple electromagnetic forces of related stars, planets, asteroids, small and tiny objects, and other substances, etc. inside and outside the galaxy. Electromagnetic forces of star in a galaxy change from the strongest at the early period of the galaxy to relatively weakest at the final collapse of the galaxy. Spinning and revolution simultaneously happens to a planet, or an object, etc. only under the roles of electromagnetic forces. The paper concludes that it is inferred that whatever new particles presenting dark matter or dark matter itself in case they were discovered in the future must be connected with stars, planets, and small and tiny objects and other substances via electromagnetic forces and that they would never be something irrelevant to the other of the universe. In other words, it is inferred that all major things in the universe are mutually correlated or connected via electromagnetic forces whether or not there is dark matter, or whatever dark matter is. It is the invisible magnetic field with attractive and repulsive forces that stabilizes galaxy structures.

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BIOGRAPHY

Mrs. Mei Yin like studying new things. I once received education in multiple fields such as Business Information Systems, European Business and Linguistics. Particularly I love theoretically-based research also in multiple fields including the universal gravitation, black holes and cosmic formation, origins of life, medicine and linguistics.

Cosmological OHM's LAW Minimal Electro Magnetic Tool Box

Amar Vakil
NASA Principle Investigator, USA

ABSTRACT

Every high school physics student is taught to build a circuit test Ohm's Law as defined by Voltage divided by Current. Using a closed path circuit of an electrically conducting material, source voltage as in the case of battery, and a resistive element with thermal gradient, a positive linear relation is found between voltage and current and its slope revealing the resistance. This can be extended to cosmology framework if we instead use a minimally electromagnetic conducting medium that is not directed to the material itself, but the vacuum of spacetime material displaces. The goal of the experiment is to use all phase states of physical matter in a way to tool up a process.Itwould enable anegative feedback control through disturbance and regulation and interrogate the spacetime continuum using the interdisciplinary of systems science machine learning and build a classification system of systems to give additional lens to practitioners in cosmology and related disciplines. Cosmology in mainstream research and development has many interpretations, some contradict each other, a cosmological Ohm's law minimal electromagnetictoolbox is considered.

BIOGRAPHY

Mr. Amar M. Vakil is self-trained (experience of 28 years circa 1993 -present) systems scientist in his creation of the Autonomous Universal Predictor (AUP). It is a dynamically nonlinear quantum algorithmic processes via deterministic un-supervisory learning for changes detected in a system via its feedback signal in the presence of noise. Here the underlying model is not known (less understood) in advance (there is no a priori) and measures of information treasured in a quantum bit are partially acquired, clustered and data mined (not data dredged) while correlated spatiotemporally through triangulation of network of (preferably noninvasive) sensors. AUP is seamlessly nonlinear, quantum, with no computation overhead, and can be made as precise and accurate as required. It is thereby robust and fast while invariant to sensor network complexity and resilient to any data distortions. AUP is primarily suited for mission critical quantum feedback control for dynamical context sensitive operations. Amar independently uncovered the AUP physical concept, developed, and derived its statistical framework. Furthermore, Amar realized the need to perform high standards evidence experiments in data exploration unique to AUP. This involved litmus tests (separate from Amar's research development) and experiments to illustrate an AUP application solution at high to mid to low technology readiness levels (TRLs).

Importance-Field Physics-Informed Neural Networks For Hyperbolic Forward and Inverse Problems

Mobin Shakeri
University of British Columbia, Canada

ABSTRACT

The Importance-Field Physics-Informed Neural Network (IF-PINN) is a novel extension of the PINN framework designed to efficiently solve hyperbolic partial differential equations, such as those governing black hole collisions and other high-dimensional, time-dependent systems. This approach leverages the concept of an importance field, a dynamically adaptive mechanism that enhances the training process by concentrating computational resources on regions of high significance.

The model introduces multiple importance measures:
• Event Importance focuses on regions following the general path of physical events, such as soliton trajectories.
• Temporal Importance ensures that computational weight is assigned based on causal relationships, incorporating weights determined by the system's dynamics.
• Spatial Importance adapts the collocation point density in relation to compactified coordinates, reducing boundary-induced errors and improving performance in large or unbounded domains.
• Error Importance dynamically redistributes collocation points to areas with persistent high errors, guided by an epoch-dependent function.

The importance field is defined as a weighted combination of these components, seamlessly integratingspatial,temporal,anderror-basedadaptivity.Thisresultsinarefinedlossfunction and an optimized point density distribution, enabling IF-PINN to solve hyperbolic equations with reduced training batch sizes and improved accuracy.

Preliminary results demonstrate the model's ability to compactify the coordinates, essentially remove the boundary terms in the loss, and generalize across different boundary conditions, including Dirichlet, periodic, and compactified setups. By incorporating causal weights and adapting the training process dynamically, IF-PINN reduces computational overhead while preserving physical fidelity, making it a promising tool for tackling complex systems in gravitational wave science such as black-hole collision and beyond.

Keywords: *NumericalRelativity;PINN;HyperbolicEquations;GravitationalWaveModeling.*

BIOGRAPHY

Mr. Mobin Shakeri PhD student in numerical relativity at the University of British Columbia, working with Matthew Choptuik. My current research involves applying physics-informed machine learning techniques—especially Physics-Informed Neural Networks (PINNs)—to model black hole collisions. This approach holds the potential to streamline gravitational wave inference, offering more efficient pathways to interpret complex astrophysical signals.

Before working on numerical relativity, I completed my Master's under the supervision of Ian Affleck, where I employed numerical methods such as DMRG methods to explore super symmetry in a Majorana chain. Throughout my academic journey, I have engaged with diverse areas of physics, yet my primary interest consistently lies in the computational and methodological aspects that underpin these investigations. As a side research, I enjoy spending time on Ads/CFT correspondence. I also had numerical experience working on 2D materials such as Graphene.

Ultimately, I seek to refine and expand the computational techniques at our disposal, improving our ability to model, simulate, and understand fundamental physical phenomena. In doing so, I hope to contribute to the ongoing effort to bridge theory and computation in service of deeper scientific insight.

Signatures of Dipolar Dark Matter on Indirect Detection

Olga Guadalupe Felix Beltran
University of Puebla, Mexico

ABSTRACT

Will be Updated Soon

BIOGRAPHY

Dr.Olga Guadalupe Félix Beltrán, PhD in Science (Physics). Research professor at the Benemérita Universidad Autónoma de Puebla, Faculty of Electronics Sciences. Since 2005 she has taught physics and mathematics courses at undergraduate and graduate level. Member of the National System of Researchers (SIN-CONHACYT Mexico) (Level I), cultivates the lines of research and knowledge generation High Energy Physics and its Applications and Physico-Mathematics: dynamic modeling, nonlinear systems and chaos.

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