INTERNATIONAL CONFERENCE ON

APPLIED SCIENCE, ENGINEERING AND TECHNOLOGY

June 09, 2025

Amsterdam, Netherlands

BOOK OF ABSTRACT

ICAET2025

TABLE OF CONTENTS

FOREWORD

Dear Colleagues,

It is our pleasure to invite all scientists, academicians, young researchers, business delegates and students from all over the world to attend the **International Conference on Applied Science, Engineering and Technology** will be held in **Amsterdam, Netherlands** during **June 09, 2025**.

ICAET2025 aim to showcase recent advancements, innovative research, and emerging technologies across the fields of Applied Science and Engineering. The event is expected to attract a dynamic and diverse community of brilliant minds—including early-career researchers, seasoned scientists, business delegates, and enthusiastic students—fostering a vibrant atmosphere for learning and collaboration.

ICAET2025 is to unite a multidisciplinary network of experts from across the globe to exchange groundbreaking ideas and solutions related to Applied Science such as Physics, Chemistry, Biology, Environmental Science, Materials Science and cutting-edge engineering applications. By promoting high-impact research and fostering global collaboration, the conference seeks to elevate the quality of scientific dialogue and shine a spotlight on remarkable achievements in both theoretical and applied domains.

We look forward to welcoming participants from all corners of the world for an enriching and inspiring gathering, as we share novel insights and explore new frontiers in Applied Science, Engineering and Technology.

COMMITTEE

ORGANIZING COMMITTEE MEMBERS

Complete Solution of the Dark Matter and Dark Energy Problems through Einstein's Equation

Peter H. Handel[1] and Klara E. Splett[2]

Department of Physics and Astronomy, University of Missouri-St. Louis, St. Louis MO 63121 USA
Department of Physics and Astronomy, University of Missouri-St. Louis till Dec 2022; Presently: Handel's Research Team
Email: phasenoisehandel@gmail.com; erikasplett@yahoo.de
Tel: +1-314-2557348

ABSTRACT:

This paper reveals the complete solution of the problem of Dark Matter (DM) and Dark Energy (DE), determining their density at any point, disclosing their nature. Based on general relativity (GR) we show that DM is the energy of the coherent gravitational field of the observable universe (OU). We derive simple universal analytic formulae exactly agreeing with current observations, for DM at all levels, the DE density, and the cosmological constant L, by anticipating the solution of Einstein's equation for the OU. This yields our "DM key" for DM concentration □D=Qg. The constant Q=1.39.10-16gs2/cm4 is the DM concentration accreted per unit local Newtonian gravitational field g, from the OU, on the g of lower-scale structures. We exactly derive the galactic rotation curves, the observed extended galactic halos, the Tully-Fisher relations and MOND. Our key calculates the distribution of DM in galaxy clusters, super clusters, colliding clusters, planetary systems, wide binary stars, or on Earth. We derive □ as 1.08.10-56cm-2 and□□=5.8.10-30g/cm3, with error <3%, from our key, fixed by the Tully-Fisher relations. We also clarify the nature of DE, showing in what sense it exists. Our results replace previously proposed hypothetical DM/DE models.

BIOGRAPHY:

Peter H. Handel studied general relativity from Hermann Weyl's book. He received his MS degrees in atomic (nuclear) and theoretical physics in 1959and his PhD in solid-state theory in

1965, both from the University of Bucharest. From 1960 to 1967 he was a research scientist at the Institute of Physics of the Romanian Academy. In 1967-69 he was a research scientist at the Max V. Laue-Paul Langevin Institute in Munich, Germany, appointed by Heisenberg. He has been a Professor of Physics at the University of Missouri, St. Louis since 1969, emeritus since 2012. He introduced the turbulence theory of 1/f noise in 1965, the quantum theory of 1/f noise in 1975, the coherent quantum 1/f effect in 1982, defining a fundamental new aspect of quantum mechanics, the time domain infrared divergence effect of 1/f quantum fluctuations in physical cross sections and process rates. Since 1975 Dr. Handel developed the maser-soliton theory of ball lightning. In 1981 he developed a polarization-catastrophe theory of atmospheric electricity. He has also made contributions to solid-state, plasma and electronic noise theory. His simple universal coherent and conventional quantum 1/f effect formulas allow for the ultra-low noise and phase noise close to carrier optimization of most electronic devices, almost all high-technology materials, systems and devices, resonators, clocks, MEMS, particularly useful in nanotechnology. Dr. Handel has been organizer and Chairman of van der Ziel's Quantum 1/f Symposia 1990-2004. He is also a founding member of the Center for Molecular Electronics of the University of Missouri at St. Louis. He was a member of the 2001-2006 Ultra-low Phase Noise MURI at UCSB. Details, awards, are at www.umsl.edu/~handel. Recently he solved the 90 years old "Dark Matter in the universe" problem and the 23 year old Dark Energy puzzle, both with his partner K.E. Splett, P. H. Handel and K. E. Splett, "Calculation of Dark Matter as a feature of Space-Time", Springer Nature journal "Foundations of Physics," 2023, DOI 10.1007/s10701-023-00705-x, Open Access and a companion paper submitted to Nature.

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

Hans Deyssenroth

Senior Scientist, Germany

ABSTRACT:

A. Einstein derived the time dilation via the Pythagoras theorem from the oblique light path perpendicular to the direction of motion and H.A. Lorentz concluded that the light path in the direction of movement must be contracted to remain the null result of the Michelson Morley experiment. Einstein concluded that therefore space and time belong together and invented space time as basis for the theories of relativity. But the patterns of the return rates of photons from a mirror on the Moon reveal with a probability of error of $< 10^{-80}$ that this is wrong: the light path perpendicular to the direction of movement is not oblique. Therefore, the time dilation cannot be derived via the Pythagoras theorem. Space and time are independent of each other. Some other observations that have been ignored or dismissed by wrong arguments or even censored lead to the conclusion that gravity can be shielded. Therefore, new experiments in this direction should be performed. Physics should be based on experimental results. But can physicists accept an experiment that contradicts the theories of relativity?

BIOGRAPHY:

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.

Measures to Enhance National Resilience and Mitigate Disasters and Global Warming through the Geo-Utilization of Wood

Tadashi Hara[1], Rachana Poudel[2]

1Professor, Department of Science and Technology, Faculty of Natural Sciences, Ministry of Education and Research, Kochi University, Kochi, Japan
2 Graduate School of General Humanities and Natural Sciences, Kochi University, Kochi, Japan
Email:haratd@kochi-u.ac.jp
Tel:+81-80-888-8071

ABSTRACT:

The increasing frequency and intensity of climate-related disasters, caused by global warming, pose significant challenges to land conservation and disaster management. In response, Japan aims to achieve carbon neutrality by 2050. In the land, infrastructure, and transport sectors, efforts such as energy-efficient buildings, compact city planning, and smart city development have been encouraged to reduce greenhouse gas emissions. The building sector, in particular, is challenged to apply innovative energy-saving and low-carbon technologies.

As a practical solution that addresses both disaster risk reduction and climate change mitigation, this study evaluates the use of logs as a ground improvement application known as the log casting and carbon stock approach. By this method, logs are being driven into the ground for strengthening the soil, in addition to lessening the liquefaction hazard. Along the way, the logs uptake carbon by sucking in carbon dioxide, contributing to environmental sustainability. This study provides the current scenario of Japan's forest resources and presents the common application of logs in civil engineering construction and ground stabilization. Furthermore, it presents a new approach based on the use of logs to mitigate liquefaction based on field testing in sandy ground. Finally, by presenting the long-term performance of buried logs by taking their durability and performance into account in both sandy and clayey soil.

BIOGRAPHY:

Tadashi Hara, Professor

Professor Tadashi Hara has been a respected geotechnical Engineering professor at Kochi University, Japan, since 2014, in the position of Vice Director for the Disaster Prevention Division of Kochi University Research Center. He completed a Ph.D. in Civil Engineering from Chuo University, Japan. His research interests in earthquake-resistant design, gabion technology, and improvement of the ground by logs, and reservoir strengthening. He has published 167 Scopus-indexed papers in leading journals, authored 15 technical books, and written numerous book chapters. He is also a professor at Ehime University, Japan, and has been actively involved in several international JICA projects on disaster management, particularly in developing countries.

Proposal of an Easy Evaluation Method for Rainfall Infiltration of Railway Embankments by Field Monitoring

Takashi Nakayama, Tadashi Hara, Keigo Koizumi and Fumihiko Kimura

C. S. Inspector Co., Ltd.
Research and Education Faculty, Kochi University
Earth Watch Institute, Inc.
C. S. Inspector Co., Ltd.
Email:nakayama.takashi@nankai.co.jp
Tel:+81-90-8529-7974

ABSTRACT:

Disasters emanating from heavy rain have increased and become more severe worldwide in recent years. Additionally, the collapse and deformation of earth structures such as embankments have increased. Even a small-scale surface collapse of a railway embankment results in track deformation, which consequently causes the long-term suspension of train services. Currently, train-operation restrictions during rainfall in Japan are typically specified based on empirical rules of rainfall and disaster history, which do not reflect the actual circumstances. Meanwhile, railway embankments have different compaction degrees depending on the construction date and complex strata. Therefore, changes in rainfall infiltration over time are unclear, and the accuracy of restrictions and information is low. This implies that to increase the sophistication of train-operation restrictions, a new method that evaluates rainfall infiltration in real time is necessitated.

We had explained the complex strata of railway embankments through field surveys, as well as had determined the change in volumetric water content in soil over time due to rain infiltration based on laboratory column tests. In this study, observations of volumetric water content on the surface of railway embankments at two locations with different topographies and strata

show the presence of not only basic rainfall infiltration in the vertical direction but also infiltration, in which rainfall in the track area flows into the slope and forms a high-water-content zone from the top of the slope. Additionally, we propose a method for evaluating rainfall infiltration easily using a scatter diagram of volumetric water content at different depths. This study enables the real-time determination of embankment infiltration without on-site presence, thus enabling the acquisition of evidence that contributes to operation restrictions and rapid information provision.

BIOGRAPHY:

Mr. TakashiNakayama is the Chief Manager of the Facilities Department, Railway Business Division of Nankai Electric Railway Co.,Ltd. He is also a Director of C. S. Inspector Co., Ltd.He earned his Ph.D. from The United Graduate School of Agricultural Sciences, Ehime University.Since 1995, he has been engaged in the maintenance of railway civil engineering structures and tracks.He currently oversees the maintenance of railway facilities such as civil engineering, architecture, tracks, signals, and electricityas a Chief Managerof Nankai Electric Railway Co., Ltd., andsince 2020 has worked as a researcher atC.S.Inspector Co., Ltd., where he is working on developing a method to evaluate the rainfall infiltration status of embankments in real time.

Supplementary Figure

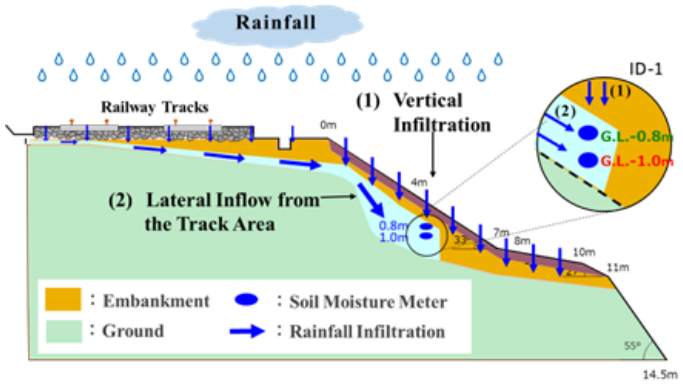

Figure: Schematic diagram of rainfall infiltration characteristics at observation site A

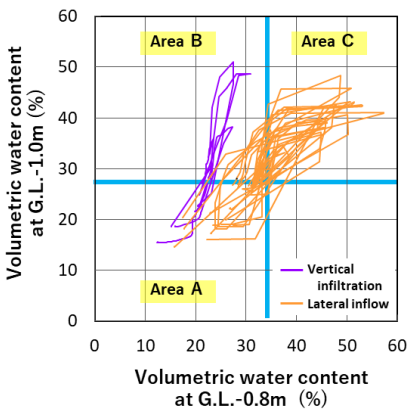

Figure: Evaluation of rainfall infiltration at observation site A using a scatter diagram

The Time Velocity Gravity Model: A New Framework Where Time Flows at c and Governs Gravity, Rotation, and Orbits

Behrooz Kasraee

Scientis, 11 Rue Cornavin, 1201, Geneva, Switzerland
kasraeebehrooz2021@gmail.com
Tel : +41788806698

ABSTRACT:

The fundamental motions of the universe—free-fall, planetary rotation, and orbital motion—shape cosmic systems from planets to galaxies. While Newtonian gravity and General Relativity offer explanations, some questions remain unanswered: Why do planets rotate? What ensures orbital stability over cosmic timescales? Why do certain gravitational anomalies persist despite theoretical corrections? In this paper, we introduce a new hypothesis: time propagates at velocity c , rather than being a static coordinate. The Time Velocity Gravity Model (TVGM) proposes time velocity as the key driver of motion, suggesting that time itself moves at velocity c .This assumption naturally explains why objects traveling at c , such as photons, experience no time flow—they match the motion of time. TVGM posits that gravity, rotation, and orbits are consequences of time velocity variations caused by mass. When mass is present, time velocity slows, creating a gradient in time flow. This differential in time velocity is perceived as acceleration toward the mass, which explains free-fall without needing spacetime curvature or force-based attraction. Planetary rotation emerges from asymmetric time velocity across a body, leading to a continuous drift that stabilizes as rotation. Orbital motion results from a balance between time velocity gradients and initial momentum, forming stable paths around massive bodies.TVGM offers alternative explanations for gravitational anomalies, such as Mercury's perihelion precession, galaxy rotation curves (without dark matter), and fly-by anomalies in spacecraft trajectories. By recalculating gravitational interactions using time

velocity gradients, TVGM aligns with observations and simplifies the interpretation of motion at cosmic scales. This paper presents the mathematical foundation of TVGM, its predictions, and a comparative analysis with Newtonian and relativistic models. Experimental proposals are outlined to assess whether empirical measurements of time velocity variations can deepen our understanding of gravity, motion, and the nature of time itself.

BIOGRAPHY:

Dr. Behrooz Kasraee is the Chief Scientific Officer at Scientis company, Geneva, Switzerland. He is focused on theoretical gravity and quantum physics, with a strong interest in understanding the fundamental forces of nature. Dr. Kasraee is working on a new concept that seeks to explain gravity, planetary rotation, and orbital motion in a novel way. His research aims to provide fresh perspectives on these phenomena and explore how time and space interact in the context of gravity and motion. This work is intended to contribute to ongoing discussions in the field and offers alternative explanations for several gravitational anomalies.

Challenge to Black Holes and Supernova Explosions – Astrophysical Implications of Magnetic Monopoles

Qiuhe Peng

(qhpeng@nju.edu.cn) (Department of Astronomy, Nanjing University)

ABSTRACT:

Part I: On our Galactic Center

An unusually strong radial masgnetic field has been found near our Galactic Center (Eatough et al., 2013). Its important implication is that the observed radiation from the GC cannot be emitted by the gas of the accretion disk due toaccretion plasma fluid being hard to transfer cross the magnetic field line by the Lorentz force. This is the first dilemma of the standard accretion disk model of black hole at the GC (Peng et al. 2016).

The second dilemma is that the magnetic field with a lower limit of 8mG near the GC is hardly produced by α-turbulence dynamo mechanism which is the best dynamo mechanism for producing magnetic field up to now (Peng et al. 2016).

Then I would like talk that the strong radial magnetic field detected in the vicinity of the GC is consistent with the prediction from our model of supermassive object with magnetic monopoles (Peng and Chou 2001). This is a strong evidence of both no black hole at the GC and existence of magnetic monopoles (Peng et al., 2016, 2017a). Besides, the five theoretical predictions of our paper at 2001 are totally confirmed by astronomical observations after 2001.

Part II: Query on the black hole models for other quasars and active galactic nuclei:

The key dilemma of the black hole model is the question on the BH mass at the center of AGNs .

The radiation from the BHs is emitted by gas of an accretion disk around the BHs. According to the Mach principle, the mass distribution of the universe (different redshifts) of the black holes formed in the early universe (with the number of black holes formed) was roughly the same. Through the accretion process, the mass of black holes could only increase continuously. In order to find the original mass of a quasar when it was born in the early universe, we need to subtract the mass added by accretion from the mass of the quasar determined today since the time of its birth ($t \approx 0$) to the time of t(z) , if we assume that all quasars were born at the same primordial era. However, according to various possible accretion theories in the current research and taking the data of 105,783 quasars based by SLOAN Digital sky survey (SDSS), we find that the primordial masses of these black holes (quasars) with medium and low redshift are mostly negative or very small after deduction. This is totally ridiculous.

A quasar with mass of1010 mSun at redshift Z=6 has been found by Wu et al. This observations pose a challenge to existing black hole models. This presentation will introduce the magnetic monopole model as an alternative explanation for these observations. Based on the proposal of magnetic monopole-catalysed nucleon decay as a novel energy mechanism in particle physics in the 1970s, the authors proposed a model of quasars with magnetic monopoles in 1985, and published a model of a magnetic monopole-containing object at the centre of the Milky Way Galaxy in 2001, together with five scientific predictions that are consistent with the new astronomical observations. The model of the energy mechanism of magnetic monopole-catalysed nucleon decay is also expected to provide new ideas in solving the physical mechanism of supernova outbursts and the physical mechanism of the UniverseHot Big Bang..

Part III: An unified model for supernova explosion mechanism

Taking the RC effect (nucleons may decay catalyzed by MM) as an energy source, besides, we have proposed an unified model for various supernova explosion(Peng et al. 2017b). In our model, the remnant of the collapsed core of supernova is still a neutron star rather than a black hole no matter how huge of the supernova mass. That means, black holes with stellar mass are

impossible to be formed through supernova explosion.

We may also explain the physical reason of the Hot Big Bang of the Universe with the similar mechanism of supernova explosion by using the RC effect as an energy source.

Reference

• Eatough R.P., et al., 2013, "A strong magnetic field around the supermassive black hole at the centre of the Galaxy"□<Nature>, Vol.591, 391-393.

• Peng Q. & Chou C., 2001, "High-Energy Radiation From a Model of Quasars, Active Galactic Nuclei, And the Galactic Center With Magnetic Monopoles", ApJ., 551(2001) L23-L26

• Peng et al., 2016, "A possible influence on standard model of quasars and active

• galactic nuclei in strong magnetic field", Astrophys Space Sci (2016) 361:388

• Peng et al., 2017a, "Some new possible anticipated signals for existence of magnetic

• monopoles?" , New Astronomy, 57 (2017)59-62

• Peng et al. , 2017b, " A unified model of supernova driven by magnetic monopoles" Astrophys Space Sci , 2017, 362;22

• Peng & Li, 2019, "Implications for Discovery of Strong Radial Magnetic Field at the Galactic Center—Challenge to Black Hole Models"

BIOGRAPHY:

Qiuhe Peng graduated from the Department of Astronomy at Nanjing University in 1960. He taught at Peking University for 18 years before returning to Nanjing University. His research spans nuclear astrophysics, particle astrophysics, and galactic astronomy. In nuclear astrophysics, Pengâ€™s work focuses on neutron stars (pulsars), supernova explosion mechanisms, thermonuclear reactions in stars, heavy element synthesis, and the origin of interstellar radioactive elements like celestial 26Al. He has published 235 papers. In recent years, his research has integrated astrophysics with particle and condensed matter physics. Some notable papers include: "Error Analysis of Ia Supernova and Query on Cosmic Dark Energy" (2014) "Query on Accelerating Expansion of the Universe by Error Analysis of Ia Supernova" (2016) "Origin of Strong Magnetic Fields of Magnetars" (2016) "A Unified Model of Supernova Driven by Magnetic Monopoles" (2017) "Implications for Discovery of Strong Radial Magnetic Field

at the Galactic Centerâ€"Challenge to Black Hole Models" (2019) "A Magnetic-Monopole-Based Mechanism to the Formation of the Hot Big Bang Modeled Universe" (2020) "New Insight into the Physical Essence of Pulsar Glitch" (2022) "Neutrino Rocket Jet Model: An Explanation of High-Velocity Pulsars and Their Spin-down Evolution" (2022).

The 3-D Solar Radio Imaging-Spectroscopy for Observing Space Weather Drivers

Yihua Yan[1,2,3,] Wei Wang[1,2], Linjie Chen[1,2], Jin Fan[2,1], Zhichao Zhou[1], Xin Yao[1] and Chengming Tan[1]

1. State Key Laboratory of Solar Activity and Space Weather,National Space Science Center, Chinese Academy of Sciences, Beijing, China
2. National Astronomical Observatories, Chinese Academy of Sciences, Beijing, China
3.School of Astronomy and Space Science, University of Chinese Academy of Sciences, Beijing100049, China
Email:yyh@nao.cas.cn
Tel:+86-10-64851674

ABSTRACT:

The solar eruptive activities may cause severe space weather effects on space activities. It is desirable to obtain information from the Sun to the Earth with multi-messenger observations. Radio technique is complementary to visible, EUV and X-rays observations, andsolar radio bursts are prompt indicators of the various solar activities including flares, CMEs, and SEPs, etc.Therefore radio observations play important role in understanding space weather origins at the Sun and their propagation in the heliosphere. MUSER (Mingantu spectral radioheliograph), a new generation of radioheliograph capable of observing the Sun with high time, angular, and frequency resolution, is located in Inner Mongolia of China, with MUSER-I covering 400 MHz-2.0 GHz with 40 antenna elements, MUSER-H covering 2–15 GHz with 60 elements, and MUSER-L (newly-built in 2024) covering 30–400 MHz with 224 LPDA elements. MUSER images the solar atmosphere in 3-D at broad radio bands in diagnosing and monitoring the physics processes in the space weather events.

BIOGRAPHY:

YihuaYan is Professor at National Space Science Center, Chinese Academy of Sciences, Beijing, China. He is currently the Chinese Representative to Comm. J of URSI. He served as President of Division E: Sun & Heliosphere of IAU during 2015-2018. He obtained his Ph.D, Master and Bachelor degrees in 1990, 1985 and 1982 respectively.His research interests include coronal magnetic field reconstruction, solar radio bursts and their associations with solar activities and space weather, astronomical methods and instrumentation. He was PI of infrastructures: MUSER (Mingantu Spectral Radioheliograph) and the Chinese IPS Telescope Array with three 140m*40m cylinder antennas and two 30m dish antennas.He has published more than 300 publications (ORCID: 0000-0002-7106-6029).

Explore the Potential of Large Language Models in Astronomy: a Pilot Application Framework Implemented in Solar Physics

Jiaben Lin

Chinese Academy of Sciences, China

ABSTRACT:

Artificial Intelligence (AI) is revolutionizing the landscape of scientific research. Large Language Models (LLMs), as a cutting-edge technology of AI, are being extensively explored and applied in diverse disciplines, enabling tasks ranging from literature reading and summarization to scientific research. Herein, we present an application framework for implementing AI4S (Artificial Intelligence for Science) leveraging LLMs, which has been successfully applied in solar physics and named JinWu. JinWu has successfully accomplished both scientific tasks and intelligent Agent tasks. Notably, in the challenging flare forecasting scientific task, JinWu demonstrates remarkable proficiency, highlighting the potential of LLMs in advancing scientific research.In this talk, I will present the implementation technical raodmap and the test results of the JinWu.

BIOGRAPHY:

Jiaben Lin has long been engaged in the research and development of scientific instruments for solar observation and in the study of electronic technologies and methods related to solar telescopes. He has undertaken several large projects, such as the on-board scientific data acquisition and processing system of the ASOS/FMG payload and the AIMS general control system. Recently, he has focused on the interdisciplinary research of solar observation data analysis and artificial intelligence methods.

Derivation of MOND, of Dark-Matter-in-Wide-Binaries and of the Nature of DM and Dark Energy

P. H. Handel[1*] and K. E. Splett[2]

1 Department of Physics and Astronomy, University of Missouri-St. Louis & Center for Nanoscience; St. Louis MO 63121, USA.
2 University of Missouri-St. Louis; present addr.: Petersroda, Sandersdorf-Brehna, Germany.

ABSTRACT:

From general relativity (GR) and its Newtonian approximation (NA), we easily calculated analytically for the first time the concentration C=Qg of Dark Matter (DM) in our previous publication* and subsequently Dark Energy (DE),** in any point of the universe, calling this simple formula "our DM key." Here g is the Newtonian gravitational field g calculated classically without DM and Q=1.39.10-16gs2/cm4. This agrees with all presently known evidence, even in clusters and super-clusters of galaxies. Applying this key to any galaxy, we exactly derive the distribution, concentration, or extension of halos, and immediately derive here belowanalytically, or even generalize the well-known MOND approximation, without modifying Newtonian Dynamics or GR. Applying it here also to wide binary stars, we solve the Kepler problem by including for the first time DM. This allows easy comparison with Chae's extended observations.*** From the vantage of this complete analytical solution of the "dark universe" problem, we finally present our new conjectures, proposals clarifying the ultimate nature of DE and DM, thus showing for the first time in what sense they actually exist.

*P. H. Handel and K. E. Splett, Calculation of Dark Matter as a feature of Space-Time, Springer Nature "Foundations of Physics," 53 (5) 2023, DOI 10.1007/s10701-023-00705-x.
**P. H. Handel and K. E. Splett, Complete Solution of the Dark Matter and Dark Energy Problems through Einsteins Equation, This Conference, First Plenary Paper
***P. H. Handel, Quantum Mechanics Related to a New View of General Relativity, and the Nature of Existence, This Conference, First day afternoon Plenary Paper 14:05-14:45.

BIOGRAPHY:

Peter H. Handel studied general relativity from Hermann Weyl's book. He received his MS degrees in atomic (nuclear) and theoretical physics in 1959and his PhD in solid-state theory in 1965, both from the University of Bucharest. From 1960 to 1967 he was a research scientist at the Institute of Physics of the Romanian Academy. In 1967-69 he was a research scientist at the Max V. Laue-Paul Langevin Institute in Munich, Germany, appointed by Heisenberg. He has been a Professor of Physics at the University of Missouri, St. Louis since 1969, emeritus since 2012. He introduced the turbulence theory of 1/f noise in 1965, the quantum theory of 1/f noise in 1975, the coherent quantum 1/f effect in 1982, defining a fundamental new aspect of quantum mechanics, the time domain infrared divergence effect of 1/f quantum fluctuations in physical cross sections and process rates. Since 1975 Dr. Handel developed the maser-soliton theory of ball lightning. In 1981 he developed a polarization-catastrophe theory of atmospheric electricity. He has also made contributions to solid-state, plasma and electronic noise theory. His simple universal coherent and conventional quantum 1/f effect formulas allow for the ultra-low noise and phase noise close to carrier optimization of most electronic devices, almost all high-technology materials, systems and devices, resonators, clocks, MEMS, particularly useful in nanotechnology. Dr. Handel has been organizer and Chairman of van der Ziel's Quantum 1/f Symposia 1990-2004. He is also a founding member of the Center for Molecular Electronics of the University of Missouri at St. Louis. He was a member of the 2001-2006 Ultra-low Phase Noise MURI at UCSB. Details, awards, are at www.umsl.edu/~handel. Recently he solved the 90 years old "Dark Matter in the universe" problem and the 23 year old Dark Energy puzzle, both with his partner K.E. Splett, P. H. Handel and K. E. Splett, "Calculation of Dark Matter as a feature of Space-Time", Springer Nature journal "Foundations of Physics," 2023, DOI 10.1007/s10701-023-00705-x, Open Access and a companion paper submitted to Nature.

Time, Energy and Matter Are Interconvertible Phases: Foundations of Chronal Triality

Dr. Behrooz Kasraee

Scientis, 11 Rue Cornavin, 1201 Geneva, Switzerland
University of Geneva, Switzerland

ABSTRACT:

We introduce the Chronal Triality principle (□□ $\mathscr{E}$ □ $\mathscr{M}$), in which time, energy, and matter arise as interconvertible phases of a fundamental time-flow field (ϕ_t). The local flow velocity of time (v_t) acts as an order parameter, governing transitions from vacuum ($v_t = c$) to energy ($0 < v_t < c$) to matter ($v_t \to 0$ via chronon condensation). This framework explains dark energy as residual v_t-pressure ($\rho\_\Lambda \approx 10^{-26}$ kg/m³), matching observations within one order of magnitude. It also predicts a 9.2% enhancement in e^+e^- pair production thresholds for $v_t < 0.91c$ (testable at FACIR-II), and scalar gravitational waves ($\delta\phi_t/\phi_t$ □ 10^{-15}), detectable by LISA.Chronal Triality recovers the second-order correction constant α—originally introduced empirically in the Time Velocity Gravity Model (TVGM)—from first principles as a natural outcome of v_t-field fluctuations in matter–vacuum boundary layers. The model also accounts for the anomalous Planck mass scale as a phase boundary in time flow, and connects □v_t gradients to the emergence of inertia and thermodynamic irreversibility.CT provides experimentally testable predictions via Josephson junction arrays (δv_t □ 10^{-19} s^{-1} at 20 mK) and SKA observations of 21-cm anomalies ($\Delta z \sim 0.1$). By treating time as a dynamical physical field rather than a geometric background, Chronal Triality offers a falsifiable, unified approach to quantum gravity, dark energy, and the arrow of time.

BIOGRAPHY:

Dr. Behrooz Kasraee is the Chief Scientific Officer at Scientis company, Geneva, Switzerland. He is focused on theoretical gravity and quantum physics, with a strong interest in understanding the fundamental forces of nature. Dr. Kasraee is working on a new concept that seeks to explain gravity, planetary rotation, and orbital motion in a novel way. His research aims to provide fresh perspectives on these phenomena and explore how time and space interact in the context of gravity and motion. This work is intended to contribute to ongoing discussions in the field and offers alternative explanations for several gravitational anomalies.

The Need to Bridge Science Education Research on Teaching and Learning in Basic Training offered to Engineering Students: The Case of Physics

Abdeljalil Métioui

University of Quebec in Montreal
Email: metioui.abdeljalil@uqam.ca
Tel:1-212-514-7665604

ABSTRACT:

Many engineering studies require the acquisition of fundamental concepts underlying the fields of physics and chemistry. Thus, the study programs of most university institutions specializing in teaching and research in engineering (mechanical, electrical, aerospace, chemical, and others) offer introductory courses in physics and chemistry according to the field of specialization. For example, in electrical engineering, the École de technologiesupérieur and the ÉcolePolytechnique, located in Montreal, Quebec (Canada), the following courses are offered at the beginning of the training: Electrical Circuits, Fundamental Principles of Electrical Circuits, Electronic Circuits and Electromagnetism. Similarly, in mechanical engineering, the following courses are given: Dynamics, Thermodynamics, Fluid Mechanics, Statics and Resistance of Materials, and Chemistry of Materials. Many students encounter conceptual difficulties in acquiring the fundamental concepts underlying these different fields of knowledge. These difficulties can significantly impact their academic performance and future career prospects. In this communication, we will first present a synthesis of the research carried out with students in electrical, mechanical, and chemical engineering on their conceptual difficulties in qualitatively analyzing the operation of simple electrical circuits using the notions of current and electrical voltage (Periago&Bohigas, 2005; Métioui et al., 1996) as well as their difficulties in using the notions of speed, acceleration, and force (developed within the framework of Newtonian physics) to elaborate on phenomena requiring the acquisition of these concepts (Cashman &O'Mahony, 2022). Following this synthesis, we will present why students encounter conceptual difficulties despite the teaching offered. Our discussion will draw

on the historical development of science, including the concept of paradigm and paradigmatic change. This concept, developed by Kunn, a respected physicist and historian of science, plays a significant role in our understanding of physics. Finally, we will present teaching strategies focused on conceptual conflict to help students achieve meaningful learning.

BIOGRAPHY:

Abdeljalil Metioui holds a B. Sc. in Physics from Universite Mohamed V, Morocco, a Diploma of Advanced Studies in Physics from Universite de Bordeaux 1, France, a Master of Science in Physics, and a Ph.D. in Didactics from Universite Laval, Canada. He has also taught Science didactics at Canadian universities such as Universite Laval, Universite de Moncton, and Universite Sainte-Anne. His diverse research interests include the history of science in science teaching and learning, university student's alternative conceptions in physics, and the design of a constructivist numeric environment. He published many articles and books. His academic achievements include being awarded a SALTISE mini-grant in the autumn of 2018 for developing a two-tier diagnostic test to detect secondary and post-secondary student's alternative conceptions of electrical circuits.

The Need to Improve Microelectronics Technologies in order to Face the Challenges of Electrical Energy Consumption

Olivier BONNAUD

Professor emeritus
University of Rennes & GIP-CNFM
France
Research Interest
Higher Education strategy of Microelectronics and nanotechnology field – Applied Science

ABSTRACT:

Digital activities involving the internet and artificial intelligence (AI) are evolving rapidly in today's world. This evolution seems to be very useful for most of our daily activities, including finance, bitcoin, entertainment and new tools such as ChatGPT or Mistral, as well as in the field of research and development thanks to the ability to sort billions of data. The main problem is the huge increase in the amount of data being transferred and processed, particularly with the very rapid development of AI tools. Given that all operations in this field are primarily based on electronic equipment, whether iPhone, iPads, PCs, flat screens, life boxes, servers or data centers, electrical energy consumption is unfortunately growing exponentially today in the same way. It seems that the only way to halt this deleterious trend is to make a major effort to reduce energy consumption. Indeed, within the space of a decade, this could lead to a global impasse, with digital activity absorbing the entire global production of electrical energy.The solution lies in significantly reducing the energy consumption of every component in the field of micro-nanoelectronics. Recent research and development studies have shown that it is possible to reduce energy consumption by a factor of more than 10 within a reasonable timeframe. By combining improvements in elementary device technology processes involving new materials, circuit technology and architecture, and by introducing new hybrid packaging, we can hope to meet the challenges. At a global level, it is clear that to achieve this, new skills and

know-how need to be developed to drive innovation in the production of billions of connected objects every year. These correspond to new jobs in applied sciences, mainly in microelectronics and nanotechnology. At the same time, this approach requires the adaptation of training to provide new skills and competencies for innovation in research and production.In France, new projects are underway as part of the France 2030 program. The French national network for higher education in microelectronics and nanotechnologies, CNFM, comprising 12 French inter-university training centers, has adopted this strategy and has been selected for a project entitled INFORISM. Several examples of new technical approaches combined with training on innovative platforms relevant to the challenges ahead will be presented.

BIOGRAPHY:

Olivier Bonnaud, born in 1950 in France, is a student of the Ecole NormaleSupérieure de Paris-Saclay and holds a PhD in microelectronics. In 1984, he became a full professor at the University of Rennes 1 and at Supelec (Engineer School), where he created a microelectronics research laboratory that he directed until 2010, as well as several international joint masters and PhD programs. He has supervised 43 PhDs and worked in cooperation with many international microelectronics companies. He has published or presented more than 600 papers and 7 books including 100international invited papers/keynotes. Founder in 1985 of a regional inter-university center for microelectronics (CCMO), he headed it until 2010, when he was appointed by the French Minister of Higher Education as Executive Director of the National Coordination for Higher Education to Microelectronics and Nanotechnologies (GIP-CNFM), a network of 12 French inter-university training centers that welcome around 20,000 students a year for hands-on training on technology platforms. President of several scientific national and international associations, evaluator and expert for several research and higher education agencies, member of more than 140 scientific committees of international conferences, he is professor emeritus since 2013, guest professor at the South-East University (Nanjing, China) and international expert in microelectronics field. He was selected for the “1000 global Talents” program by the Chinese government in 2014. He received the Jiangsu Friendship Award in 2018, Microelectronics Brazilian Society Award in 2019, Chinese Government Friendship Award in 2023. Among his missions of Executive Director of GIP-CNFM, he is presently coordinating.

The Essence of Space Systems from an Engineering Science Perspective

Hiroaki Miyoshi

NEC Corporation's Space Development, Japan

ABSTRACT:

The most advanced telescopes are not sold in stores. Astronomy is an observational science that applies cutting-edge engineering, and the horizons of observation have expanded alongside advances in engineering.

While scientists ask, "What do we want to see?" engineers ask, "How can we make it visible?" The innovations in gravitation, astrophysics, and cosmology have been quietly supported by engineers who have consistently worked to develop and design observational tools to address scientists' questions.

On the other hand, commercialism has led to the concentration of wealth and accelerated short-term resource allocation driven by the ability to buy time with money.
If this continues, engineers—who play a crucial role in expanding humanity's knowledge horizon through innovative ideas as a public wealth—will become an unpopular profession, making it difficult to secure talented individuals.

From "invisible supporters" to "partners in enriching society together." Let us collectively consider what actions the entire academic community should take to ensure the sustainability of engineers as public wealth.

BIOGRAPHY:

Graduated from the University of Tokyo's Graduate School of Engineering, Department of Aeronautics in 1991 and joined NEC Corporation's Space Development Division the same year.
During his student years, he was involved in the research and development of the ion engine for the asteroid explorer "Hayabusa".

After joining NEC, he worked on the development of onboard computers and spacecraft autonomy for Earth observation satellites "Midori" and "Daichi", as well as the satellite communication systems connecting space stations and the ground. He spent about 10 years working on the development of space data systems, which realized the fusion of space and information communication technology (ICT).

For the next 15 years, he was in charge of project management for large-scale, practical ICT systems that created social values, contributing to establish Japanese national infrastructure for science, national security and positioning, navigation and timing.

He is currently active as an NEC Fellow, promoting new commercial space utilization markets through the combination of our space technology and ICTs.

Investigation of Multi-Component-Abundance-Isotope GeV High-Energy Particle Acceleration from Plasma Statistical Physics

Bojing Zhu[1,2,3,4,13*], Zehua Fu[1,2,3,4†], Yongbing Li[2,5†], Yang Zhao[2,5], Yan-Li[1,2,3,4], Zhi-kuo Ma[1,2,3,4], Shichao Wang[2,5], Qian Wang[2,5], Wu Wang[6], Hui Yan[7], Ying Zhong[7], Huiyong Li[8], Gen Li[9], Chuan Wang[10], Gang Zheng[10], Jinwei Leng[11] and Henry Tufo[12]

1.Yunnan Observatories of Chinese Academy of Sciences, Kunming, 650216 China
2.University of Chinese Academy of Sciences, Beijing, 100049, China
3.Center of Astronomical Mega-Science, Chinese Academy of Sciences, Beijing, 100012, China
4.Yunnan Key Laboratory of Solar Physics and Space Science, Kunming,650216, China
5.Key Laboratory of Computational Geodynamics & Key Laboratory of Earth System Numerical Modelling and Application, Chinese Academy of Sciences, Beijing, 100049, China
6.Computer Network Information Centre & National Supercomputer Center in CAS, Chinese Academy of Sciences, Beijing, 10083, China
7.National Supercomputer Center in Guangzhou, Sun Yat-sen University, Guang zhou, 510006, China
8.National Supercomputer Centre in Chengdu, Chengdu, 610200, China
9.Phytium Information Technology Co.. Ltd. Changsha, 410008, China
10.National Supercomputer Centre in Tianjin, Tianjin, 250103, China
11.National Supercomputer Centre in Jinan, Jinan, 300457, China
12.Department of Computer Science, University of Colorado at Boulder, Boulder, CO80309-0430, USA
13.State Key Laboratory of Space Weather, National Space Science Center, Chine se Academy of Sciences, Beijing, 100190, China
E-mail: bjzhu@ynao.ac.cn; cynosureorion@ucas.ac.cn
Landline: 86-0871-63920142; Fax: 86-0871-63920142
Mobile: 86-134-3997-0873; 86-158-8783-4683

ABSTRACT:

Over the past two years, the Parker Solar Probe has provided unprecedented observational data, revealing the intricate nature of solar energetic particles (SEPs)—such as electrons, pro tons, and heavier particles. These SEPs exhibit a complex makeup, characterized by multiple components, varying abundances, and diverse isotopes. Events involving SEPs with energies in the hundreds of MeV occur frequently, with the most energetic reaching up to GeV levels. Yet, despite these observations, limitations in our data leave the acceleration mechanisms be hind these particles a mystery. Earlier theoretical and numerical studies failed to anticipate this complexity.SEP events at GeV energy levels pose a serious threat as a primary driver of space weather disasters. They can wreak havoc on spacecraft in orbit and disrupt the electromagnetic environment on Earth, potentially causing catastrophic consequences. This underscores an urgent need to investigate how SEPs interact with multi-component, multi-abundance isotopes. We must develop a robust theory and model to explain these interactions and unravel the acceleration mechanisms powering these high-energy particles.In this work, our interdisciplinary research team has leveraged a plasma statistical physics model alongside our proprietary 3D turbulent magnetic reconnection relativistic hybrid particle-in-cell & lattice Boltzmann method (RHPIC-LBM). With this approach, we've explored the turbulent acceleration of wave-particle interactions driving GeV-level SEPs(such as protons, electrons, helium-3, and helium-4) while accounting for precise charge-to-mass ratios and turbulence-induced dissipation-diffusion across fully coupled hydrodynamic and kinetic scales. Our work aims to advance scientific research for deep space exploration and enhance early warning systems for space weather disasters in my country.

BIOGRAPHY:

Bojing Zhu, associate professor of computational physics, joined the Chinese Academy of Sci ences in 2008 at Yunnan Observatories & Center for Astronomical Mega-Science of the Chi nese Academy of Sciences and the University of Chinese Academy of Sciences. My research spans solar physics theory, space physics, planetary science, and high- performance supercom puter algorithms, and I have published over 70 peer-reviewed articles, most on computational solar physics and Earth and planetary physics; his research work has been cited more than 6,00 times, according to Google Scholar. From 2018, my research focuses on the source and origins

of extremely GeV SEPs, the early warning system for extremely SEPs space weather disasters with the Independent Intellectual Property Rights(IIPR) data-driven multi-component-abun dance-isotope (H, He, and heavy ions) relativistic hybrid particle-in-cell and lattice Boltzmann method (RHPIC-LBM).

URL: https://people.ucas.edu.cn/~cynosure URL: https://x.com/ZhuBojing

The Unified Theory (TUT)

M. Helmy

Email: said_mohamed@hotmail.com

ABSTRACT:

The Unified Theory (TUT) revolutionizes our understanding of spacetime by introducing velocity as a fifth dimension and acceleration as a sixth, unifying gravity, electromagnetism, and the nuclear forces into a single framework. By integrating general relativity, quantum mechanics, and higher-dimensional dynamics, TUT addresses key cosmological puzzles, including dark matter, dark energy, and cosmic inflation. It redefines matter and energy as manifestations of universal oscillations, eliminating the concept of emptiness, and reimagines light as a self-sustaining soliton wave.

TUT predicts a closed, spherical universe and proposes a multiverse model of seven interconnected universes interacting through higher-dimensional fields. The theory extends Lorentz transformations to accommodate superluminal phenomena, offering testable predictions that align with data from Planck and JWST. By bridging quantum and cosmological scales, TUT advances the quest for a Theory of Everything (TOE), providing transformative insights into spacetime, matter, and the fundamental forces of nature.

Keywords:

(TUT), Fifth Dimension (Velocity), Sixth Dimension (Acceleration), Fundamental Forces, Dark Matter, Dark Energy, Quantum Gravity, Redshift, Hawking Radiation, Light Deflection, Supersymmetry, Faster-than-Light Particles, Multiverse, Cosmic Expansion, Relativity, Quantum Mechanics, Big Bang, Spherical Universe, Cosmology.

References:

1. Helmy Said, M. (2017). Transformation Equations for the Fifth Dimension. AIP Conference Proceedings, 1863, 560087. https://doi.org/10.1063/1.4992770
2. Helmy Said, M. (2020). Infinity Theory for the Fifth Dimension. Global Scientific Journal. Retrieved from: http://www.globalscientificjournal.com/researchpaper/INFINITY_THEORY.pdf
3. Helmy Said, M. (2023). (TUT). Journal of Physics & Optics Sciences. DOI: 10.47363/JPSOS/2023(5)195
4. Helmy Said, M. (2023). What is Light? Journal of Physics & Optics Sciences, 5(4), 1–3. DOI: 10.47363/JPSOS/2023(5)195
5. Kaluza-Klein Theory. (n.d.). Kaluza-Klein and Their Story of the Fifth Dimension. Plus Maths. Retrieved from: https://plus.maths.org/content/kaluza-klein-and-their-story-fifth-dimension
6. Louis de Broglie. (n.d.). HAL Archives. Retrieved from: https://hal.archives-ouvertes.fr/jpa-00205281/document
7. Magueijo, J. (2002). Faster Than the Speed of Light: The Story of a Scientific Speculation. Perseus Publishing.

BIOGRAPHY:

Mohamed Helmy Said is a self-taught physicist, engineer, and inventor. His groundbreaking TUT reconceptualizes spacetime by introducing velocity and acceleration as fifth and sixth dimensions, solving mysteries such as dark matter and quantum gravity without unproven assumptions.

Trained as a production engineer, Said's unique interdisciplinary approach bridges art, engineering, and theoretical physics. In 1977, he famously declined a PhD, citing Einstein's precedent, choosing instead to pursue science as an independent researcher. His practical innovations include patented automotive technologies for Toyota and unpublished inventions awaiting commercialization.

He is recognized in Finland with four rare titles—engineer, physicist, inventor, and artist—and remains the only polymath to hold all four. His predictions from the University of Toronto are consistent with data from the James Webb Space Telescope (JWST) and the LIGO Observatory, providing testable alternatives to mainstream cosmology. His work is peer-reviewed in the journal Physical Review D and is available on Research Gate: DOI: 10.13140/RG.2.2.14995.80163.

Stepping-Stone Intrusion Detection and its Development Trend

Jianhua Yang

Columbus State University, Columbus, GA, USA
Email:yang_jianhua@ColumbusState.edu
Tel: 001-706-507-8180

ABSTRACT:

Employing stepping-stones to launch attacks has become more and more popular since the emerging of the Internet. Most professional attackers use this way to gain benefits and protect themselves as well. Even worse, most computers under stepping-stone intrusion have no idea they are actually under attacks since unlike other cyberattacks, stepping-stone intrusion does not present any apparent attacking sign. Detecting stepping-stone intrusion is thus important and critical to the security of the Internet infrastructure. In this paper, we summarize the most typical approaches developed to detect stepping-stone intrusion since 1995 including host-based and network-based detection algorithms. At the end of the paper, we discuss the future trend of the development of stepping-stone intrusion detection, especially, focusing on stepping-stone intrusion upstream detection. We also introduce the progress we have made in stepping-stone intrusion upstream detection by using the distribution of inter computer network packets time gap.

BIOGRAPHY:

Dr. Jianhua Yang is currently working at TSYS School of Computer Science, Columbus State University (CSU), Columbus, GA USA as a Full Professor. Before joining CSU, he was an Assistant Professor at Bennett College from 2006 to 2008, University of Maryland Eastern Shore from 2008 to 2009, and Associate Professor at Beijing Institute of Petro-Chemical Technology, Beijing, China from 1990 to 2000. Dr. Yang has published more than 80 peer-reviewed journal papers and conference proceedings. He has been awarded by NSA, NSF, and DoD with amount of more than half million dollars. His current research interest is computer network and information security.

Cosmological Hydrodynamical Simulations to Probe the Evolution of Galaxies and their Central Supermassive Black Holes

Paramita Barai

National Institute of Astrophysics, Italy

ABSTRACT:

A complete understanding of the astrophysical processes in the Universe require a hybrid approach involving multiple techniques. Theoretical and numerical studies is a parallel attempt to understand how the Universe came to be as is observed by multi-wavelength observations. Galaxy formation is highly non-linear, and involves a complex interplay of distinctive processes over a wide range of physical scales: from star formation in molecular clouds on the pc scale, to millions of times larger tidal interactions between galaxies on Mpc scales. Energetic feedback from stellar evolution and supernova (SN) explosions as mass/energy ejection play crucial roles in the build up of galaxies. Simultaneously, accretion of matter onto central Supermassive Black Hole (SMBH)s in massive galaxies liberates enormous amounts of feedback energy, often generating powerful AGN outflows observed at multi-wavelengths. Numerical methods are ideal to tackle these sophisticated physical mechanisms occurring inside galaxies. Cosmological Hydrodynamical Simulation, executed on massively parallel petaflop computing platforms, has emerged as a powerful tool to produce cosmic structures that are similar to the observed ones.

I will describe the performance and analyses of Cosmological Hydrodynamical Simulations, emphasizing on the growth and feedback from SMBHs at galaxy centers. These simulations are done with the SPH code GADGET-3, and includes sub-resolution prescriptions for the physical processes of cooling, star-formation, chemical evolution, SN and AGN feedback. We investigate the growth of the central supermassive BHs, as well as their impact on the host galaxies.

BIOGRAPHY:

Paramita Barai is a researcher in the field of Astronomy & Astrophysics, with study/work experience in India, USA, Canada, Italy, and Brazil. From 2022 she is a permanent Staff at the National Institute for Astrophysics (INAF)-Astronomical Observatory of Trieste (Italy). She currently coordinates a PRIN 2022 PNRR grant won from the Italian Ministry for the project “Next-generation Computing and Data Technologies to probe the Cosmic Metal content”. Her research areas include galaxy formation and evolution, supermassive black holes, AGN; which she investigates by executing numerical simulations. She obtained her B.Tech. in 2002 in Electronics Engineering from Indian Institute of Technology-Kharagpur (India), M.S. in 2004 and Ph.D. in 2006 in Physics from Georgia State University (USA). Thereby she did Post-Doctoral research at: UniversitÃ© Laval (Canada, 2006-2009), University of Nevada-Las Vegas (USA, 2009-2011), INAF-Trieste Observatory (Italy, 2011-2015), Scuola Normale Superiore-Pisa (Italy, 2015-2016). Thereafter she held a FAPESP Jovem Pesquisador grant at the Instituto de Astronomia-Universidade de SÃ£o Paulo (Brazil, 2017-2020); and was a fixed-term Professor at the Universidade Federal do ABC (Brazil, 2020-2022). She has a total of 67 Publications, including 38 peer-reviewed journal papers. Her publications have achieved over 1400+ Google Scholar citations, and an h-index of 25. She has given 150+ conference talks/invited seminars; has supervised 8 post-graduate students an-d 1 postdoc.

Goutte a Goutte: Academia and Little Enterprises to Reduce Water in Food Production

Alessia Corami

Cerege/AixMArseille Université
Email:alessia.CORAMI@univ-amu.fr; corami@cerege.fr
Tel:+33767647976

ABSTRACT:

Extreme weather events affected France and Italy in summer 2022 and 2023, such as burned forests, dried-up lakes, destroyed harvests, and production slowed by abnormally high temperatures. IPCC (Intergovernmental Panel on Climate Change) published the report "Impacts, Adaptation, and Vulnerability" in 2022, with a clear and terrible conclusion: among the four identified risks threatening France and Italy will suffer from bias of water shortages. Particularly, this concerns two areas South of France and North of Italy; with a warming of +2°C, more than a third of the population in this area could experience a water shortage. Drought is already costing France €1.2 billion per year due to agricultural losses and disruptions to food production and resource distribution. Northern Italy is not far behind, with a state of emergency declared in five regions, including Piedmont, where the 2022 drought is historic.

Indeed, the various maps of the European Drought Observatory (EDO) very specifically identify the ALCOTRA region as one of the most problematic areas in Europe. These territorial disparities unfortunately mean that citizens, and even more so cross-border businesses, will have to develop new uses and practices in water resource management more quickly than other regions. The issue of water resource use and management is the same in France and Italy.

This is the entire objective of our project and the benefit of conducting it jointly. The project GoutteaGoutte/GocciaaGoccia supports micro and little enterprises from the food industry production along three main pillars: reduction of water leaks, water reduction along the industrial chain and wastewater remediation to a secondly reuse.

Food production is a water-consuming production (water footprint), it is essential to raise awareness, support, train, and monitor production companies, with particular emphasis on ecological transition and long-term economic competitiveness.

The project was funded by the European Regional Development Fund (ERDF) as part of the Interreg V-A France-Italy ALCOTRA 2021-2027 Program

BIOGRAPHY:

Alessia Corami, researcher.

She received her degree in Earth Science at University of Rome La Sapienza with a thesis about Archaeometry and Geology.She won a fellowship about isotopic chemistry at Geokarstsrl AREA Science Park. In 2002 she won Ph.D. fellowship at University of Rome La Sapienza about Environmental Geology and Geochemistry.From 2007 she was a professor at Guglielmo Marconi University for 5 years.In 2014 she was a visiting professor at Karl Eberhard University of Tübingen (Germany).During the last two years she is a visiting assistant professor at University of Louisiana at Lafayette and from June 2025 she joined Aix-Marseille University/Cerege.In these years, she published articles about archaeometry, geochemistry and remediation techniques.

Pursuing Large-Scale Structure Measurement with MeerKLASS

Wenkai Hu

University of the Western Cape
Email: wkhu@nao.cas.cn
Tel: +8615701320752

ABSTRACT:

As a prevalent and widely distributed component of galactic gas, neutral atomic hydrogen (HI) plays a crucial role in comprehending various astrophysical processes, including star formation histories, galaxy interactions, and the tracing of cosmic large-scale structures. However, the sensitivity limitations of telescopes pose challenges to directly measuring line signals from distant individual galaxies. This limitation can be overcome by employing Line intensity mapping, thereby extending the survey capabilities to higher redshifts. Significant progress has been made in detecting the HI cross-correlation power spectrum using intensity mapping survey utilizing MeerKAT's L-band receiver, and there is a good prospect of detecting the HI auto power spectrum in the near future. MeerKLASS, launched in late 2022, has accumulated over 400 hours of observations across approximately 2,000 deg^2 and aims to cover over 10,000 deg^2 within next four years, will address this challenge by employing HI intensity mapping with MeerKAT's UHF-band receiver in single-dish mode, enabling the study of large-scale HI power spectra at higher redshifts and enhancing our knowledge of cosmic structure formation. This presentation highlights our efforts in processing MeerKAT UHF intensity mapping data from MeerKLASS. I will introduce the MeerKLASS calibration pipeline, MuSEEK (Multi-dish Signal Extraction and Emission Kartographer), designed to mitigate systematic errors, radio frequency interference (RFI), bandpass variations, and flux calibration issues, ensuring precise large-scale HI measurements. I will also present the latest calibration and map-making results, demonstrating our ability to extract scientifically meaningful HI signals. Additionally, I will assess the noise performance of MeerKLASS, focusing on 1/f noise characterization and mitigation strategies. Finally, key advancements in MeerKLASS will be highlighted, emphasi-

zing its impact on HI cosmology and intensity mapping techniques, paving the way for future large-scale surveys, including those with the Square Kilometre Array (SKA).

BIOGRAPHY:

Wenkai Hu, SKA postdoctoral fellow

I am Wenkai Hu. I obtained my BSc from USTC in 2014 and completed my PhD in 2020 at NAOC, focusing on HI cosmology. During my PhD, I spent two years at ICRAR studying HI mass and cosmic density via spectral stacking. I later contributed to the FAST HI Intensity Mapping Survey and characterized 1/f noise. I joined LAM as a postdoc, working on [CII] line observations with CONCERTO, while continuing FAST collaborations. I'm currently an SKA Postdoctoral Fellow at UWC, leading pipeline development for the MeerKAT Large Area Synoptic Survey. My research spans HI/OH absorbers, FAST forecasting, cosmic HI density, tidal fields, and ISM/IGM evolution, with broad interests in cosmology, HI, and galaxy evolution.

Recent Advances in Multimodal Sentiment Analysis

Gulanbaier Tuerhong[1] and Mairidan Wushouer[1]

Guangdong University of Science and Technology, School of Computer Science, Guangdong, 523083, China
Email: gulan@gdust.edu.cn

ABSTRACT:

Sentiment analysis is an emerging technology that explores people's attitudes towards specific subjects. It has a wide range of applications, including product evaluation, public opinion analysis, mental health analysis and risk assessment. While traditional models of sentiment analysis focus on text content, certain forms of expression, such as sarcasm and hyperbole, can be challenging to detect in writing. As technology advances, people are expressing their opinions and feelings through multiple channels, including audio, images and videos. Consequently, sentiment analysis is shifting towards multimodality, creating new opportunities. Multimodal sentiment analysis incorporates rich visual and auditory information alongside textual information, enabling more accurate inference of sentiment polarity (positive, neutral, or negative) using fusion analysis. In this talk, I will share some recent work conducted by my research team on multimodal sentiment analysis.

BIOGRAPHY:

Gulanbaier Tuerhong is an associate professor in the School of Computer Science at the Guangdong University of Science and Technology.

She received her Ph.D. from the Information Management and Security Research Institute at Korea University in 2013. Prior to joining Guangdong University of Science and Technology, she worked as a full-time associate professor in the Department of Computer Science and Technology at Xinjiang University. Her research interests include machine learning and multimodal sentiment analysis. She has published over 40 academic papers on machine learning and sentiment analysis in both international and domestic journals.

Some Dark-Matter and Gravitational Details That Explain Otherwise Seemingly Unexplained Cosmic Data

Thomas J Buckholtz

Ronin Institute, USA

ABSTRACT:

We provide quantitative explanations for known ratios of dark-matter effects to ordinary-matter effects, and we suggest explanations for the rate of expansion of the universe and for cosmology tensions. Our work features a well-defined specification for dark matter. Our work features multipole expansions that combine Newtonian gravity and special-relativistic interpretations of properties of objects. Our work adds one integer-based equation to successful popular modeling. Some solutions of the equation help to quantitatively explain dark-matter-to-ordinary-matter ratios and help to suggest insight regarding galaxy formation, rate-of-expansion phenomena, the Hubble tension, and the S8 tension.

BIOGRAPHY:

Dr. Thomas J. Buckholtz has made contributions to society that span aspects of research and development, business, government, education, information technology and IT business practices, not- for-profit endeavors, startup enterprises, and the environment.

He does research in (1) cosmology and elementary particle physics and (2) innovation, leadership, skills development, and thinking. Regarding (1), his 2024 Journal of High Energy Physics, Gravitation and Cosmology paper & quot; Characterizations That Help Explain Particle and Cosmic Data & quot does the following: (A) Catalog all known elementary particles and suggest new elementary particles; (B) Suggest a well-defined specification for dark matter. (C) Explain observed ratios of dark-matter effects to ordinary-matter effects; (D) Suggest how to close gaps, between models and data, regarding the rate of expansion of the universe; and (E) Suggest new insight about galaxy formation. The paper also suggests new solutions for multidimensional isotropic harmonic oscillator equations. Thereby, the paper provides pos-

sibly useful perspective about the following: (a) Vacuum energy and (b) Gauge symmetries and the Higgs mechanism. His background for (1) includes a mathematics BS from Caltech, a physics PhD from Berkeley, and work as a physicist {including for the Lawrence Livermore National Laboratory}. His background for (2) includes catalyzing a grassroots innovation program throughout an energy utility and serving as a U.S. General Services Administration commissioner {including leading a $1-billionbusiness unit, serving as co-chief information officer for the U.S. federal government's Executive Branch, and leading efforts that catalyzed a nationwide grassroots movement that laid USA groundwork for “e-government”}. He lives in Portola Valley, a town in the Silicon Valley region of California, USA.

Field Torsion Evidence from the Poles and Singularities of the Space-Time

Prof. Dr. FranciscoBulnes

IINAMEI, Research Department in Mathematics and Engineering, TESCHA, Chalco, Mexico

ABSTRACT:

All field sources are identified as poles or singularities in the complex Riemannian manifold model of the space-time, such that their integrals can calculate their value through the Cauchy type integrals as the Conway integrals to any loop generated in the local causal structure of the space-time around of thesefields.Theintegralsaresolutionsofthespinorequationassociatedto the corresponding twist or field equation. A theorem is mentioned on the evidence of field torsion as field in variant and geo metrical in variant in poles of Cauchy type integrals in spin or-twist or frame, through of the energy spectra. Then an immediate result is that torsion existence in the space-time induces gravitationalwavesinaprojectivebundle.Sourcesareevidenceatleastlocally of torsion existence. Then exists curvature here. A recently observational fact (Astrophysical and Astronomic observation) is included showed the conjectures and theorem proved.

BIOGRAPHY:

DR. FRANCISCO BULNES, PhD, PostDocs, Doctor H. C., HonDSc, zbMATH, MathSci PhD in Mathematical Sciences, IM/UNAM. IINAMEI Director, Mathematics Research Centre in Mexico, 2015-Actually. Pioneer in curvature energy theory, formal theory of engineering and mathematical theory of nanotechnology. Editor-in-Chief of Journals of Mathematics, in USA, and India, 2015- Actually. Member of various international committees of science. Reviewer of British journals of mathematics and physics in SCOPUS; Head of Research Department, GITESCHA. Numerous papers (more than 150) in mathematics and physics research journals, and author of much books of mathematics and physics. Recognised and famous in East Europe, Asia, Arab continents. He has many theories, theorems, math objects with his name. He has received various honors and awards (Doctorates Honoris Causa) by universities and

NGO's, likewise GO's. He received the Doctor Honoris Causa in Education Philosophy and Peace Ambassador by ODAEE in Frankfurt, Germany. Also is Czech Republic Mathematics Society distinguished member (JCFM). He has two post-doctorates in Cuba and Russia in mathematics. Many international awards and badges (more than 70) as Publons badge, SCOPUS, ZbMath, Thomsom Reuters, MathSci, ORCID, Peace Ambassador and others. His biography appear and has been published in many books of the United Kingdom, India, China, Russia, Ukraine, USA, Spain and Mexico. He has received various tributes from publishing houses in United Kingdom and others. Also he has advanced research in electronics, micro-electronics, nanomedicine and spintronics. www.iinamei.com.mx

The Influence of Wellbeing Factors on Urban Planning History

Pilar M Guerrieri

Theme: Urban Infrastructure Planning

Speakers: Pilar M Guerrieri, Historian of Architecture and Urban Planning, Department of Architecture and Urban Studies (DASTU), Politecnico di Milano, via Bonardi 3, 20133, Milan; pilar.guerrieri@polimi.it (corresponding author)

Keywords: Urban history, sustainable planning, sustainable infrastructure, urban environmental wellbeing

ABSTRACT:

The relationship between cities and the well-being of their inhabitants has historically been a key factor in urban design and has become an increasingly relevant topic in contemporary discourse. This paper examines the evolution of planning approaches and strategies to enhance citizens' well-being, drawing on comparative examples from different periods and different urban realities. The prioritisation of well-being has consistently, directly or indirectly, influenced urban planning decisions made by politicians, ruling bodies and policymakers. However, variations exist in terms of the scale, focus, and public accessibility of these interventions and the extent to which they address environmental issues. Urban planning has long grappled with welfare-related concerns, particularly those connected to public health and quality of life. This contribution compares present and past significant urban case studies exploring theoretical frameworks and practical methodologies concerning well-being and sustainable urban planning to foster critical thinking in the contemporary debate. The analysis spans interventions at the city-wide level and at the micro-scale of neighbourhoods, offering insights into the feasibility and impacts of such initiatives.

BIOGRAPHY:

Dr Pilar Maria Guerrieri holds a PhD with honours in 'Architectural Composition, History and Theory' from Politecnico di Milano, in collaboration with the Indian National Trust for Art and Cultural Heritage in Delhi and Westminster University in London. She is an Architectural Historian, particularly interested in re-reading pregnant contemporary issues from a historical perspective to give them a new light and a wider understanding. She has been extensively studying the development of megacities and the effects of cultural exchanges, exploring the meaning of terms such as 'tradition', 'identity' and 'heritage', and she is now interested in the relationship between city, environment and human well-being. Pilar since she finished her PhD is teaching, she has been teaching 'History and Theory of Architecture and Human Settlements' in Delhi at the Italian-Indian GD Goenka University, branch of Politecnico di Milano in India, and she is now teaching 'History of Architecture and Urban Planning', at Politecnico di Milano (DASTU) in Italy. She has been published in several international journals, participated at national and international conferences. She is the author of the book Maps of Delhi (Niyogi, 2017) and Negotiating Cultures: Delhi's Architecture and Planning from 1912 to 1962 (Oxford University Press, 2018), Architettura di Egizio Nichelli (1937-1991), (Franco Angeli, 2022), Post Western Histories of Architecture, with Marco Biraghi, (Routledge, 2023).

Characterizing Magnetic and Velocity Fluctuations in Earth's Tail Plasma Sheet with a Machine Learning-Based Magnetotail Region Classifier

Lingqian Zhang[1] Jiye Wang[1,2], Xuan Liu[2]

1 State Key Laboratory of Solar Activity and Space Weather, National Space Science Center, Chinese Academy of Sciences, Beijing, 100080, China
2 Information Engineering College, Central University for Nationalities, Beijing, 100081, China
Email: Lqzhang@nssc.ac.cn
Tel:15910889092

ABSTRACT:

The magnetic and velocity fluctuations in Earth's turbulent plasma sheet are systematically investigated using Magnetospheric Multiscale (MMS) mission observations from its 2016 magnetotail campaign. By employing a newly developed machine learning-based Hybrid Filter-Decision Tree Model (HFDTM), we classify the magnetotail (X < -10 RE) into four distinct regions: current sheet (CS), central plasma sheet (CPS), plasma sheet boundary layer (PSBL), and tail lobe. Within each region, fluctuations are further categorized by flow velocity: (1) stagnant plasma sheet (VX< 50 km/s), (2) sub-Alfvénic flow (50 km/s < V < VA), and (3) super-Alfvénic flow (V > VA). Statistical analysis of cross-region anisotropy, correlation, and cross-helicity (σC) reveals that plasma sheet turbulence predominantly exhibits isotropy, low correlation, and low cross-helicity characteristics distinct from Alfvénic turbulence. Comparative analysis with WIND observations at 1 AU demonstrates fundamental differences between solar wind turbulence and plasma sheet turbulence, particularly in super-Alfvénic flows, highlighting the unique non-Alfvénic nature of plasma sheet dynamics.

BIOGRAPHY:

L. Q. Zhang is an Associate Professor at the National Space Science Center, Chinese Academy of Sciences. She received her Ph.D. in Space Physics from NSSC and conducted postdoctoral research at the State Key Laboratory of Solar Activity and Space Weather. Dr. Zhang's research focuses on fundamental plasma processes in Earth's magnetosphere, particularly magnetic reconnection and turbulence phenomena in the magnetotail and solar wind environments. Her work has advanced understanding of these dynamic processes through over thirty peer-reviewed publications in journals including Geophysical Research Letters and Journal of Geophysical Research. Currently, she is exploring machine learning applications in space physics, developing analytical approaches to study solar wind-magnetosphere coupling processes. Dr. Zhang maintains particular interest in developing computational methods to characterize dayside magnetopause and nightside plasma sheet dynamics.

White Hole Formation: Radiation-Induced Polymerization

Yang I. Cao

Independent
Email:ypach@yangpachankis.us
Tel: +41 77 924 20 15

ABSTRACT:

The research complements the gravitational null result of the black hole and white hole thermonuclear binding (BH=WH) research experiments. The literature analyses simplified the complexities of relativistic astrophysics by Lorentz transformation, and cosmochemistry processes are considered to be similar to those known on earth, specifically nuclear chemistry. With high affinities between the analyses and the phenomena observed in the past researches, this research finds copolymerization on BH=WH is the most plausible explanation to the origins of the finite and varied lifeforms on earth. Layers of mass of black holes and white holes are shaped by copolymerization and adhesion by surface tension, with enthalpy variation conditions sustained by thermal exchange between fusion and fission plasmas. I further discuss the possibilities of causal inference evidence in the system in determining the order of formation of black holes and white holes, and conclude with the thermonuclear sensitivities of the subject matter.

BIOGRAPHY:

Yang I. Cao, independent researcher.

Yang I. Cao engaged in nonproliferation and electromagnetic warfare research since 2010 on the environmental determinants of health after graduation from the Communication University of China. Hisearly paradigm takes nuclear physics and nuclear chemistry perspectives in biomedical sciences, and reserved the theory of black hole and white hole thermonuclear binding shaped from high school. He kept his interests in cosmology, astrophysics, and astrobiology that answer to the fundamental existential questions. Due to his graduate research's subject

matter before the consequential power consolidation with the P. R. China's constitutions, he continued knowledge production upon the COVID-19 lockdowns. He's been acknowledged by the international academic community Masters & Ph.D. in global governance, cosmology afterwards, and is a member of the Sigma Xi Honor Society.