7th edition of the cross-disciplinary International Summer School INFIERI series

Report of Contributions

https://indico.cern.ch/e/infierisch23

Contribution ID: **1** Type: **not specified**

Arrival of school attendants

Sunday, 27 August 2023 12:00 (10 hours)

Contribution ID: **2** Type: **not specified**

KEYNOTE1: Introduction to Quantum Mechanics

Contribution ID: **3** Type: **not specified**

KEYNOTE2: PARTICLE PHYSICS : A QUANTUM SCIENCE

Tuesday, 29 August 2023 17:30 (2 hours)

CHAIRED by: Dr. Ozgur Mehmet Sahin (CEA-IRFU, University Paris-Saclay)

Abstract: Quantum science emerged from studies of the smallest objects in nature. Today, it promises to deepen our understanding of the universe and deliver groundbreaking technology, from quantum computers to ultra-precise measuring devices to next-generation materials, quantum sensing, quantum communication with the many interesting applications in quantum cryptography for instance. The basic concepts underlying the field of quantum science, including superposition, entanglement, and the uncertainty principle are indeed the basics for developing such novel technological approaches and application. This keynote will recall how quantum Physics principles and our understanding of them are harnessed to benefit society and catalyze new research across disciplines as well as great prospects in technological developments.

Lecturer: Marcela Carena is a distinguished scientist and the head of the Theoretical Physics Department at the Fermi National Accelerator Laboratory in Batavia, Illinois. She received her Diploma in Physics from the Instituto Balseiro of Bariloche, Argentina, and her Ph.D. in Physics from the University of Hamburg. She was a John Stuart Bell Fellow at CERN, was awarded a Marie Curie Fellowship, and she was a CERN staff member in 1999-2000. She has been a Professor of Physics at the University of Chicago since 2008, where she is both a member of the Enrico Fermi Institute and the Kavli Institute for Cosmological Physics (Text informed by Lecturer)..
More info on Prof. Carena's research and teaching activities, in the Link here below.

Presenter: Prof. CARENA, Marcela (FNAL Theory Dept Head and University of Chicago)

Contribution ID: **4** Type: **not specified**

KEYNOTE3: High Field Magnets and Multifaceted Applications

Wednesday, 30 August 2023 17:30 (2 hours)

CHAIRED by Vinicius Njaim Duarte (PPPL, Princeton, USA)

This keynote will review three main facets of the High Field Magnet technology, were indeed they are essentiel:
1) Application to the future colliders under study: the muon colliders and the high energy hadron colliders
2) Application to MRI (the highest field magnet for MRI is the one developed at Saclay CEA for NEUROSPIN, 11.7 Tesla)
3) Application to Fusion.
The synergy and common interest in this ttechnology leads to an active and worldwide R&D.

Speaker: Pierre Vedrine is a renowned Accelerator Physicist, the Head of the Division on Accelerators, Cryogenics and Magnets, DACM, at the Institute of Research in the Fundamental Laws of the Universe, IRFU, at the Commissariat of Atomic Energy CEA in France.
His many expertise and achievements include Accelerator Physics in some of the main worldwide projects e.g. development of novel magnets such as the toroidal filed magnet equipping the muon detector system of ATLAS or the 4 Tesla magnet of CMS, the developments of magnets for a number of wordwide accelerators currently running e.g. LHC in development HL-LHC or in project (Linear electron positron, circular high energy electron collider, etc..). He launched and built the high field, 11.7 Teslas for the new MRI at NEUROSPIN, currently the world record highest MRI field magnet. He started his career at the JET and carry on with his Division the development on new high filed magnets especially the High temperature magnets with application to Nuclear Fusion as well as high energy accelerators in project.

Presenter: VEDRINE, Pierre (Université Paris-Saclay (FR))

Contribution ID: **5** Type: **not specified**

KEYNOTE4: High Energy Muon and Hadron Collider Projects within the overall future accelerator panorama

Thursday, 31 August 2023 17:30 (1h 30m)

CHAIRED by: Dr.Nadia Pastrone (INFN-Torino, IT)

Abstract: Beyond the successful completion of the high-luminosity LHC, the ESPPU (European Strategy for Particle Physics Update) identified an e+e–Higgs factory as the highest priority future collider, and tasked CERN to undertake a feasibility study for a hadron collider operating at the highest possible energies, with a Higgs factory as a possible first stage (FCC). China is developing a similar startegy with the CepC followed by the SppC high energy hadron collider. Linear collider Higgs factory options as ILC and CLIC are studied in parallel. An international muon collider collaboration addresses the challenges of constructing a future 3-10 TeV muon collider.
Although accelerator R&D is necessarily a long-term endeavour, the European LDG (Lab Directors Group) roadmap focuses on the shorter but crucial timescale of the next five-to-ten years. It concentrates on the five key objectives identified in the ESPPU: further development of high-field superconducting magnets; advanced technologies for superconducting and normal-conducting radio-frequency (RF) structures; development and exploitation of laser/plasma-acceleration techniques; studies and developments towards future bright muon beams and muon colliders; and the advancement and exploitation of energy-recovery linear accelerator technology.
This keynote will first describe the overall panorama of the future accelerators starting with the e+e- Higgs factory options. The speaker will then expand on two main accelerators options that are also actively studied as part of the abovementioned accelerator roadmap: a high energy muon collider (3 to 10 TeV) and a high energy hadron collider at 100 TeV. A high energy Muon collider R&D is studied both in Europe and USA; a high energy hadron collider is studied both at CERN (FCC-hh) and in China (SppC). Both accelerator options are linked to the development of high field magnets; this is the subject of another keynote in this school. Besides, the introductory theoretical presentation by Carlos Wagner stresses the physics potential with these colliders, and the lecture by Nadia Pastrone will discuss the experimental set-ups needed to confront the new challenges imposed on the detectors of these colliders.

Lecturer: : Steinar Stapnes is a Professor at the Department of Physics of the Faculty of Mathematics and Natural Sciences at the University of Oslo (Norway). He is currently Linear Collider Study Leader and Research Scientist at CERN. He was deeply involved in the construction of the ATLAS experiment at CERN, where he acted as Co-Deputy Spokeperson. The last decade he has been involved on the development of future accelerators, primarily the CLIC high energy e+e- linear accelerator project and ILC. He is leader of the International Muon Collider Collaboration Steering Group and member of the International Advisory Committee for the CepC project in China (text informed by the lecturer).

Presenter: Prof. STAPNES, Steinar (CERN (CH) and University of Oslo (NO))

Contribution ID: **6** Type: **not specified**

KEYNOTE5: Future in Neutrino Physics

Friday, 1 September 2023 17:30 (2 hours)

Chaired by Prof. Stefan Soldner-Rembold (Manchaster U, Head of the Physics Department)

Abstract: In this lecture we look forward, beyond the next generation giant neutrino experiments presently under contraction, T2HK and DUNE, and will explore the landscape of experiments and facilities that are in preparation or being considered for precision oscillation studies and could become 'next-to next' generation experiments, depending on the open questions in neutrino physics that will emerge at the time. We will also e.g. look forward to planned experiments for measuring properties of neutrinos such as mass measurements or the Majorana/Dirac nature of this fundamental particle.
Next, we report on opportunities offered by colliders as neutrino factories, the first pathfinder experiments of which that have produced first results in 2023 at the LHC namely the FASER and SND@LHC experiments. A proposal for a dedicated TeV neutrino detector facility at CERN for the High-luminosity LHC to take data in 2030 is being prepared.
These activities will be very inspiring for the long-term plans of future high energy colliders at CERN or elsewhere.
Finally a very important part of the present and future neutrino program will be the study of neutrinos from the sky with large detectors in the ice or water, such as IceCube and KM3NET.
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Lecturer: Prof. Dr. Albert De Roeck is a senior research scientist and staff member of the largest particle physics laboratory in the world, CERN, home of the Large Hadron Collider (LHC). De Roeck is also a professor at the University of Antwerp (Belgium) and a visiting professor at UC Davis, the British University in Cairo (Egypt) and NTU in Singapore. He obtained his PhD at the university of Antwerp on an experiment at CERN, studying the multi-particle dynamics in hadron-hadron interactions. De Roeck spent then 10 years at DESY (Germany) where he and his team made very precise measurements of the quark and gluon structure of the proton, and precise tests of the strong force. At the end of the 90's his interest turned to the possibility to discover new physics at future particle colliders, in particular Supersymmetry and Extra Dimensions, and returned to CERN. He first joined an experiment at the large electron-positron collider LEP, studying the strong force and searching for signals of new physics. He played a significant role in the preparation of one of the experiments at the LHC: the Compact Muon Solenoid (CMS) (2000-2009). De Roeck has become one the leaders in the CMS/LHC physics program, actively involved in physics analyses. He was deputy spokesperson at CMS (2010-2011), and convener of the Higgs search physics group (2012-2013) with a leading role in the Higgs discovery (July 2012).
At the LHC he is a leader of the long-lived particle search effort and involved in several new experiments such as SND@LHC and FPF (Forward Physics Facility). He leads the neutrino physics group at CERN (since 2017) and is an active member in the DUNE and ICARUS experiments in the US and the T2K experiment in Japan (text informed by the Lecturer).
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Photos one during Albert's keynote with Stefan chairing this keynote session and the other photo taken at the end of Albert's keynote (courtesy Douglas Novaes)

Presenter: Prof. DE ROECK, Albert (CERN)

Contribution ID: **7** Type: **not specified**

KEYNOTE6: GREEN HYDROGEN and NUCLEAR FISSION : AN EMERGING NEW INDUSTRIAL ERA

Saturday, 2 September 2023 17:30 (2 hours)

This session has just been modified to include an important new achievement on biofuels and Hydrogen energy: converting ethanol in hydrogen. This worlwide premiere has just been realized at the Research Center for Greenhouse Gas innovation RCGI, by POLI at USP. This is a center supported by FAPESP and SHELL.

THIS KEYNOTE SESSION IS CHAIRED by PROFESSOR JOSE ROBERTO PIQUEIRA (Polytechnic School at USP)

At the end of the keynote session and of the ENERGY DAY, a photo of the audience was taken with on the screen Prof. Meneghini who was on remote.

Contribution ID: **8** Type: **not specified**

SCHOOL BANQUET

Contribution ID: **9** Type: **not specified**

KEYNOTE7: Current and near-future space high energy astrophysics missions of China: eXTP as a showcase

Monday, 4 September 2023 17:30 (1h 30m)

Abstract: In this talk I will briefly introduce several on-going and near-future space X-ray astronomy missions of China: 1) Insight-HXMT X-ray mission (launched on June 15th, 2017, , mostly on X-ray binaries and GRBs); 2) GECAM (launched on December 10th of 2020, small satellites on GRBs and other transients from several keV to MeV); 3) SVOM (to be launched by the end of 2024, carrying optical and X-ray telescopes, a wide FoV hard X-ray imager and three gamma-ray monitors, mostly on GRBs and other transients); 4) EP (to be launched by the end of 2023, carrying many wide FoV lobster-eye X-ray telescopes and two narrow FoV X-ray follow-up telescopes, mostly on tidal disruption events, GRBs and many other transients); (5) CATCH (a proposed large constellation of small satellites carrying light-weight focusing X-ray telescopes, to follow and characterize many transients simultaneously, with the first path-finder satellites to be launched in 2023-2024); 6) POLAR-2 (the successor of POLAR operated on China's Tianggong-2 spacelab in 2016, to be placed onboard China's Space Station in 2024-2026, carrying GRB polarimeters covering several keV to several hundred keV energy range with spectroscopic and localization capabilities); (7) HERD (a large cosmic-ray experiment developed by a Sino-European consortium onboard China's Space Station for operation around 2027, with unprecedented acceptance and energy range for direct measurements of cosmic-rays, electrons and gamma-rays in space). Finally, I will present as a showcase the eXTP (enhanced X-ray Timing and Polarimetry) mission, a large X-ray observatory studying neutron stars, black holes and many other high energy explosions, developed by a large Sino-European consortium for launch around 2029, carrying large arrays of X-ray timing, spectroscopy and polarimetry telescopes, as well as a wide field monitor.

Lecturer: Current position: Director of Particle Astrophysics Division, Institute of High Energy Physics, Chinese Academy of Sciences; Chief Scientist of Space Science Research Division and Director of X-ray Imaging Laboratory of National Astronomical Observatories of China, Chinese Academy of Sciences.
Education and work experience: 1984, Bachelor Degree, Tsinghua University; 1989, PhD Degree, University of Southampton, U.K.; 1989-1992, Postdoctoral research associate, University of Pennsylvania, USA; 1992-1998, Senior scientist, Universities Space Research Association and NASA Marshall Space Flight Center, USA; 1998-2014, assistant, research associate professor and full professor, University of Alabama in Huntsville, USA; 2002-2009, Distinguished professor, Physics Department, Tsinghua University.
Awards & Honors: NASA Group Achievement Award; Zhao-Jiu-Zhang "Space Science Award"; National Distinguished Young Investigator of National Science Foundation of China; Copernicus Visiting Scientist Award, University of Ferrara, Italy; Yangtze Scholar Distinguished Professorship of the Ministry of Education of China; Distinguished Team Achievement Award of the Chinese Academy of sciences.
Space science projects: Principal Investigator of the Astronomy and Astrophysics Program of China's Space Station, POLAR experiment onboard China's TG-2 Spacelab (launched in Sept. 2016), the Insight-HXMT astronomy satellite mission (launched in June 2017), the future High Energy Cosmic-ray Detection (HERD) facility onboard China's Space Station and the future enhanced X-ray Timing and Polarimetry (eXTP) space observatory; Co-PI of the China-France Space Variable Object Monitor (SVOM) space astronomy mission (2024 launch); Science Advisor of the Einstein Probe X-ray satellite mission (2023 launch).

Publications: More than 400 refereed publications with more than 14000 citations.
Publication link: https://ui.adsabs.harvard.edu/public-libraries/lrpptWUZQAK5d_jLVRq16A (Text informed by the Lecturer)

Presenter: Prof. ZHANG, Shuang-Nan (Institute of High Energy Physics, IHEP, Beijing, and Chinese Academy of Sciences, CAS, CN)

Contribution ID: **10** Type: **not specified**

KEYNOTE8: Nanotechnology/NanoBiology/NanoMedicine Interplay

Abstracts:
Two Lectures
1. Introduction to physics of biological systems.
In this lecture I will summarise the current state of study of biological systems from a physicist perspective, going from the nanoscale of proteins and DNA and to their their assembly into whole organisms. I will also discuss briefly the implications for other fields, including computer science and materials science.
2. Bionanotechnology and medicine
In this lecture I will summarise the latest research at the interface of nanotechnology and medicine; this will include biosensing, nanomedicine , nanovaccines , tissue engineering and protein nanotechnology.

Lecturer: Sonia Contera is a Professor of Biological Physics at the University of Oxford, where she is also the associate head of the Department of Physics for Equality, Diversity and Inclusion.
She has lived in many countries, she got her undergrad degree in Physics in Madrid, and her PhD from Osaka University in Japan. She is an expert in atomic force microscopy and in mechanics in biology. She is also the author of the book "Nano comes to life: how nanotechnology is transforming medicine and the future of biology"(Text informed by the Lecturer).

Presenter: Prof. CONTERA, Sonia (Oxford, Physics Department, UK)

Contribution ID: **11** Type: **not specified**

KEYNOTE 9: EUCLID EUROPE's FLAGSHIP COSMOLOGY SPACE MISSION

Wednesday, 6 September 2023 17:30 (1h 30m)

CHAIRED by Prof. Yoshinobu Unno (KEK, Japan)

Two of the most challenging questions facing astrophysics and fundamental Physics are the natures of dark energy, the cause of the accelerated expansion of the Universe, and of dark matter, the dominant but unknown form of matter in the cosmos. The European Space Agency's (ESA) Euclid mission is a satellite dedicated to answering these questions.

Euclid was launched on July 1st, 2023 from Cape Canaveral on a SpaceX Falcon 9 rocket. From its observing station at the Sun-Earth Lagrange point 2 (L2), 1.5 million kilometers from Earth, it will survey the visible extragalactic sky over six years with a 1.2-meter telescope feeding two instruments: a broad-band visible imager (VIS, covering wavelengths 550-900 nm) and a near-infrared spectrometer and photometer (NISP, covering wavelengths 900-2000 nm) equipped with three imaging filters (YJH bands) and a slitless spectrograph (grism). This will give us images at an angular resolution approaching that of the Hubble Space Telescope, but covering 1/3 of the sky, as well as deep near infrared images and spectra - a rich astronomical survey promising important advances and discoveries.

Coupled with visible imaging data from several ground-based telescopes, Euclid will use observations of gravitational lensing - the distortion of distant galaxy images by foreground gravitational fields bending light rays - and of galaxy positions to accurately measure the large-scale distribution of matter (large-scale cosmic structure) and its evolution with time. This will tell us about the evolution, if any, of dark energy and about the nature of dark matter as it creates the large-scale structure of the Universe.

Led by ESA, with contributions from NASA, Euclid is a large international effort already spanning more than a decade.. The Euclid Consortium (EC) is responsible for delivering the two instruments and for the scientific exploitation of the mission. The EC regroups more than 2000 members in more than 15 countries across Europe, Canada, Japan, and the United States.

I will give an overview of the Euclid mission from inception to the present, including its scientific objectives, technical and operations design, and an update on current status and future milestones.

Prof. James G. Bartlett is Distinguished Professor of Physics at the Astroparticule et Cosmologie (APC) Laboratory of the Université Paris Cité. He is a cosmologist working on the origin and evolution of the Universe and its large-scale structure. He is was a member of the Planck satellite mission that measured the cosmic microwave background anisotropies, and is now member of the Euclid space mission and the Rubin/LSST experiment. He is head of the Cosmology and Euclid groups at APC.

Presenter: Prof. BARTLETT, James G. (Astroparticle and Cosmology Laboratory CNRS and Université Paris Cité, FR)

Contribution ID: **12** Type: **not specified**

KEYNOTE10: The Revolution of Quantum Technologies, status and prospects

Thursday, 7 September 2023 17:30 (1h 30m)

Chaired by Prof. Ricardo D'Elia Matheus (IFT-UNESP)

Lecturer: Bachelor and Master Degrees at PUC-Rio (Pontifical Catholic University), Paulo A. Nussenzveig achieved his PhD at the University Pierre et Marie Curie, Ecole Normale Superieure (ENS) in Paris (1994). He is Professor of Physics at the University of São Paulo (USP), Brazil, where he co-heads the Lab for Coherent Manipulation of Light and Atoms. His main scientific interest is in Quantum Optics and Quantum Information Science. He follows very closely discussions on scientific integrity, scientific dissemination, responsible research assessment. He is currently Provost for Research and Innovation at USP and promotes the concept of responsible research and innovation.

Presenter: Prof. NUSSENZVEIG, Paulo (Prorector of Science and Innovation, USP, BR)

Contribution ID: **13** Type: **not specified**

MENS SANA IN CORPORE SANO: RUNNING AND/OR SWIMMING RACE===> TOO "COLD WHEATHER TO RUN" SO LET's GO TO THE CHURRASCARIA

Friday, 8 September 2023 19:00 (3 hours)

THE RUNNING RACE IS A TRADITION IN THIS SCHOOL SERIES: STUDENTS , RESEARCHERS, PROFESSORS AND TECHNICAL STAFF ATTENDING THE SCHOOL ARE ALL ENCOURAGED TO PARTICIPATE.

BUT THIS YEAR, THIS TRADITION IS REPLACED BY ANOTHER ONE, LOCAL ONE, THE CHURRASCARIA... MORE PEOPLE VOLUNTEERING TO PARTICIPATE TO IT.

Contribution ID: **14** Type: **not specified**

FAREWELL PARTY

Contribution ID: **15** Type: **not specified**

Some Challenges of Contemporary Astrophysics

Tuesday, 29 August 2023 09:00 (1h 15m)

At the time where several programs both on Space (with new Space telescopes) and on Earth (with largest terrestrial observatories) are prepared or being launched, an exciting period is opened for crucial advances in the exploration of the Universe and understanding of crucial aspects such as indeed the Dark Energy and Dark Matter.

Lecturer: PhD in Astronomy by Universidade de São Paulo, USP (1989), and postdoctoral position at the Royal Greenwich Observatory (UK). Professor Laerte Sodre Junior is currently full professor at USP, and former Director of the Institute of Astronomy, Geophysics and Atmospheric Science, IAG. Various councils, Commissions and Consulting positions. Visiting scientist in places such as: Institute of Astrophysics of Paris, IAP, Observatory of Paris-Meudon, Institute of Astronomy and University of Cambridge in UK. He has a high skilled experience in Astronomy, focusing on Extragalactic Astrophysics, acting on the following subjects: clusters of galaxies, observational cosmology, evolution of galaxies, galaxy classification and gravitational lensing. He is currently participating to the Javalambre Photometric Local Universe Survey (J-PLUS) in North Hemisphere and to the Giant Magellan Telescope, GMT (Text informed by Lecturer on CV Lattes).

Presenter: Prof. SODRE, Laerte (Institute of Astrophysics and Geophysics, IAG, USP, BR)

Session Classification: Vision Introductory Lectures

Contribution ID: **16** Type: **not specified**

Introductory vision lecture on Elementary Particle Physics: Unexplored possible directions with High energy Hadron and Muon colliders and with Neutrino Titan experiments

Tuesday, 29 August 2023 11:45 (1h 15m)

Session Classification: Vision Introductory Lectures

Contribution ID: **17** Type: **not specified**

Mega-scale neutrino detectors: science and technological challenges

Thursday, 31 August 2023 09:00 (1h 30m)

Abstract: The lecture will introduce the technology and the science of the mega-scale neutrino experiments Hyper-Kamiokande and DUNE that are currently being built in Japan and the US. While the neutrino was discovered experimentally over 60 years ago, it has not given up all its secrets just yet. Oscillations between its flavour states are now well established and have been studied in detail in many experiments. An interesting hint from current experiments implies that neutrinos and antineutrinos may not oscillate in the same way, leading to possibly a strong CP violation effect in the neutrino sector. Such an observation would be extremely relevant for models attempting to explain the matter-antimatter asymmetry in the Universe. The next-generation neutrino experiments will address these and many other questions about the nature of the neutrino.

Lecturer: Professor and Head of the Department of Physics and Astronomy at the University of Manchester, United Kingdom.
Stefan Söldner-Rembold is a particle physicist whose research currently focuses on neutrino physics. He is member of the DUNE, MicroBooNE, SBND, IceCube-Gen2, and SuperNEMO Collaborations. He previously worked on high-energy collider and fixed target experiments at CERN, DESY, and Fermilab.

He graduated from the University of Bonn in 1987 and received his doctorate from the Technical University of Munich in 1992, with a research fellowship of the Max Planck Institute. He worked at the University of Freiburg from 1992 to 1999, where he received his Habilitation in 1996. He held a Heisenberg Fellowship of the German Research Foundation from 1999 to 2003 and was Scientific Associate at CERN from 2000 to 2001. Professor Söldner-Rembold joined the faculty of the University of Manchester in 2003.

Söldner-Rembold was Spokesperson of the DUNE Collaboration from 2018 to 2022 and of the Dzero Collaboration at the Tevatron Collider from 2009 to 2011. He is a Fellow of the American Physical Society and of the Institute of Physics; he received a Royal Society Wolfson Research Award, the James Chadwick Medal and Prize, and the Max Born Medal and Prize (text informed by the Lecturer)

Presenter: Prof. SOLDNER-REMBOLD, Stefan (University of Manchester (GB))

Session Classification: Intelligence on Instruments: The Particle Physics Case

Contribution ID: **18** Type: **not specified**

Detectors for Future High Energy Muon and Hadron Colliders: Main technological challeges, some proposed solutions and R&D

Thursday, 31 August 2023 11:20 (1h 40m)

Abstract: The lecture will review the Physics and environmental challenges to be confronted by experiments to successfully run at a high energy Muon (3 to 10 TeV) or a high energy Hadron proton-proton collider (100 or more TeV). This means new generation of tracking detectors (both microvertex, near the colliding region and outer detectors i.e. at large radius from the beam pipes), the calorimeters able to measure with high precision the energy deposits of the particles and to carry on the tracking of the particles (high granularity calorimetry), as well as the sophisticated triggering systems to select the events from a huge background and the data readout chain and data processing able to handle extremely large amount of data, all this in a rather "hostile" environment. The upgrades already underway for the High Luminosity LHC are pioneering advances in detectors technology as well as in the associated DSM electronics to build the "intelligent" front-end and in the data communication and big data to process the huge amount of data and extract the Physics results. This first stage in the upgrades of the LHC experiments (ALICE, ATLAS, CMS and LHCb) will be probably followed by a second stage upgrade towards 2035; this will be another step forward in the preparation of the experiments for these next generation accelerators.

To be noted: Hands-on Lab on detectors or related signal anddata processing R&D aspects for these future experiments are prepared for this school and will deepen the knowledge of the school attendants on the experimental challenges to be confronted in such accelerators environements (see INFIERI2023-Labs Booklett)

Lecturer: Dr Nadia Pastrone is the former Chaiperson of the 1st National Scientific Committee of INFN which coordinates the research activities of the institute in the field of high energy physics, former Head of the Italian participation to the CMS experiment at LHC.
Dr Pastrone is currently one of the leader and main instigator of the high energy Muon Collider project.(Text informed by the lecturer).

Presenter: Dr PASTRONE, Nadia (Universita e INFN Torino (IT))

Session Classification: Intelligence on Instruments: The Particle Physics Case

Contribution ID: **19** Type: **not specified**

The Square Km Array Observatory: A New step in Extremely Large Terrestrial Telescopes, Science and Instrumentation Challenges and breakthroughs

Friday, 1 September 2023 09:00 (1h 50m)

The SKAO is a next-generation radio astronomy-driven Big Data facility that will revolutionise our understanding of the Universe and the laws of fundamental physics. Enabled by cutting-edge technology, it promises to have a major impact on society, in science and beyond.

The SKA Observatory, or SKAO for short, is an intergovernmental organisation bringing together nations from around the world.
Its mission is to build and operate cutting-edge radio telescopes to transform our understanding of the Universe, and deliver benefits to society through global collaboration and innovation.
The observatory has a global footprint and consists of the SKAO Global Headquarters in the UK, the SKAO's two telescopes at radio-quiet sites in South Africa and Australia, and associated facilities to support the operations of the telescopes.

Lecturer: Dr Wendy Williams is a Scientist at the SKA Observatory Headquarters, at the Jodrell Bank site in Cheshire (UK), and part of the SKAO Science Team since July 2022. She hold a Postdoctoral Resarch Fellow at Leiden Observatory (2018-2022) and a Postdoctoral Research Assistant at the University of Hertfordshire (UK) (2015-2018) and graduated at Leiden University and Observatory (2015) after undergrad and Master studies at University of CapeTown (MsC Astronomy distinction) (Text informed by the Lecturer).

Presenter: Dr WILLIAMS, Wendy (SKAO Science Team, Jodrell-SKAHeadquarters, UK)

Session Classification: Intelligence on Instrumemts: The Astrophysics/Astronomy Case

Contribution ID: **20** Type: **not specified**

New Societal dilemna in Fundamental Research Projects

A number of new Fundamental Research Facilities are facing societal issues.They are indeed not new but take more and more importance as the consciousness of some societal aspects is increasing. They are not specific to this domain but impact many activity fields. It was thought to introduce this point in the School with some example case.

Presenter: Dr CUBY, Jean Gabriel (Institute of the Sciences of Universe at the National Center of Scientific Research, CNRS-INSU, France and Executive Director Canada-France-Hawaiʻi Telescope (CFHT) 65-1238 Mamalahoa Hwy Kamuela, HI 96743, USA)

Session Classification: Intelligence on Instrumemts: The Astrophysics/Astronomy Case

Contribution ID: **21** Type: **not specified**

New Spatial Projects

Session Classification: Intelligence on Instrumemts: The Astrophysics/Astronomy Case

Contribution ID: **22** Type: **not specified**

21cm cosmology and the BINGO radio telescope

Friday, 1 September 2023 11:20 (1 hour)

Abstract: In this talk I will present the current status of 21 cm cosmology and its capabilities to be used as a probe to determine cosmological parameters. The BINGO radio telescope is an instrument built in Brazil and led by Brazilian scientists, devoted to study the 21 cm emission and to detect baryon acoustic oscillations in the radio band.

Lecturer: Carlos Alexandre Wuensche has a Physics degree, a M.Sc. in Astrogeophysics and a Ph.D. in Cosmology. He is a senior researcher at INPE (National Institute for Space Research in Sao Jose dos Campos, BR), working at the Astrophysics Division and has done research in Cosmology, working mainly with CMB, Galactic diffuse emission, 21 cm cosmology and Instrumentation in Radio Astronomy. He has participated in several international projects linked to CMB since 1991.
He is also interested in Astrobiology, with a focus on habitability and astrochemistry. Dr. Wuensche occupied various administrative positions at INPE, including Head of the Astrophysics Division, academic coordinator of the graduate program in astrophysics and Head of Staff of INPE. Currently he is the scientific coordinator of the BINGO project, which aims to build a radio telescope in Brazil to measure the hydrogen distribution in the Universe and detect baryon acoustic oscillations (BAO) in the radio band (text informed by the Lecturer).

Presenter: Dr WUENSCHE, Carlos Alexandre (INPE, BR)

Session Classification: Intelligence on Instrumemts: The Astrophysics/Astronomy Case

Contribution ID: **23** Type: **not specified**

HPC and hardware heterogeneity, how to navigate in this environment?

Monday, 4 September 2023 09:00 (50 minutes)

Abstract: The need for large-scale models and simulations is more and more increasing, these last years. To provide support to process them, the High-Performance Computers are reaching Exascale capacities, most of them using accelerators. How to obtain better results with this increasing complexity of top computers? In this talk, I will discuss several topics related to performance improvements of applications, heterogeneous environments, and how to deal with their complexity.

To be noted: The school attendants will have the possibility to deepen their knowledge on this topic, thanks to the hands-on Lab prepared by Dr. Alfredo Goldmann (see INFIERI2023-Labs Booklett).

Lecturer: is a full time professor at São Paulo University, Institute of Mathematics and Statistics (IME). He finished his Ph.D. in France at Grenoble (November 99). Graduated with a BA in Applied Mathematics from the University of São Paulo (1990), MSc in Applied Mathematics from the University of São Paulo (1994) and Ph.D. in Informatique et Systèmes - Institut National De Polythecnique Grenoble (1999). He is currently associate professor at the University of São Paulo, associate editor of the journal Parallel Computing, part of the program committee of conferences like XP, IPDPS, IEEE NCA, ICPP, JSSPP, SBAC, SBRC, SBES and SBQS. He has experience in differents areas of Computer Science, mainly in the following topics: parallel and distributed computing, scheduling and agile software development (Text informed by the Lecturer).

Presenter: Prof. GOLDMAN, Alfredo (IME, USP, BR)

Session Classification: Big Data, Massive and High Performance Computing, Data transmission

Contribution ID: **24** Type: **not specified**

HPC INTEGRATION IN DATA INTENSIVE SCIENCE

Monday, 4 September 2023 09:50 (1h 5m)

Abstract: The High Luminosity LHC (HL-LHC) and the Square Kilometre Array (SKA) are both global scientific experiments that will produce Exabytes of data on a similar timescale and will require significant global resources to process and analyse their data. The CERN, SKAO, GÉANT and PRACE consortium was formed to address this burning need for computing resources and lay the foundation for High Performance Computing (HPC) adoption for fundamental research. Challenges ranging across authentication, authorisation, data transfer and access, and benchmarking and accounting are applicable to all big data fields on the path to Exascale computing. In this talk I will discuss developments to support the CERN use case in these cross-cutting areas of HPC integration, and their impact to future sciences.

Lecturer: David Southwick is a Computing Engineer and Fellow at CERN Openlab. During the past decade he has worked in the CMS experiment at the Large Hadron Collider (LHC) in areas of detector design, upgrades, and data acquisition systems. Currently he leads several efforts on the advancement of HPC computing for fundamental and Big Data sciences focused on the topics of data transmission and heterogeneous compute resources on the path to Exascale (Text informed by the Lecturer).

Presenter: Dr SOUTHWICK, David (CERN (CH))

Session Classification: Big Data, Massive and High Performance Computing, Data transmission

Contribution ID: **25** Type: **not specified**

Extreme scale dataflows in the compute continuum for the next generation of giant astronomical observatories

Monday, 4 September 2023 11:20 (50 minutes)

Abstract: The next generation of multi-science hubs such as the SKA are based on a highly challenging operating principle: they generate extreme scale data volumes to be processed and reduced in a guaranteed maximum time, while remaining as energy efficient as possible and operable for decades. To build these infrastructures, the complete digital continuum has to be realized, through a hierarchy of cyber-infrastructures, fed continuously by science sensors at the edge ; filtering, combining, processing and reducing continuous data streams in quasi real-time locally on supercomputers; and generating science grade data products to be delivered worldwide to a distributed community of scientists, relying on cloud infrastructures for high-level analysis. The challenges faced by international scientific communities in looking towards the implementation and exploitation of such experiments are driven by i) a paradigm shift to a dataflow model in which data streams have to be reduced in real-time before being discarded, ii) managing a new scale of data volumes, up to the multi-Exabyte as well as iii) fitting development, operations, maintenance and upgrades within a restricted cost and power envelope. In this talk, I will cover more quantitatively these challenges and will present the large scale R&D initiatives initiated at national and European levels to address them, federated under joint public-private laboratory: ECLAT.

Lecturer: Senior Research Scientist at Observatoire de Paris, CNRS.
Damien holds a PhD in Observational Astronomy from Université Paris-Diderot (2005). He has been an Adaptive Optics (AO) fellow, responsible for the last stages of commissioning of the Altair AO system on the Gemini North Telescope in Hawaii (2006) ; and an Instrument Scientist (2007-2008), for GeMS, the Gemini MCAO System, a facility featuring 6 Laser guide stars.
Since 2008, at Observatoire de Paris - PSL, Damien has been leading an original research program on high performance numerical techniques for astronomy including modeling, signal processing and instrumentation for large telescopes. He has been the P.I. of several large programs at national and European levels targeting AO Real-Time Controllers for giant optical telescopes with emerging computing technologies. Since 2021, with France officially joining SKAO, he is also getting strongly involved in the French effort dedicated to the construction of this giant radio-telescope. In particular, he is currently coordinating the implementation of ECLAT, a joint laboratory between CNRS, INRIA and Atos, as a long-term support structure federating resources from academic and industrial teams that will engage in the co-design work for the French contribution to the SKA (Text informed by the Lecturer).

Presenter: Prof. GRATADOUR, Damien (Observatoire de Paris (FR))

Session Classification: Big Data, Massive and High Performance Computing, Data transmission

Contribution ID: **26** Type: **not specified**

New data transmision means: The ELLA link as a new high speed high rate bridge between Europe and Latin America

Monday, 4 September 2023 12:10 (50 minutes)

EllaLink is a carrier neutral & open-access provider, a perfect partner for a telecoms operator looking to improve their existing customer's connectivity experience and to create a new range of products and solutions in their portfolio.
The EllaLink network has been specifically designed to address the increasing demand for a new low latency route between Europe and Latin America. Creating a direct data corridor between the two continents and onwards to Africa, the Middle East and Asia is our primary goal.
With open access at key interconnection points in Sao Paulo, Rio de Janeiro, Lisbon, Madrid and Marseille, EllaLink has selected strategic data center partners whilst maintaining neutrality for our customers.
Uptime is crucial for today's internet users and the EllaLink network has diversity built-in throughout, from our submarine cable route to our terrestrial paths, from building entry points right down to physical cabling.
At a time of constant change, bringing a reliable high-speed connection between Europe and Latin America is at the heart of all EllaLink solutions.

Besides, the BELLA link; BELLA-Building the Europe link to Latin America: the BELLA Programme provides support for the long-term interconnectivity of European and Latin American research and education communities through 'EllaLink', a new 6 000 km submarine cable.

Lecturer: Rafael Lozano is ELLA Link Country Manager, Administrator of the Brazilian end of the newest optic fiber cable since June 2019. This caEuble links rope with South America, providing the highest speed and availability, with the lowest delay between continents, since August 2021 (Text informed by the Lecturer).

Presenter: LOZANO, Rafael (ELLA Link Counrty Manager)

Session Classification: Big Data, Massive and High Performance Computing, Data transmission

Contribution ID: **27** Type: **not specified**

Introduction to Integrated Photonics and Silicon Photonics

Tuesday, 5 September 2023 09:00 (1h 40m)

Abstract:
Photonics is defined as the field of science and engineering that involves the precise manipulation of light, and particularly at a microscopic level (i.e. the scale of the wavelength of light). One of the key technologies that enable this field is the use of Photonic Integrated Circuits, i.e. chips which make it possible to generate, guide, distribute, diffract, filter, modulate and detect light. By using chip technology, integrated photonics enjoys the same benefits of integrated electronics: smaller form factor, lower energy consumption, better stability, en potentially lower cost and large-volume manufacturing.
In this lecture, we will cover the basics of photonic integrated circuits, the basic operational principles, the various functions we want to perform and the different technological implementations. We will also explore the different applications for photonic chips.
We will then dive deeper into one particular technology platform for photonic circuits: silicon photonics. Silicon photonics builds on the materials and manufacturing infrastructure for CMOS electronics, and even though silicon is not the most ideal material for most optical functions, it has become a key driver for the use of photonic circuit, especially powering the growing communication networks in datacenters.

Lecturer: Wim Bogaerts is a professor in the Photonics Research Group at Ghent University and the IMEC nanotechnology research center in Belgium. He completed his PhD in 2004, pioneering the use of industrial CMOS fabrication tools to build photonic circuits. Between 2000 and 2010, he was the driver behind the buildup of IMEC's silicon photonics technology. In parallel, he started developing design automation tools to implement complex silicon photonic circuits. In 2014, he co-founded Luceda Photonics, bringing the design tool IPKISS to the market. Since 2016 he is back full-time at Ghent University and IMEC on research grant of the European Research Council, focuses on the challenges for large-scale photonic circuits and the new field of programmable photonics. He is an IEEE Fellow, and senior member of OSA and SPIE (Text informed by the Lecturer).

To be noticed: The school attendants will have the possibility to deepen their knowledge on this topic thanks to the Hands-on-Laboratory related to this lecture and developed by Prof. Wim Bogaerts (see the INFIERI2023-Labs Booklett)

Presenter: Prof. BOGAERTS, Wim (Gent University and IMEC (BE))

Session Classification: Introduction to the Photonics World

Contribution ID: **28** Type: **not specified**

Harnessing optical non-linearities with integrated photonic structures

Tuesday, 5 September 2023 11:00 (1 hour)

Abstract: The confinement of light in optical microguides and cavities enables us to achieve exotic regimes of nonlinear optics, even with low power levels. Specifically, by recirculating light in optical microcavities, the intensity of the stored field can be increased by thousands of times compared to the incident field, resulting in amplified interaction between light and matter. In this lecture, I will introduce fundamental concepts on this subject and review our recent progress in this area, with a focus on new findings, such as the investigation of nonlinear dynamics of vibrational modes and the generation of novel optical and mechanical frequencies. Additionally, I will discuss their implications in second-generation quantum technologies.

Lecturer: Gustavo Wiederhecker holds an Associate Professor position at the University of Campinas, his research laboratory targets at harnessing nonlinear optical phenomena within microphotonic devices, with emphasis in the interaction between light and mechanical waves. He has been elected an affiliate member of the Brazilian Academy of Sciences for the 2019-2024 term. Before joining University of Campinas in 2011, he earned his B.Sc and Ph.D degrees in Physics from the same University and has been a postdoctoral fellow at Cornell University from 2008-2011. His Ph.D thesis has been awarded with the "Grande Prêmio CAPES José Leite Lopes" on 2009. (Text informed by the Lecturer).

Presenter: Prof. WIEDERHECKER, Gustavo (Gleb Wataghin Institute of Physics of the University of Campinas, IFGW-UNICAMP)

Session Classification: Introduction to the Photonics World

Contribution ID: **29** Type: **not specified**

Wireless Communication

Tuesday, 5 September 2023 12:00 (50 minutes)

Abstract: Wireless data and power transmission is a necessity and a challenge in the High Energy Physics (HEP) community: a necessity because it will end up with the cabling and will accelerate the triggering process, a challenge because it requires high rate data transmission, especially in the tracker detector region (close to the interaction point between the two beams of particles) of the present and future detectors. Millimetre waves for wireless communication seem a good candidate as it allows large bandwidth however, it imposes some constraints.
The WADAPT (Wireless Allowing Data and Power Transfer) collaboration started a R&D program with different laboratories around the world. The main results of this collaboration will be presented as well as the present and future studies.

Lecturer: Dr Yan Benhammou is a researcher at the Tel Aviv University. He mainly worked in CMS and ATLAS, the two largest experiments at the Large Hadron Collider (LHC) at CERN on the detector development and spent time at CERN leading some ATLAS detector upgrade. In parallel, he worked on silicon and GaAs detectors and developed ultra thin sensors for forward calorimetry in future accelerators. These detectors will be used in the future LUXE (LUXE stands for Laser and XFEL experiment at DESY, using the XFEL, a 3.4 kms long X-Ray laser beam, to study Quantum Electrodynamics (QED) in the strong-field regime where QED becomes non-perturbative). In the two last years, he is also involved in the wireless transmission (see here below).(Text informed by the Lecturer).

Presenter: Dr BENHAMMOU, Yan (Tel Aviv University (IL))

Session Classification: Introduction to the Photonics World

Contribution ID: **30** Type: **not specified**

HARNESSING ENERGY: THE ONLY SOLUTION FOR A VIABLE FUTURE

Saturday, 2 September 2023 09:00 (50 minutes)

Abstract: In the current rise of environmental challenges and depletion of conventional energy sources the quest for a viable future requires a profound transformation in the world's energy landscape. This seminar will explore definitions, conventional and renewable sources, storage, integration of smart grids, optimisation of resource utilization and minimisation of waste. Emphasis will be given on the importance of education and on the global contribution to a fast and efficient energy transition.

Lecturer: Cinzia Da Vià is a Professor of Physics at the University of Manchester UK, and currently a visiting Professor at Stony Brook University USA.
She is an expert in innovative radiation detectors for High-Energy Physics and Medical applications. She is the co-chair of the Independent
Committee of the ATTRACT Initiative to promote Radiation Imaging Technology research across different fields of application in Europe.
She is a member of Institute of Electrical and Electronic Engineering, (IEEE), Nuclear and Plasma Society (NPSS) Transnational Committee, representing the United Kingdom and the 2019 Nuclear Science Symposium Chair. Since 2022 she is the NPSS liaison to the IEEE Technical
Activities Board Program on Climate Change and a member of the Technical and Innovation Group of the European Physical Society. She is the Chief Editor of the Frontiers in Physics Radiation Detector and Imaging Journal (Text informed by Lecturer).

Presenter: Prof. DA VIA, Cinzia (University of Manchester (GB))

Session Classification: NEW ENERGIES DAY

Contribution ID: **31** Type: **not specified**

ENERGY WHAT DOES IT MEAN AND WHAT IS THE MAIN CHALLENGE?

Lecturer: Dr Frederick Bordry is the former Director for Accelerators and Technology at CERN (until December 2020). Today, an honorary member of CERN, he is an advisor to the Director General of CERN.
He is scientific advisor to several institutions, industries, and start-ups. He is the CTO (Chief Technology Officer) of Gauss Fusion and scientific advisor to Transmutex.
He is an auditor at IHEST (Institute of Advanced Studies for Science and Technology: https://www.ihest.fr/).
He is scientific advisor to the OPECST (Parliamentary Office for the Evaluation of Scientific and Technological Choices).
To complete, see also the resume about F. Bordry in the attached file here below (Text informed by the Lecturer).
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abstract: Energy is, of course, at the heart of our life. It encompasses the ability to do work, for plants to grow,
for animals to think or move and for machines to displace or fashion anything. Energy is the fundamental underpinning of life.
To have a constructive debate on energy, it is important to remember the definition of energy as a physical quantity and to not mix power and energy, to know the different sources of primary energy, what an energy vector—such as electricity—is, the orders of magnitude of these different energies and their CO2 emissions.
After these reminders, the presentation will discuss the major challenge which is to reduce CO2 emissions by 50 percent before 2030 and 100 hundred percent before 2050—today, 50 billion tons of CO2 each year—by providing our civilisation with sustainable, carbon-free energies.
This presentation aims to introduce this day on energy and in particular the following talks on biofuels, hydrogen, fission and fusion nuclear energies.

Presenter: Dr BORDRY, Frederick

Session Classification: NEW ENERGIES DAY

Contribution ID: **32** Type: **not specified**

RENEWABLE ENERGIES:BIOFUELS/AGROFUELS & HYDROGEN ENERGIES, STATUS AND FUTURE PROSPECTS:

Saturday, 2 September 2023 09:50 (1h 20m)

Session Classification: NEW ENERGIES DAY

Contribution ID: **33** Type: **not specified**

INTRODUCTION TO NUCLEAR FISSION: PROCESS, PRESENT STATE OF THE ART AND THE RMB PROJECT IN BRAZIL,

Saturday, 2 September 2023 11:30 (40 minutes)

Abstract:
The Brazilian Nuclear Energy Commission (CNEN) decided to construct a new research reactor, named RMB (Brazilian Multipurpose Reactor). This reactor will be part of a new nuclear research center, to be built on a site about 100 kilometers from São Paulo city, in the southeast part of Brazil. It is a 30 MW open pool-type research reactor using low enriched uranium fuel, and several associated facilities and laboratories: to produce radioisotopes for medical and industrial use; to use thermal and cold neutron beams in scientific and technological research; to perform neutron activation analysis; and to perform materials and fuel irradiation tests.
This presentation will cover details of the RMB Project and its implementation. The reactor core design for the multipurpose utilization will be explored, emphasizing the technical aspects of the in core and out of core experiments.

To be noted: The school attendants will have the possibility to deepen their knowledge on this topic, thanks to the hands-on Lab prepared by Dr. F. Genezini and colleagues at the reactor at IPEN-CNEN(see INFIERI2023-Labs Booklett).

Lecturer: Dr Jose Parrotta is a Civil Engineer, MSc in Nuclear Engineering, DSc in Nuclear Technology, working in nuclear technology area since 1978. Joined the Institute of Energy and Nuclear Research (IPEN) of the Brazilian Nuclear Energy National Commission (CNEN) in 1983 where retired in June 2022 receiving the title of Emeritus Researcher. Have performed several technical, management and coordination functions, among the main ones: Head of the Nuclear Reactor Core Engineering Division (IPEN); Head of the Nuclear Engineering Center (IPEN); Coordinator of the Fuel Cell and Hydrogen Program (IPEN); Director of Special Projects (IPEN); Director of Research and Development (CNEN); Member of the IPEN High-Level Council; Advisor to the CNEN Presidency; and Technical Coordinator of the Brazilian Multipurpose Reactor Enterprise (RMB –CNEN) (Text informed by the Lecturer).

Presenter: Dr PERROTTA, Jose (IPEN-CNEN, BR)

Session Classification: NEW ENERGIES DAY

Contribution ID: **34** Type: **not specified**

INTRODUCTION TO NUCLEAR FUSION: PROCESS, PRESENT STATE OF THE ART

Saturday, 2 September 2023 12:10 (45 minutes)

Abstract: In this lecture, some principles of nuclear fusion and plasma physics will be presented. Special attention will be given to magnetic confinement fusion, which is nowadays the most developed method of confining hot thermonuclear plasmas. In addition, a brief overview of the state of the art on magnetic confinement fusion is provided. At the end, an overview about the newly growing fusion industry is provided, including a short description of the new methods for achieving fusion that have being proposed by different fusion companies.

To be noted: The school attendants will have the possibility to deepen their knowledge on this topic, thanks to the hands-on Lab prepared by Prof. Gustavo Paganini Canal et al. at the Tokamak Lab at the Physics Institute at USP (see INFIERI2023-Labs Booklett).

Lecturer: PhD in Plasma Physics from the École Polytechnique Fédérale de Lausanne, Switzerland, Postdoc at the General Atomics - Fusion Division, San Diego - USA, with a long term appointment at the Princeton Plasma Physics Laboratory, USA. Dr. Gustavo Paganini Canal is Associate Professor at the Institute of Physics of the University of São Paulo, Brazil, and coordinator of the upgrade of the Brazilian tokamak - the TCABR. This upgrade will allow for unique and advanced studies on the suppression of violent plasma instabilities, termed edge localized modes, which can represent a threat to the development of nuclear fusion power plants. This upgrade project is also providing technological advances within the Brazilian private sector. Prof. Canal is also the coordinator of the Plasma Physics area of the Brazilian Physical Society and the first author of the Brazilian National Program for Nuclear Fusion (Text informed by the Lecturer)

Co-author: Prof. PAGANINI CANAL, Gustavo (Institute of Physics, USP, BR)

Presenter: Prof. PAGANINI CANAL, Gustavo (Institute of Physics, USP, BR)

Session Classification: NEW ENERGIES DAY

Contribution ID: **35** Type: **not specified**

LASER INDUCED FUSION BY INERTIAL CONFINMENT

Saturday, 2 September 2023 12:55 (20 minutes)

Abstract:Nuclear fusion has been pursued by mankind since the mid-20th century, and ignition has been obtained recently by laser inertial confinement, where 3MJ were liberated by a fuel pellet irradiated by 2MJ of laser light. There is still a long way to go before practical applications, and this lecture will present a simplified view of the inertial confinement fusion physics and the requirements to attain it, the difficulties to be overcome, and the future perspectives for laser fusion.

To be noted: The school attendants will have the possibility to deepen their knowledge on this topic, thanks to the hands-on Lab prepared by Dr. Ricardo Elgul Samad at the Center of Advanced Laser at IPEN-CNEN (see INFIERI2023-Labs Booklett).

Lecturer: Dr. Ricardo E. Samad is a Senior Researcher at the Nuclear and Energy Research Institute (IPEN-CNEN) is São Paulo, Brazil, where he has been working with the development and applications of solid state lasers for more than 30 years. He specialized in high intensity ultrashort laser pulses and their interaction with matter, having published on nonlinear effects, laser material modification and micromachining, harmonic generation and laser induced plasma formation. More recently, his group has started working on laser particle acceleration, studying the generation of electron bunches capable of inducing photonuclear reactions that produce radioisotopes for nuclear medicine (Text informed by the Lecturer).

Presenter: Dr ELGUD SAMAD, Ricardo (Center for Lasers and Applications, IPEN-CNEN, BR)

Session Classification: NEW ENERGIES DAY

Contribution ID: **36** Type: **not specified**

The University of Sao Paulo, USP, Sao Paulo State, BR

Monday, 28 August 2023 09:00 (30 minutes)

Professor Paulo Nussenzveig is the Pro-rector for Science and Inoovation of the University of Sao Paulo, USP, Physicist with main scientific interest in Quantum Optics and Quantum Information Science.

Presenter: Prof. NUSSENZVEIG, Paulo (Prorector of Science and Innovation, USP, BR)

Session Classification: Opening Day

Contribution ID: **37** Type: **not specified**

The Institute of Physics of the University of Sao Paulo

Monday, 28 August 2023 09:30 (20 minutes)

Professor Kaline Coutinho is the Director of the Physics Institute of USP, her research work expands on Theoretical Molecular Physics and its Modelling.

Presenter: Prof. COUTINHO, Kaline (Institute of Physics, USP, BR)

Session Classification: Opening Day

Contribution ID: **38** Type: **not specified**

The Institute of Astrophysics and Geophysics of USP

Monday, 28 August 2023 09:50 (20 minutes)

Prof. Beatriz Barbuy is the Vice-Director of IAG, USP, a renowned astrophysicist, member of academy of Science of Brazil, France and TWAS, Honorary Fellow of the Royal Astronomical Society, Honorary Member of the American Astronomical Society.

Presenter: Prof. SILVEIRA BARBUY, Beatriz Leonor (IAG, USP, BR)

Session Classification: Opening Day

Contribution ID: **39** Type: **not specified**

The Institute of Mathematics and Statistics of USP, IME, BR

Monday, 28 August 2023 10:10 (20 minutes)

Prof. Ronaldo Hashimoto is the Vice-Director of the Statistics and Mathematics Institute, IME, at USP, Professor at the Department of Computing Science.

Presenter: Prof. HASHIMOTO, Ronaldo (IME-USP, BR)

Session Classification: Opening Day

Contribution ID: **40** Type: **not specified**

Polytechnic School at USP (POLI)

Monday, 28 August 2023 10:30 (20 minutes)

Professor Silvio Ikuyo Nabeta is the Vice-Director of the Polytechnic School at USP, PhD at the Department of Energy and Electrical Automation,University of São Paulo; I. Nabeta is Full Professor at Department of Energy and Electrical Automation of Polytechnic School - University of São Paulo. He is currently director of Electrical Drives and Machines Laboratory. He has experience in Electrical Engineering with emphasis on electrical machines and power devices, acting on the following topics: electrical machines, finite element method.(Based on document published on 5 April 2023).

Presenter: Dr IKUYO NABETA, Silvio (Polytechnic School at USP, BR)

Session Classification: Opening Day

Contribution ID: **41** Type: **not specified**

Institute of Recherches on Energies and on Nuclear Energy from the National Center of Nuclear Energy, IPEN-CNEN, BR

Monday, 28 August 2023 11:10 (20 minutes)

Dr. Isolda Costa, is the Director of Research and Development at the Nuclear and Energy Research Institute (IPEN); her main topics of research interest are corrosion in aluminum alloys, stainless steels, biomaterials and surface treatments by clean technology processes.

In absence of both Drs Isolda Costa and Wilson Calvo, IPEN Superintendant, Dr. Ricardo Samad made the presentation of IPEN on their behalf.

Presenter: Dr ELGUD SAMAD, Ricardo (Center for Lasers and Applications, IPEN-CNEN, BR)

Session Classification: Opening Day

Contribution ID: **42** Type: **not specified**

Institute of Theoretical Physics (IFT) of the State University of Sao Paulo, UNESP

Monday, 28 August 2023 11:30 (20 minutes)

Prof. R. D'Elia Matheus is the Vice-Director of the IFT-UNESP, and expert in the Phenomenology of the Standard Model of Particle Physics and its extensions.

Presenter: Prof. D'ELIA MATHEUS, Ricardo (IFT-UNESP, BR)

Session Classification: Opening Day

Contribution ID: **43** Type: **not specified**

Maua Institute of Technology, IMT, Sao Paulo, BR

Monday, 28 August 2023 11:50 (20 minutes)

Prof Marcelo Nitz is the Pro-rector of the Maua Institute of Technology, IMT, at Sao Paulp.

Presenter: Prof. NITZ, Marcelo (Pro-rector Maua Institute of Technology)

Session Classification: Opening Day

Contribution ID: **44** Type: **not specified**

Tracking particles in space and time: the 4D tracking revolution

Wednesday, 30 August 2023 09:00 (1h 30m)

Abstract: In the past few years, two design innovations have radically changed the performance of silicon detectors and turned silicon sensors into high-resolution timing detectors, fit to meet the very demanding requirement of future 4D trackers. In this presentation,I will review the performance improvements that these two design innovations, low-gain (LGAD) and resistive read-out (RSD) [1], have brought to silicon sensors. Due to the LGAD mechanism, large signals lead to improved temporal precision, while charge sharing, due to the RSD design, has removed the need for very small pixels to achieve excellent spatial precision. LGAD- and RSD- based silicon sensors are now adopted, or considered, in several future experiments and are the basis for almost every next 4D-trackers. In the final part of the presentation, I will show how the introduction of multiple sampling front-end electronics and reconstruction methods based on machine learning can further improve the performances of future 4D trackers.

Lecturer: Dot. Cartiglia is an experimental high-energy physicist. His field of research is detector design, construction, and commissioning. He has been a member of several large collaborations based both in Europe and the US. Throughout his carrier, he has complemented his work on detector innovation with a strong involvement in physics analyses. In the past 10 years, he has focused his efforts on developing innovative silicon detectors, specifically for tracking particles in space and time, the so-called 4D tracking. He has been the PI of important projects, including an ERC advanced grant and an Italian PRIN grant (Text informed by Lecturer).

Presenter: Dr CARTIGLIA, Nicolo (INFN Torino (IT) and Visiting Prof. University of California, USA)

Session Classification: Fundamental Research and High Tech advances

Contribution ID: **45** Type: **not specified**

Precision Timing Detectors

Wednesday, 30 August 2023 11:00 (1 hour)

Abstract: Timing detectors are an indispensable tool in collider experiments. The advent of new precision timing detectors will enhance resolution to a few tens of picoseconds. Beyond aiding precise physics measurements and new physics searches, these detectors will play a pivotal role in addressing the reconstruction challenges posed by future high-luminosity detectors. In this lecture, we will delve into the requirements for these detectors. We will examine the obstacles we've overcome and the advancements we've achieved in electronics. Finally, we will discuss the synchronization of these detectors when they are implemented on a large scale, as in the Phase II CMS and ATLAS experiments.

Lecturer: Ozgur Sahin is a tenured scientist at CEA Paris Saclay. He received his PhD from DESY and Hamburg University. He has been actively engaged in the LHC experiments since 2010 and is currently leading the development of the DAQ system of the new MIP (Minimum Ionizing Particle) timing detector (MTD) for the Phase II (i.e. the High Luminosity Phase of the LHC) CMS (Compact Muon Solenoid) experiment. In addition to precision timing detectors, his research interests also extend to the applications of modern machine learning algorithms in data filtering and the field of Higgs Physics (Text informed by Lecturer).

Presenter: Dr SAHIN, Mehmet Ozgur (Université Paris-Saclay (FR))

Session Classification: Fundamental Research and High Tech advances

Contribution ID: **46** Type: **not specified**

Future Trends on Chip Fabrication and Next Challenges on Semiconductor Technology

Wednesday, 30 August 2023 12:00 (1 hour)

Abstract: Moore's Law predicted the sustained scaling that our industry has enjoyed for decades. End consumers have come to expect ever-increasing functionality at lower cost with each passing year. However, in the coming decade the limits of physics will forcibly slow the pace of geometric scaling, perhaps all but ending it. In the face of this issue, the industry is looking for new ways to fulfill the end consumer's expectations. 2.5D and 3D integrated circuits created through Advanced Packaging (AP) have emerged as the best near-term solution to mitigate the roll-off of geometric semiconductor scaling. Additive Semiconductor (AS) manufacturing can add unique technologies such as Back-End-of-Line (BEoL) memory and photonics. Combining AP and AS manufacturing provide new powerful high leverage tools to the industry.
This talk will discuss the advancements, processes, and methods for advanced packaging and additive semiconductor manufacturing and how these enable small and medium scale customization for an industry very focused on high volume manufacturing. It will address the benefits and issues of heterogeneous integration as well as considerations that improve manufacturability and performance.

Lecturer: Robert Patti is the president of NHanced Semiconductors, Inc. He has spearheaded the development and delivery of cutting-edge 3D and 2.5D integration technology for high energy physics, medicine, automotive, military, HPC, and other fields. He has managed hardware engineering teams in several organizations, including successful startups. Dr Patti received the 2009 SEMI Award for North America for his pioneering work in 3D IC integration and the 2015 3DIncites Individual Achievement Award (Text informed by Lecturer).

To be noted: A presentation of Nhanced-semiconductors, Inc. will be included in the High Technology Symposium, September 9.

Presenter: PATTI, Robert (President, Nhanced-Semiconductors, USA)

Session Classification: Fundamental Research and High Tech advances

Contribution ID: **47** Type: **not specified**

Introduction to Artificial Intelligence and the Internet of Things

Wednesday, 6 September 2023 08:45 (1h 40m)

Lecturer: Marcelo Finger is Professor of Computer Science at the Institute of Mathematics and Statistics, University of São Paulo. He received his BSc in Electronic Engineering from the University of São Paulo, MSc and PhD (1994) in Computing by the Imperial College, University of London. He was a visiting professor in Computer Science department in Université Paul Sabatier - Toulouse (2011) and Cornell University (2012-2013). He currently conducts research involving logical and probabilistic reasoning in order to understand the interaction between these two basic ways of thinking, their computational complexity and their applications in Artificial Intelligence, Databases, Computational Linguistics and Digital Humanities (from FAPESP)

Presenter: Prof. FINGER, Marcelo (Institute of Statistics and Mathematics, IME, USP)

Session Classification: Introduction to Artificial Intelligence and Hardware based applications

Contribution ID: **48** Type: **not specified**

Quantum Machine Learning

Wednesday, 6 September 2023 10:25 (50 minutes)

Abstract:
In the transformative era of quantum computing, the fusion of quantum mechanics and machine learning promises to revolutionize data-driven tasks. In this lecture, we will present the fundamental concepts of Quantum Machine Learning (QML), offering participants an understanding of its potentials and challenges. Our goal is to demystify the quantum learning algorithms that may soon underpin many technological advances. As a use case, we will highlight our recent article, 'Quantum Neural Networks Successfully Calibrate Language Models.' This work shows that parametrized variational circuits can successfully calibrate Deep Learning Q&A models, ensuring that they not only produce accurate outcomes, but also trustworthy probabilities.

Lecturer:
Professor and researcher at Universidade Estadual Paulista (Unesp - Bauru), Dr. Fanchini has expertise in quantum information, quantum computation, and machine learning. His primary research areas encompass open quantum systems, protection of quantum information, and the exploration of quantum systems through machine learning techniques. In recent years, his focus has intensified on quantum machine learning, highlighting the integration of his core areas of expertise.

Presenter: Prof. FERNANDES FANCHINI, Felipe (Sao Paulo State University, Faculty of Science of Bauru, UNESP-Bauru, BR)

Session Classification: Introduction to Artificial Intelligence and Hardware based applications

Contribution ID: **49** Type: **not specified**

The Edge of Tomorrow: Real-time Artificial Intelligence for Science

Wednesday, 6 September 2023 11:30 (1h 10m)

Abstract: Pursuing answers to fundamental questions about our nature requires searches for the ultra-rare, very subtle, and the inspection of nature at extremely fine spatial and temporal scales. Cutting-edge experiments are often confronted with massive amounts of very rich data on which Artificial Intelligence (AI) techniques provide powerful insights. To accelerate scientific discovery, enabling powerful AI algorithms across the data processing continuum, as close to sensor front-ends as possible, is becoming increasingly valuable. To deploy AI in these challenging scientific environments, we require robust and efficient learning and usable and accessible tool flows for optimized training and implementation across a broad range of scientific domains. This talk will introduce the motivations and requirements for real-time AI applications for physics and connections to broader science and industry applications, the development of modern techniques for deploying them into our experiments, and open research questions and challenges.

Lecturer: Nhan Tran is a Wilson Fellow at Fermi National Laboratory , FNAL, USA. Tran's research focus is on using accelerator-based experiments, such as CMS at the LHC, to search for new phenomena. His current activities center on the Higgs boson and dark sectors experiments. He is developing technology at the intersection of electronics, computing, and artificial intelligence to amplify experimental capabilities. He was a postdoctoral associate at Fermilab, and prior to that he received his PhD from Johns Hopkins University in 2011 and his bachelor's degree from Princeton University in 2005. Tran is a recipient of the URA Tollestrup Award, the APS Henry Primakoff Award, and the DOE Early Career Award.(Text courtesy by FNAL).

Presenter: Dr TRAN, Nhan (Fermi National Accelerator Lab. (US))

Session Classification: Introduction to Artificial Intelligence and Hardware based applications

Contribution ID: **50** Type: **not specified**

INTRODUCTION TO QUANTUM WORLD: SUPERPOSITION & ENTANGLEMENT PHYSICAL BASIS OF QUANTUM TECHNOLOGIES

Thursday, 7 September 2023 09:00 (1h 30m)

Abstract: This lecture will review the fundamentals of quantum theory and concepts such as superposition , entanglement, as a basis of quantum technologies.

Lecturer: Barbara Lopes Amaral, Master and PhD in Mathematics at the Federal University of Minas Gerais (UFMG) carried on with a stay at the University Autonoma of Barcelona (2014). Postdoctoral position at the International Institute of Physics of the federal University of Rio Grande do Norte (IIF-UFRN). Currently Assistant Professor at the Department of Mathematics of the Physics Institute at USP. She works on the Fundamentals in Quantum Theory and the Non-locality in Quantum Theory.(CV-Lattes)

Presenter: Prof. LOPES AMARAL, Barbara (Department of Mathematics of the Institute of Physics, USP, Sao Paulo, BR)

Session Classification: THE QUANTIC WORLD: DAY 1

Contribution ID: **51** Type: **not specified**

INTRODUCTION TO QUANTUM WORLD: SUPERPOSITION & ENTANGLEMENT PHYSICAL BASIS OF QUANTUM TECHNOLOGIES

Presenter: TBA

Session Classification: THE QUANTIC WORLD: DAY 1

Contribution ID: **52** Type: **not specified**

QUANTUM SENSING WITH COLD ATOMS and MATTER WAVES

Thursday, 7 September 2023 12:00 (1 hour)

Abstract: Cold atoms represent an ideal platform for the implementation of second-generation quantum technologies. Particularly interesting opportunities emerge from a coherent coupling of the atoms to single-mode light fields enabled by resonant optical cavities. In this lecture, after a general introduction into the world of cold atoms, I will present two of our research lines. In the first one, we study the interaction of ultracold atoms with a ring cavity in parameter regimes suitable for the creation of non-classical collective states of the atomic cloud with possible application in Heisenberg-limited interferometry. The regime may also allow for a global synchronization of the atomic dipoles with application in superradiant lasing. In a second research line, we are setting up a high sensitivity matter-wave interferometer for inertial sensing and gravimetry. It is based on observing in real time Bloch oscillations performed by atoms located inside a periodic optical lattice formed by two counter-propagating modes of the a cavity and exploits the fact that the periodicity of the oscillations is strictly proportional to external forces.

Lecturer: Philippe Courteille is Professor at the São Carlos Physics Institute of the University of São Paulo with a background in atomic interferometry and Bose-Einstein condensation. Currently, he coordinates an experimental research group studying collective effects in the interaction of ultracold atoms with light. He is interested in the question, how collective coupling between atoms may be harnessed for applications in second-generation quantum sensing of time and gravity.(Text informed by the Lecturer)

Presenter: Prof. COURTEILLLE, Philippe Wilhelm (Insitute of Physics, USP Sao Carlos, BR)

Session Classification: THE QUANTIC WORLD: DAY 1

Contribution ID: **53** Type: **not specified**

QUANTUM SIMULATORS

Presenter: TBA

Session Classification: THE QUANTIC WORLD: DAY 2

Contribution ID: **54** Type: **not specified**

QUANTUM SENSING & QUANTUM METROLOGY

Presenter: TBA

Session Classification: THE QUANTIC WORLD: DAY 2

Contribution ID: **55** Type: **not specified**

QUANTUM COMMUNICATION, QUANTUM CRYPTOGRAPHY, QUANTUM NETWORKS (QUANTUM INTERNET)

Friday, 8 September 2023 11:00 (2 hours)

Session Classification: THE QUANTIC WORLD: DAY 2

Contribution ID: **56** Type: **not specified**

Introduction to Plasma Physics

Tuesday, 29 August 2023 10:15 (1h 10m)

Abstract: In this introductory lecture, fundamental aspects of plasma physics will be developed, such as plasma occurrence in Nature and in the lab, quasi-neutrality, Debye shielding, electron plasma oscillations, and Alfvén waves. Particle orbits in magnetic fields will be explored in view of magnetic containment of plasmas and applications of plasmas in industry and medicine will be presented. Finally, inertial and magnetic fusion concepts will be reviewed and discussed in terms of their potential for energy generation.

Lecturer: Vinícius Duarte's research is focused on the resonant interaction between fast ions and Alfvénic modes in tokamaks via analytical and numerical modeling. His current research interests include collisional kinetic theory, Alfvénic modes, whole-device modeling, quasilinear transport, wave chirping and galactic dynamics. Duarte received a US Department of Energy Early Career Award in 2023. He is a Member of the ITPA Energetic Particle Physics Topical Group and serves on the Editorial Board of Physics of Plasmas and on the Executive Committee of TTF. He obtained his PhD in Physics in 2017 from the University of São Paulo, for which he received the Brazilian Physical Society thesis prize. After a postdoc at Princeton Plasma Physics Laboratory (PPPL), he moved to the research staff in 2020.(Text informed by Lecturer).

Presenter: Dr DUARTE, STAFF RESEARCH PHYSICIST, Vinicius Njaim (Princeton Plasma Physics Laboratory, PPPL, USA)

Session Classification: Vision Introductory Lectures

Contribution ID: **57** Type: **not specified**

QUANTUM COMPUTING

Friday, 8 September 2023 08:45 (1h 55m)

Session Classification: THE QUANTIC WORLD: DAY 2

Contribution ID: **58** Type: **not specified**

Quantum Thermodynamics

Thursday, 7 September 2023 11:00 (1 hour)

Abstract: Thermodynamics sets bounds for different technologies including quantum technologies. In the latter case, out-of-equilibrium dynamics, energy fluctuations and randomness are fundamentally present. On the other hand, modern techniques for manipulation of quantum systems allow experimental access to microscopic states, making explicit the role of information theory in different protocols, which also introduce new perspectives for technological applications. Quantum features such as coherence and non-classical correlations can be employed to obtain advantages or to perform processes that would be impossible in the classical context. In this lecture, we will explore some experiments that harness such quantum advantages such as work extraction and heat transport. We will also discuss some generalizations of the second law in these contexts and possibilities to transcend the classical limits.

Lecturer: Roberto M. Serra is Professor of Quantum Technology at the UFABC in the Sao Paulo metropolitan area, where he runs a quantum information science and technology research group. Before he was postdoctoral researcher at Imperial College London (UK) and a Royal Society 'Newton Advanced Fellow' of the University of York (UK). His research interest is associated with general aspects of Quantum Information and Quantum Thermodynamics encompassing both theoretical and experimental research. More information about him and his research group and activities can be found on the link to his website here below.(text informed by the lecturer).

Presenter: Prof. SERRA, Roberto M. (Federal University of ABC, UFABC, SP, BR)

Session Classification: THE QUANTIC WORLD: DAY 1

Contribution ID: **59** Type: **not specified**

Photon based quantum information science

Presenter: Prof. MONKEN (TBC), Carlos Henrique (Federal University of Minais Gerais, UFMG, Br)

Session Classification: THE QUANTIC WORLD: DAY 1

Contribution ID: **60** Type: **not specified**

Physics probed by precise neutrino oscillation measurements at Hyper-Kamiokande

Thursday, 31 August 2023 10:30 (30 minutes)

Abstract: Neutrino oscillation discovered in 1998 through the observation of atmospheric neutrinos by the Super-Kamiokande experiment implies that neutrinos have non-zero masses, which was the first evidence of physics beyond the standard model of elementary particles where neutrinos are massless. Since then, thanks to many neutrino experiments based on solar, atmospheric, accelerator and reactor neutrinos, already completed or still ongoing, our knowledge on neutrino properties, in particular, their masses and mixing, has been significantly improved. We are now in the precision era of neutrino physics. In this presentation, after the short introduction, firstly I will describe briefly the current status or what we have learned so far, focusing mainly on neutrino mass and mixing parameters relevant for oscillation phenomenon including CP phase. Secondly I will address what are the open questions in neutrino physics yet to be
answered. Then I will discuss, from phenomenological point of view, what improvement on our knowledge for neutrinos can be achieved by Hyper-Kamiokande (HK) project mainly considering its long-baseline neutrino oscillation program, one of the most important
objectives of HK. I also would like to discuss briefly possible synergy/complementarity between HK and other experiments such as JUNO and DUNE.

Lecturer: He obtained the doctor of science degree in physics at Tokyo Metropolitan University in 1992, followed by postdoctoral postions during 1993-1995 at High Energy Research Organization (KEK) in Japan, during 1996-1997 at University of Valencia in Spain, and during 1998-2000 at Universidade Estadual de Campina (UNICAMP) in Brazil. During 2001-2003, he worked as a collaborating professor at Instituto de Física Teórica (IFT) of Universidade Estadual Paulista "Júlio de Mesquita Filho"(UNESP) in Brazil. He joined the department of physics of Pontifícia Universidade Católica do Rio de Janeiro in August of 2003. His research interest is physics and astrophysics of neutrino.He is chair of the Physics Department of PUC-Rio since December 2022 (From Lattes CV).

Presenter: Prof. NUNOKAWA, Hiroshi (Pontifical Catholic University of Rio, PUC-Rio, Rio de Janeiro, BR)

Session Classification: Intelligence on Instruments: The Particle Physics Case

Contribution ID: **61** Type: **not specified**

The Space Instruments and projects

Friday, 1 September 2023 12:20 (10 minutes)

This topic will be indeed reviewed in two keynote sessions:
=> one on September 4, on " The Space Astrophysics Experimental Program in China; the eXTP as a showcase" by Prof. Shuangnan Zhang, IHEP and CAS, Beijing, CN.
=> another one on September 6 on: "Accelerating Astrophysics with the SpaceX Starship: the EUCLID SPACE TELESCOPE EXPERIENCE", by Prof. James Bartlett, University of Paris, FR, and JPL-Lab, USA.
Stay tuned.

Session Classification: Intelligence on Instrumemts: The Astrophysics/Astronomy Case

Contribution ID: **62** Type: **not specified**

THE HANDS on LABS and start of THE SCHOOL TRAINING PROGRAM: INTRODUCTORY REMARKS

Monday, 28 August 2023 14:00 (18 minutes)

The overall school organization and objectives with a summary of the full training provided by this international school series and the importance not only of the lectures and keynotes but indeed of the hands on Labs sessions was stressed at the beginning of this session. The attendance to the Labs and evaluation by Lab organizers is a crucial aspects for the overall evaluation of the school attendants and providing credits points,

The Lab organizers with a number coming from abroad (even sometimes from very far) and even other places in Brazil were apart some cases all given in presential. This is consider has a pre-requisit in this School series as the direct exchanges between school attendants and lecturers/Lab organizers is considered as essential.

Presenters: SAVOY NAVARRO, Aurore (Université Paris-Saclay (FR)); Prof. PAGANINI CANAL, Gustavo (IF-USP)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **63** Type: **not specified**

Masterclass on High Energy Physics

Monday, 28 August 2023 14:18 (9 minutes)

Oral presentation, no slides

Presenter: Prof. D'ELIA MATHEUS, Ricardo (IFT-UNESP, BR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **64** Type: **not specified**

Masterclass on Plasma Physics

Monday, 28 August 2023 14:27 (9 minutes)

Presenter: Dr DUARTE, Vinicius Njaim (Princeton Plasma Physics Laboratory, PPPL, USA)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **65** Type: **not specified**

Masterclass on Quantum Science

Presenter: TBA

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **66** Type: **not specified**

CHARACTERIZATION OF ELECTRONIC DEVICES:Single Event Effect in a Commercial MOSFET

Monday, 28 August 2023 14:36 (9 minutes)

Authors: N. Added, V.A.P. Aguiar, S.G. Alberton, E.L.A. Macchione, M.A. Guazzelli, N.H. Medina, and A. Villas-Bôas, Universidade de São Paulo, USP, Institute of Physics, LAMFI Lab.

Presenter: Prof. MEDINA, Nilberto H. (LAMFI Lab, Physics Institute of USP)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **67** Type: **not specified**

LiDAR: Light Detection And Ranging

Monday, 28 August 2023 14:54 (9 minutes)

Author: Prof. Yoshinobu Unno (KEK-Japan) with contribution from HPK Photonics, Hamamatsu, JP.

Presenter: Prof. UNNO, Yoshinobu (High Energy Accelerator Research Organization (JP))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **68** Type: **not specified**

Hyperfine Interactions Laboratory

Monday, 28 August 2023 14:45 (9 minutes)

Presenter: Prof. CARBONARI, Artur W. (IPEN-CNEN (BR))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **69** Type: **not specified**

EXPERIENCING THE NEW FRONT-END ASIC SAMPA, FOR THE READOUT OF GASEOUS DETECTOR AND THE INTEGRATION OF THIS ASIC INTO A SCALABLE READOUT SYSTEM

Presenter: TBC

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **70** Type: **not specified**

Tutorial on Neural Networks

Monday, 28 August 2023 17:20 (7 minutes)

Author: This Lab was organized and taught by Dr. Ozgur Mehmet Sahin (IRFU-CEA, University Paris Saclay, FR)

Presenter: Dr SAHIN, Mehmet Ozgur (CEA-IRFU, Université Paris-Saclay, FR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **71** Type: **not specified**

Introduction to OpenCAD

Presenter: TBC

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **72** Type: **not specified**

Charged Particle Track Reconstructionin an FPGA

Monday, 28 August 2023 15:03 (9 minutes)

Authors: Ian Tomalin (Rutherford Lab, RAL, and STFC, UK) and Carlos Ruben Dell'Aquilla (SPRACE-Nucleo Center de Computacion, NCC, UNESP, BR)

Presenter: Dr TOMALIN, Ian (STFC Rutherford-Appleton Laboratory (GB))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **73** Type: **not specified**

Characterization of innovative scintillating materials and data analysis introduction

Monday, 28 August 2023 15:12 (9 minutes)

Presenter: Dr DIOCIAIUTI, Eleonora (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **74** Type: **not specified**

HYPERKAMIOKANDE NEUTRINO EXPERIMENT IN JAPAN:: Hands-on lab with photon counting by a photo-multiplier tube

Monday, 28 August 2023 15:21 (9 minutes)

Authors: Teppei Katori (Kings College London, UK), Hiroshi Nunokawa (PUC-Rio, RJ, BR), and Alexander Argüello Quiroga (UNILA, PA, BR).

Presenter: Dr KATORI, Teppei (King's College London)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **75** Type: **not specified**

INTRODUCTION TO ASTRONOMY RESEARCH WITH TERRESTRIAL TELESCOPE

Presenter: TBA

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **76** Type: **not specified**

Experimental evaluation of internal combustion engine efficiency comparing pure gasoline and bio-ethanol as fuels

Monday, 28 August 2023 15:39 (9 minutes)

Authors: This Lab was run at the Institute Maua of Technology, IMT, in the metropolitan area of Sao Paulo, by Renato Romio, Clayton B. Zabeu, Gustavo Cassares Pires and Jácson B. V. Antolini.

Presenter: ROMIO, Renato (IMT-Maua, Sao Paulo, BR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **77** Type: **not specified**

Measuring the temporal evolution of a plasma induced laser

Monday, 28 August 2023 15:57 (9 minutes)

Authors: Ricardo Samad and Jhonatha Ricardo dos Santos, Center of Lasers and Applications, IPEN-CNEN, Br

Two files are included here, the shortest one corresponds to the presentation of the Hands-on Labs on 28/8 by R. Samad and the second one corresponds to the presentation made by the Lab organizers as introduction to the Lab session.

Presenter: Dr SAMAD, Ricardo (IPEN-CNEN, BR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **78** Type: **not specified**

Determination of U and Th using Neutron Activation Analysis

Monday, 28 August 2023 15:48 (9 minutes)

Presenter: Dr CARDOSO DA SILVA., Paulo Sergio (IPEN-CNEN (BR))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **79** Type: **not specified**

Introduction to the Tokamak Problematics

Presenter: Prof. PAGANINI CANAL, Gustavo (IF-USP)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **80** Type: **not specified**

Fusion Energy: the Tokamak experience

Presenter: Prof. PAGANINI CANAL, Gustavo (IF-USP)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **81** Type: **not specified**

GPU Programming with OpenMP

Monday, 28 August 2023 16:40 (9 minutes)

Presenter: Prof. SENGER, Hermes (Federal University of Sao Carlos, UFSCAR, BR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **82** Type: **not specified**

FPGA-based acceleration of scientific applications using OpenMP cluster

Monday, 28 August 2023 16:50 (9 minutes)

Authors: This Lab was run alternatively by: Sandro Rigo, Hervé Yviquel, Marcio Pereira & thanks to the OMPC Team, Institute of Computation, IC of the UNICAMP, Campinas, BR.

Presenter: Prof. RIGO, Sandro (Gleb Wataghin Institute of Physics of the University of Campinas, IFGW-UNICAMP)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **83** Type: **not specified**

Introductory Computer Lab to Photonic Integrated Circuits

Monday, 28 August 2023 16:59 (9 minutes)

Prof Wim Bogaerts was arriving on August 30 early morning and gave his first hands-on Lab on the afternoon of that same day. But being absent for the Lab presentation, he prepared this video here attached to be presented at the Labs presentation on Augusr 28, afternoon.

Presenter: Prof. BOGAERTS, Wim (Gent University and IMEC (BE))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **84** Type: **not specified**

GETTING REAL LIFE EXPERIENCE IN AN ADVANCED PHOTONICS RESEARCH LAB

Presenter: TBA

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **85** Type: **not specified**

Physics-Informed Neural Networks for the solution of Differential Equations

Monday, 28 August 2023 17:30 (9 minutes)

Author: Marlon Sproesser Mathias is Professor at the Mechanical Engineering Department of Escola Politécnica at USP and Member of the Center for Artificial Intelligence (C4AI) located at INOVA-USP.

Presenter: Prof. SPROESSER MATHIAS, Marlon (Polytechnic School at USP, BR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **86** Type: **not specified**

LOFAR EVENT RECOGNITION and RECONSTRUCTION USING AI TOOLS.

Monday, 28 August 2023 15:30 (9 minutes)

Presented by Aurore Savoy-Navarro, on behalf of Wendy Williams

Presenter: Dr WILLIAMS, Wendy (SKAO Science Team, Jodrell-SKAHeadquarters, UK)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **87** Type: **not specified**

INTRODUCTION TO QUANTUM COMPUTING USING THE ATOS QLM (QUANTUM MACHINE SIMULATOR)

Monday, 28 August 2023 17:40 (9 minutes)

Authors: Gleydson Fernandes de Jesus and Otto Menengasso Pires (SENAI- CIMATEC/LAQCC, BR), Genaro Costa EVIDEN/ATOS R&D Labs at SENAI-CIMATEC, Adhvan Furtado- EVIDEN South America Sales Director.
The hands-on Lab was taught by Gleydson de Jesus, in-person over the first week and on-remote by Otto Menengasso Pires, the second week.

Presenter: FERNANDES DE JESUS, Gleydson (Eviden, SINAI-CIMATEC)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **88** Type: **not specified**

QUANTUM COMPUTING LAB: THE IBM QUANTUM EXPERIENCE

Presenter: Prof. ZUFFO, Marcelo (Polytechnic School at USP, BR)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **89** Type: **not specified**

QUANTUM COMMUNICATION and HIGH FIELD MAGNETS: 2 still possible hands on Labs

Presenter: Dr SAVOY NAVARRO ET AL., Aurore (Université Paris-Saclay (FR))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **90** Type: **not specified**

High Field Magnets: The transversal Tool

Presenter: TBA

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **91** Type: **not specified**

QUESTIONS TO THE LAB ORGANIZERS??

Monday, 28 August 2023 17:50 (30 minutes)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **92** Type: **not specified**

Artificial Intelligence-on chip: Physics driven hardware co-design

Monday, 28 August 2023 17:10 (9 minutes)

This Lab was taught by Javier Campos, first on-remote from FermiLab the first week of the school and then on presential when Javier came to Sao Paulo (from 4/9 to 9/9).

Presenter: CAMPOS, Javier Ignacio (Fermi National Accelerator Lab. (US))

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **93** Type: **not specified**

THE INTERNATIONAL RESEARCH CENTER: CNRS and USP

Monday, 28 August 2023 12:10 (15 minutes)

The University of São Paulo (USP) in Brazil and France's National Center for Scientific Research (CNRS) will launch an International Research Center (IRC) in early 2024. This will be the fifth unit of the kind established by CNRS, which already has similar partnerships with the University of Arizona and the University of Chicago in the United States, Imperial College London in the United Kingdom, and the University of Tokyo in Japan.,(republished from FAPESP article; https://agencia.fapesp.br/university-of-sao-paulo-and-frances-cnrs-seal-accord-to-establish-joint-research-center/40937)
Speaker: Nadège Mézié, PhD in Philosophy-Anthropology at Sorbonne (Parie Descartes University) and at the same University: Master in Sociology and Anthropology, BS in Sociology and BS in Anthropology. Currently Attaché for Science and Technology of the General Consulate of France in São Paulo;

Presenter: Dr MÉZIÉ, Nadège (Attaché for Science and Technology of the General Consulate of France in São Paulo;)

Session Classification: Opening Day

Contribution ID: **94** Type: **not specified**

Measuring the electron distribution function in the edge of the Tokamak TCABR plasmas using Langmuir probes

Monday, 28 August 2023 16:06 (9 minutes)

Presenter: Prof. PAGANINI CANAL, Gustavo (IF-USP)

Session Classification: Introductory presentation of all the Hands-on Labs for INFIERI2023

Contribution ID: **95** Type: **not specified**

Introduction to the INFIERI School series & Objectives of this 7th edition at USP

Monday, 28 August 2023 12:25 (20 minutes)

Presenter: Dr SAVOY-NAVARRO, Aurore (CEA-IRFU, Université Paris-Saclay and CNRS?IN2P3 (FR))

Session Classification: Opening Day

Contribution ID: **96** Type: **not specified**

Caninos Loucos

Friday, 1 September 2023 12:30 (30 minutes)

Presenter: Prof. ZUFFO, Marcelo (Director of tge INOVA-USP Center)

Session Classification: Intelligence on Instrumemts: The Astrophysics/Astronomy Case

Contribution ID: **97** Type: **not specified**

USP Innovation Ecosystem

Abstract: In 2022, USP approved its new Innovation regime and the expansion of the activities of research and innovation pro-rectory. From this it is intended to expand support in initiatives that transform scientific knowledge into well-being and quality of life. In this lecture, Innovation Initiatives and actions at USP will be presented

Lecturer: PhD in Electric Engineering from the Polytechnic School at USP, Professor in the Department of Engineering of Electronic Systems at POLI-USP since 2006, Prof. Zuffo is the Director of the INOVA-USP Center.

Presenter: Prof. KNORICH ZUFFO, Marcelo (Director of the INOVA-USP Center)

Session Classification: Big Data, Massive and High Performance Computing, Data transmission

Contribution ID: **98** Type: **not specified**

QUANTUM ELITES: An introduction to the IBM Quantum Computing

A task force with long term research goals has been signed to joint research and development in quantum comouting, selecting IBM as the quantum computing platform.
in this lecture preliminary conclusions from the task force as well as an introduction from the IBM quantum Computing ecosystem will be presented.

Presenter: IBM REPRESENTATIVE

Session Classification: Introduction to Artificial Intelligence and Hardware based applications

Contribution ID: **99** Type: **not specified**

Identification of BCC skin cancer using Fourier Transform Infrared Spectroscopy and Machine Learning" –

Presenter: LUMARA PEREIRA MENDES DE OLIVEIRA PERES, Daniella (USP)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **100** Type: **not specified**

Interdisciplinary and Innovative Educational Practices at the University of São Paulo with a STEAM Approach

Saturday, 9 September 2023 14:16 (8 minutes)

Authors Hadassa Harumi Castelo Onisaki | Thesis Advisor: Roseli de Deus Lopes, Integrated System Laboratory, LSI, at the Polytechnic School at USP.

Presenter: CASTLE ONISAKI PINTO, Hadassa Harumi (Escola Politécnica - USP)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **101** Type: **not specified**

Identification of BCC skin cancer using Fourier Transform Infrared Spectroscopy and Machine Learning" –

Saturday, 9 September 2023 14:08 (8 minutes)

Authors: Daniella Lúmara Peres[1]; *Sajid Farooq[1]; Rocío Raffaeli2; Maria Virginia Croce 2; Adela Croce2; Denise Maria Zezell[1*]*.
[1]Nuclear and Energy Research Institute, IPEN-CNEN, São Paulo, Brazil
2Universidad Nacional de La Plata, UNLP, La Plata, Argentina

Presenter: LUMARA PEREIRA MENDES DE OLIVEIRA PERES, Daniella (IPEN-CNEN)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **102** Type: **not specified**

Looking for X17 at PADME

Saturday, 9 September 2023 14:24 (8 minutes)

For the PADME Collaboration

The PADME experiment (Positron Annihilation into Dark Matter Experiment) at Laboratori Nazionali di Frascati of INFN aims to search for a "Dark Photon"using positron on target collision at the DAΦNE Beam Test Facility.
The collaboration involves: INFN sezione di Frascati, Roma, Lecce and Torino, La Sapienza-Roma1 University, Politecnico Torino, University of Sofia (Bulgaria), MTA Atomki, Debrecen (Hungary), Cornell University, Cornell Laboratory for Accelerator-based Sciences and Education, Ithaca (NY, USA), College of William and Mary, Williamsburg (VA, USA) and Princeton University, Princeton (NJ, USA).

Presenter: DI MECO, Elisa (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **103** Type: **not specified**

Conceptual design of a system of RMP coils for the TCABR tokamak

Presenter: MACHADO SALVADOR, Felipe (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **104** Type: **not specified**

Temporal Evolution of Spacial Distribution of Hydrogen at TCABR -UPGRADE

Saturday, 9 September 2023 14:32 (8 minutes)

Presenter: VITOR KOBAYASHI DE SOUSA, Vitor Araya (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **105** Type: **not specified**

Development of Biosensors based on SPR technology for fast diagnosis

Saturday, 9 September 2023 14:40 (8 minutes)

Authors A. Mazzeo*1; G. P. Canal 2, M. I. Alayo1
1 Polytechnic School, Department of Electronic Systems Engineering / University of São Paulo, SP 05508-010, Brazil
2 Institute of Physics, Plasma Physics Laboratory - Tokamak / University of São Paulo, São Paulo, SP 05508-090, Brazil

The document here attached include a short video taken by Ricardo Mesquita during Angela's presentation. It shows how the posters were presented.

Presenter: MAZZEO, Angela (Polytechnic School of the University of São Paulo / Department of Electronic Systems Engineering.)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **106** Type: **not specified**

Modeling separatrix splitting and magnetic footprints in TCABR

Saturday, 9 September 2023 14:48 (8 minutes)

Authors: . R. Fernandes Jr.1, G. P. Canal1, J. R. Richieri1, F. M. Salvador1, D. C. Taborda2 and M. Roberto3
1Institute of Physics, University of São Paulo, São Paulo, SP 05508-090, Brazil
2REMA, Federal University of Santa Catarina, Florianópolis, SC 88049-500, Brazil
3Aeronautics Institute of Technology, São José dos Campos, SP 12228-900, Brazil

Presenter: FERNANDES JUNIOR, Jose Roberto (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **107** Type: **not specified**

Development of tube of quiescent plasma for introduction to waves in plasmas

Saturday, 9 September 2023 14:56 (8 minutes)

Presenter: DE ÁVILA MESQUITA, Ricardo (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **108** Type: **not specified**

Recent Results and Future Prospects with Skipper CCDs in the CONNIE Experiment

Saturday, 9 September 2023 15:04 (8 minutes)

For the CONNIE Collaboration:

CONNIE: COherent Neutrino Nucleus Interaction Experiment
International Collaboration: with 30 collaborating Institutes from Argentina, Brazil, Mexico, Paraguay, Switzerland and USA, performed near the ANGRA 2 reactor at Angra dos Resi, Brazil.

Presenter: ZILVES MAIO VENTURA, Pedro (Institute of Physics of the Federal University of Rio de Janeiro, IF-UFRJ, Br)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **109** Type: **not specified**

Study of Disruptive Instability Prediction in Tokamaks Through Deep Learning Models

Saturday, 9 September 2023 15:12 (8 minutes)

Authors: Cruz M.S. (1,2), Canal GP (2), Santos MC (1), Schirru, R. (1)
1-Federal University of Rio de Janeiro - UFRJ
2- University of São Paulo - USP

Presenter: DA CRUZ SILVA, Matheus (Nuclear Engineering Program - PEN, the Federal University of Rio de Janeiro, UFRJ, Br)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **110** Type: **not specified**

Project and Development of a Decision Support System for Anesthesia Based on Data Fusion and PK/PD models

Saturday, 9 September 2023 15:20 (8 minutes)

Authors:
1Bruno Bestle Turrin; 2Fuad Kassab Jr.; 3Joaquim E. Vieira
1, 2 Escola Politécnica da Universidade de São Paulo; 3 Faculdade de Medicina da Universdade de São Paulo

Presenter: BESTLE TURRIN, Bruno (Polytechnic School of the University of São Paulo / Department of Electronic Systems Engineering.)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **111** Type: **not specified**

UV degradation of pigments: spectroscopic, morphological changes and mathematical expression

Saturday, 9 September 2023 15:28 (8 minutes)

Authors: Master Student: Caue Gomes Ferreira, Advisor: Drª Marcia Almeida Rizzutto
Instituto de Fısica da Universidade de Sao Paulo, Brasil - LACAPC*/DFNc
LACAPC is a Laboratory of Archeometry in the Department of Nuclear Physics , DFNc at the Physics Institute of USP.

Presenter: FERREIRA, Cauê G. (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **112** Type: **not specified**

Design of a Diagnostic for the Neutral Particle Density Profile Measurement for the TCABR Tokamak

Saturday, 9 September 2023 15:36 (6 minutes)

Authors:
F.A.F. Albuquerque[1], J.H.F. Severo[2], N.U. Wetter[1]
[1]Instituto de Pesquisas energéticas e Nucleares IPEN-CNEN, Brazil
[2]Institute of Physics of Universty of São Paulo, Brazil

Presenter: A. F. ALBUQUERQUE, Fernando (IIPEN/ University of São Paulo, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **113** Type: **not specified**

Absorption and polarization effects of terahertz waves on clinochlore

Saturday, 9 September 2023 15:42 (8 minutes)

Authors: 1D. Alves Matos, 1N. Kawahala, 2R. de Oliveira, 2I.de Barcelos, 1 F.D.D. Hernandez
1 Laboratory of New semiconductors materials, IF-USP
2 Brazilian Synchroton Light Laboratory (CNPEM)

Presenter: ALVES MATOS, Daniel (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **114** Type: **not specified**

Characterizing Organic Scintillators: Construction of Bragg Peaks for Different Materials at Varying Proton Beam Energies

Saturday, 9 September 2023 15:50 (8 minutes)

Authors: Mosst Tasnim Binte Shawkat,
Cinzia DaVia, Michael Taylor, Stephen J Watts, John Alison,
Department of Physics, University of Manchester, UK

Presenter: BINTE SHAWKAT, Mosst Tasnim (Department of Physics, University of Manchester, UK)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **115** Type: **not specified**

Frequency Selection Techniques in Terahertz Spectroscopy and Focus Diameter Estimation

Saturday, 9 September 2023 15:58 (8 minutes)

Authors: Eduardo D. Stefanato, Nícolas M. Kawahala, Felix G. G. Hernandez

Presenter: DESTEFANI STEFANATO, Eduardo (Institute of Physics, USP Sao Carlos, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **116** Type: **not specified**

Use of software chains to simulate and test BSM models.

Saturday, 9 September 2023 16:06 (8 minutes)

Authors: Gabriel Vian (MSc student at IFT-Unesp) and Dr. Ricardo D'Elia Matheus (professor at IFT - Unesp).

Presenter: VIAN, Gabriel Vinicius (IFT-UNESP, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **117** Type: **not specified**

Disentanglement of the chemodynamical assembly: mapping the Milky Way disks

Saturday, 9 September 2023 16:14 (8 minutes)

Authors: Elvis Cantelli, Ramachrisna Teixeira

Presenter: CARVALHO CANTELLI, Elvis Wiliam (Instituto de Astronomia, Geofísica e Ciências Atmosféricas, IAG - University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **118** Type: **not specified**

The Chimera project - A distributed multi-metric approach for weather forecast ensemble combinations

Saturday, 9 September 2023 16:22 (8 minutes)

Authors
Elvis Cantelli[1], Vitor Marrafon[2], Gustavo Beneduzi[1]
1: University of São Paulo
2: Federal University of Itajubá

Presenter: CARVALHO CANTELLI, Elvis Wiliam (Instituto de Astronomia, Geofísica e Ciências Atmosféricas, IAG - University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **119** Type: **not specified**

Nhanced-Semiconductors Inc., USA

Saturday, 9 September 2023 09:10 (30 minutes)

Speaker: Robert Patti is the president of NHanced Semiconductors, Inc. He has spearheaded the development and delivery of cutting-edge 3D and 2.5D integration technology for high energy physics, medicine, automotive, military, HPC, and other fields. He has managed hardware engineering teams in several organizations, including successful startups. Dr Patti received the 2009 SEMI Award for North America for his pioneering work in 3D IC integration and the 2015 3DIncites Individual Achievement Award (Text informed by Lecturer).

Presenter: PATTI, Robert (President, Nhanced-Semiconductors, USA)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **120** Type: **not specified**

Universal Quantum Ltd., UK

Saturday, 9 September 2023 09:40 (30 minutes)

Speaker: Dr Sebastian Weidt is the Co-Founder and CEO of Universal Quantum - a UK company 50+ exceptional engineers, scientists and operational staff operating in the UK, US and Germany developing the world's first million qubit quantum computer. to a The German government has recently become the latest backer of Universal Quantum's technology by awarding one of the world's largest government quantum computing contracts ever given to a single company to Universal Quantum. Sebastian is also an Associate Professor in Quantum Technologies at the University of Sussex in the UK. His previous academic work around quantum computing for example led to the development of a drastically simplified approach to quantum computing and also includes the development of the world's first blueprint for constructing a large-scale trapped-ion quantum computer.
Previously, Sebastian worked as a management consultant in Berlin, Germany before completing his PhD and postdoctoral research fellowship in quantum information technology, specializing in scalable trapped ion quantum computing.(Text informed by the Lecturer).

Presenter: Dr WEIDT, Sebastian (Universal Quantum CeO and Lecturer at Sussex University, UK)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **121** Type: **not specified**

OpenCADD

Saturday, 9 September 2023 11:00 (30 minutes)

Speaker: Dr Mehdi Dahghan, PhD in Electronic Engineering from the Islamic Azad University Science and Research Brancg. Application Engineer at OpenCADD, MATLAB and Simulink Specialisat

Speaker: Dr Arnaldo Ortiz Clemente, PhD in Mechantronics from te UNICAMP, responsible to the Brazilain Educational Market from Mathworks for products and projects.

Presenters: Dr ORTIZ CLEMENTE, Arnaldo (OPENCADD); Dr DEHGHAN, Mehdi (OPENCADD)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **122** Type: **not specified**

DELL Technologies

Speaker: Currently Computing Engineer at DELL Technologies and professor at SPTECH Digital School (from Lattes)

Presenter: CINTRA CHOLA, Rogerio (DELL Technologies)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **123** Type: **not specified**

VERSATUS HPC: A success history in HPC and AI

Saturday, 9 September 2023 10:10 (30 minutes)

Speaker:: Account Manager at Versatus HPC graduated from Escola de Engenharia Mauá as Electrical Engineer.
For more than 50 years, dedicated his carrier to technology solutions and applications in many segments of the corporative market.
His new target, at present, is to bring his background and knowledge for HPC and AI projects at the Academia, creating support and different perspectives for researchers on the usage of high-performance computing.

Presenter: NABHOLZ, Antonio (VERSATUS HPC)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **124** Type: **not specified**

Introduction to the Symposium

Saturday, 9 September 2023 09:00 (10 minutes)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on ”HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK”

Contribution ID: **125** Type: **not specified**

EVIDEN, SENAI/CIMATEC

Saturday, 9 September 2023 11:30 (30 minutes)

Speaker: Gustavo Villela is a seasoned professional with a diverse background in Information Technology and Business Management. He holds a bachelor's degree in Information Technology at the University of State of Rio de Janeiro and an MBA in Business Management at Fundação Getúlio Vargas, and he is dedicating his studies to a second MBA in AI and Big Data at ICMC USP. With more than 20 years of experience in IT infrastructure, focusing on mission-critical systems, he is a project manager certified as a PMP leading important projects at relevant companies in the Telecom, Insurance, and Technology sectors. Presently, he is a Sales Executive at Eviden, an Atos Business, where he leverages his expertise to drive success in the ever-evolving tech industry.

Presenter: VILLELA, Gustavo (EVIDEN South America)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **126** Type: **not specified**

CERN: Advancing the Frontiers of Technology

Saturday, 9 September 2023 12:00 (30 minutes)

Speaker: PhD in Energy Atomic Commissariat , CEA Saclay (France), Physicist at CERN (Operation and Upgrades), 1994, with several responsibilities related to the different aspects of Accelerators design, engineering and construction plus ugrades (from the SPS to the LHC through the Large electron-positon collider, LEP)
Head of Technology Department since January 2014, at CERN, Geneva, Switzerland.The Technology Department is responsible for technologies which are specific to existing particle accelerators, facilities and future projects.
The main domains of activities cover: magnets (superconducting, normal conducting, fast pulsed magnets, electrostatic and magnetic septa), their machine integration and protection, power converters, cryogenics, high and ultra-high vacuum systems, coatings and surface treatments.

Presenter: Dr JIMENEZ, Jose Miguel (CERN)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **127** Type: **not specified**

USP Innovation Ecosystem

Saturday, 9 September 2023 12:30 (30 minutes)

Speaker: PhD in Electric Engineering from the Polytechnic School at USP, Professor in the Department of Engineering of Electronic Systems at POLI-USP since 2006, Marcelo Zuffo is the Director of the INOVA-USP Center at USP.

Presenter: Prof. KNORICH ZUFFO, Marcelo (Head of the INOVA-USP Innovation Center)

Session Classification: SYMPOSIUM and PANEL DISCUSSION on "HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK"

Contribution ID: **128** Type: **not specified**

Concluding remarks

Saturday, 9 September 2023 13:00 (15 minutes)

Presenter: ALL

Session Classification: SYMPOSIUM and PANEL DISCUSSION on ”HIGH TECH & FUNDAMENTAL RESEARCH : THE UNPAREIL LINK”

Contribution ID: **129** Type: **not specified**

GLUCO-MIB: DEVELOPMENT OF AN INTERNET OF THINGS SYSTEM FOR MONITORING GLYCEMIA IN PATIENTS HOSPITALIZED WITH TYPE 2 DIABETES MELLITUS.

Saturday, 9 September 2023 16:30 (8 minutes)

Author: Moises Mezo Rodriguez from: Facultad de Ciencias e Ingenierías Universidad Peruana Cayetano Heredia, Peru.

Presenter: MEZA RODRIGUEZ, Moises (Biomedical Engineering Laboratory,Universidad Peruana Cayetano Heredia, Peru)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **130** Type: **not specified**

DEVELOPMENT OF AN ELECTRON SPECTROMETER FOR ENERGY CARACTERIZATION OF LASER-ACCELERATED ELECTRON

Saturday, 9 September 2023 16:38 (8 minutes)

Authors: Vitória Macêdo Costa Brandão, Ricardo Elgul Samad
Energy and Nuclear Research Institute –IPEN - CNEN

Presenter: MACÊDO COSTA BRANDÃO, Vitória (IPEN-CNEN (BR))

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **131** Type: **not specified**

Analysis of Thermal Stresses Produced on TCABR Tokamak Vacuum Vessel due to Baking Process

Saturday, 9 September 2023 16:46 (8 minutes)

Authors: Pedro Leo Oliveira Marques*1, Ruy Marcelo de Oliveira Pauletti1, Juan Iraburu Elizondo2,
1)Polytechnic School, University of São Paulo, Brazil;
2)Physics Institute, University of São Paulo, Brazil;

Presenter: OLIVEIRA MARQUES, Pedro Leo (Polytechnic School of the University of São Paulo / Department of Electronic Systems Engineering.)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **132** Type: **not specified**

Development of data acquisition and transmission system to control operational and radiological parameters in mobile irradiation unit with electron accelerator

Saturday, 9 September 2023 16:54 (8 minutes)

Presenter: BLATT, Roberto (IPEN-CNEN (BR))

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **133** Type: **not specified**

Study of heat deposition on the first wall of TCABR

Saturday, 9 September 2023 17:02 (8 minutes)

Presenter: PORTA GRECCO OLIVEIRA, Lucas (Institute of Physics, USP Sao Carlos, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **134** Type: **not specified**

Super low energy gamma radiation detection

Saturday, 9 September 2023 17:10 (8 minutes)

Presenter: STANO, Lucas (IPEN-CNEN (BR))

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **135** Type: **not specified**

Structural analysis of in-vessel RMP coils of the TCABR tokamak

Saturday, 9 September 2023 17:18 (8 minutes)

Authors List:
A.S. Bouzan[1], R. Ramos Jr.[1], G.P. Canal[2], F.M. Salvador[2], J.I. Elizondo[2], R.M.O. Pauletti[1], J.Y. Saab Jr.[3]
andre.bouzan@usp.br
[1]Polytechnic School of the University of São Paulo, [2]Institute of Physics of the University of São Paulo, [3]Institute Mauá of Technology

Presenter: SALGUEIRO BOUZAN, André (Polytechnic School of the University of São Paulo / Department of Mechanical Engineering.)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **136** Type: **not specified**

Optimizing Plasma Spectroscopy Diagnostic in the TCABR Tokamak: Simulating an Advanced Opto-Mechanical System for High Temporal and Spatial Resolution in Plasma Rotation Velocity Measurements

Saturday, 9 September 2023 17:26 (8 minutes)

Authors D.O. Novaes(1,2) , J.H.F. Severo (1) , F.B. Rizzato (2), F.A.F. Albuquerque (4) , T. Fernandes(1)
(1) Plasma Physics Laboratory, Institute of Physics, University of São Paulo, Brazil; (2) Institute of Physics, Federal University of Rio Grande do Sul; (3) Faculty of Technology of São Paulo FATEC-SP, (4) IPEN-CNEN, Brazil.

Presenter: OLIVEIRA NOVAES, Douglas (Instituto de Física - Universidade Federal Rio Grande do Sul, UFRGS, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **137** Type: **not specified**

Hybrid setup for neutron imaging and prompt-gamma activation analysis at research reactor IEA-R1

Saturday, 9 September 2023 17:34 (8 minutes)

Authors: Carlos Gabriel Santos 1 Frederico A. Genezini1
1Nuclear and Energy Research Institute (IPEN-CNEN, Brazil

Co-author: SANTOS DA SILVA, Carlos Gabriel (IPEN-CNEN (BR))

Presenter: SANTOS DA SILVA, Carlos Gabriel (IPEN-CNEN (BR))

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **138** Type: **not specified**

Implementation of a numerical solver for the Klimontovich kinetic equation in weakly ionized plasmas.

Saturday, 9 September 2023 17:42 (8 minutes)

Authors: Adson Soares de Souza, Gustavo Paganini Canal (adviser)

Adson was sick at the end of the school and could not print his poster, and thus presented it at the poster session. However his work will be taken in account also because of his participation to the hands-on Labs and to the lectures and keynotes sessions. He also attended the whole poster session on Saturday from 2h30 to 6h30pm, see the Adson's photo with Caue and Saulo.

Presenter: SOARES DE SOUZA, Adson (Institute of Physics of University of São Paulo, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **139** Type: **not specified**

1-loop corrections to the muon g-2 in Supersymmetric QED: Why we look at the muon

Saturday, 9 September 2023 17:50 (8 minutes)

Authors:
Francisco Neme C. Dahab Institute of Physics, USP and Institute of Theoretical Physics, IFT, UNESP
Ricardo D'Elia Matheus, Institute of Theoretical Physics, IFT, UNESP, Sao Paulo, Brazil

Co-author: NEME C. DAHAB, Francisco (IF-USP and IFT-UNESP, BR)

Presenter: NEME C. DAHAB, Francisco (IF-USP and IFT-UNESP, BR)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **140** Type: **not specified**

A brief view of Particle Physics: an introduction to Field Theorie

Saturday, 9 September 2023 17:58 (8 minutes)

Presenter: GEHLEN FERREIRA DA SILVA, Bruno (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **141** Type: **not specified**

Conceptual design of a system of RMP coils for the TCABR tokamak

Saturday, 9 September 2023 18:06 (8 minutes)

Authors:
Conceptual design of a system of RMP coils for the TCABR tokamak
F.M. Salvador1, G.P. Canal1, D.M. Orlov2, A.S. Bouzan3 N.M. Kot4, Y.P. Asnis1, A. Kleiner5, E.S. Seol6,
N.M. Ferraro5, F. Kassab Jr.3, J.H.F. Severo1, R.M.O. Galvão1
1 Institute of Physics, University of São Paulo, São Paulo, SP 05508-090, Brazil
2 University of California San Diego, San Diego, CA 92093-0417, USA
3 Polytechnic School, University of São Paulo, São Paulo, SP 055080-010, Brazil
4 University of Michigan, Ann Arbor, MI 48109, USA
5 Princeton Plasma Physics Laboratory, Princeton, NJ 08543-0451, USA
6 Rensselaer Polytechnic Institute, NY 12180, USA

Presenter: MACHADO SALVADOR, Felipe (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **142** Type: **not specified**

Development of tube of quiescent plasma for introduction to waves in plasmas

Presenter: DE AVILA MESQUITA, Ricardo (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **143** Type: **not specified**

Destructive radiation effects in electronic devices: atmospheric and space environments

Saturday, 9 September 2023 18:14 (8 minutes)

S. G. Alberton1,2, A. C. Vilas Bôas3, N. H. Medina1,
M. A. Guazzelli3, V. A. P. Aguiar1, N. Added1,
C. A. Federico4, O. L. Gonçalez4, J. Wyss5, L. Silvestrin2,
A. Paccagnella2, C. Cazzaniga6, M. Kastriotou6, C. Frost
1 Department of Nuclear Physics, University of São Paulo, Brazil
2 Università degli Studi di Padova, Italy
3 Centro Universitário FEI, Brazil
4 Institute for Advanced Studies, Brazilian Air Force, Brazil
5 Università degli Studi di Cassino e del Lazio Meridionale, Italy
6 Rutherford Appleton Laboratory, United Kingdom

Presenter: ALBERTON, Saulo G. (Institute of Physics of University of São Paulo)

Session Classification: POSTER SESSION and FAREWELL PARTY

Contribution ID: **144** Type: **not specified**

Concluding remarks: did we achieve the INFIERI2023 Objectives?

Saturday, 9 September 2023 18:22 (9 minutes)

Presenter: SAVOY NAVARRO, Aurore (Université Paris-Saclay (FR))

Session Classification: POSTER SESSION and FAREWELL PARTY