

The Scientific Program of ACP2021



Second African Conference on
Fundamental and Applied Physics
ACP2021

Report of Contributions

Contribution ID: 34

Type: **Invited Talk**

Welcome address —Cadi Ayyad University in Marrakesh

Monday, March 7, 2022 9:30 AM (15 minutes)

Abstract Category

Presenter: HBID, Hassan (President, Cadi Ayyad University, Marrakesh, Morocco)

Session Classification: General

Contribution ID: 35

Type: **Invited Talk**

Welcome address —Mohammed V University in Rabat

Monday, March 7, 2022 9:45 AM (15 minutes)

Abstract Category

Presenter: RHACHI, Mohammed (President, Mohammed V University in Rabat, Morocco)

Session Classification: General

Contribution ID: 36

Type: **Invited Talk**

Science bridging Cultures and Nations

Monday, March 7, 2022 10:00 AM (50 minutes)

International, global scientific research addresses not only key questions in science but also provides successful modes for peaceful cooperation. Global research projects show what mankind is able to achieve when working together coherently towards a common goal. Science and the free dissemination of scientific knowledge facilitate the dialogue among cultures and are instrumental in fostering peaceful relations between nations. The talk will address the role of research infrastructures in science diplomacy through specific examples, in particular CERN and SESAME (Synchrotron-Light for Experimental Science and Applications in the Middle East). What can we learn from such global science endeavours in areas beyond research? What can be achieved, what should be achieved? The talk will address such questions and will describe the fascinating mixture of science and diplomacy.

Abstract Category

Presenter: HEUER, Rolf (Deutsches Elektronen-Synchrotron (DE))

Session Classification: General

Contribution ID: 37

Type: **Invited Talk**

Introduction to the African Strategy for Fundamental and Applied Physics (ASFAP)

Monday, March 7, 2022 11:00 AM (25 minutes)

The ability to generate scientific innovation and technological knowledge and translate them into new products that are of value to society are key instruments for a society's economic growth and development. As remarkable as these abilities are for other regions in the world, Africa's science, innovation, education, and research infrastructure, particularly in Fundamental and Applied Physics, have over the years been under-valued and under-resourced. Africa cannot afford to lag behind other regions in the world. For that would stretch the technological gap with developed countries even farther. The African Strategy for Fundamental and Applied Physics (ASFAP) initiative was founded with big ambition for change. The aspiration is to demonstrate the potential benefits of physics for African society and to have African countries participate in a global village of technology that is in the interest of every nation in Africa. ASFAP aims to produce a long-term strategy for reforming and transforming the basic physics research and application, higher education, and scientific research systems in Africa to energize and unlock the minds for brighter economic prospects. Key considerations in ASFAP are a strong desire for investment in African science for economic growth driven by physics-based technologies and its beneficial impact, including other sciences that draw heavily on advances in physics. ASFAP is critical if Africa has to take its place as a co-leader in the global scientific process and reap the consequent socio-economic benefits. ASFAP process will last a few years and eventually produce a final report to inform the African and broader communities about the strategic directions likely to have positive impacts on physics education and research in the next decade. ASFAP should help African policymakers, educators, researchers, communities, and international partners in national, regional, and Pan-African organizations on implementing the defined strategic directions and prioritize educational and research resources and activities. ASFAP will complement African top-down strategies and encourage a broad community participation. The process will be repeated every 7-10 years.

Abstract Category

Presenter: FASSI, Farida (Universite Mohammed V (MA))

Session Classification: General

Contribution ID: **38**

Type: **Invited Talk**

Status and Impact of Particle Accelerators in Africa

Monday, March 7, 2022 12:00 PM (25 minutes)

This talk will explore the status of the particle accelerator laboratories in the African continent. Firstly; the presentation will focus on the different particle accelerator laboratories available on the continent, the type of machines available in each of the facilities. Furthermore, the talk will focus on different research platforms available in each facility on the continent; and the societal impact of these facilities.

Abstract Category

Presenter: MIRA, Joele (iThemba LABS)

Session Classification: Physics Plenary (1)

Contribution ID: 39

Type: **Invited Talk**

An Astrophysics Journey from the Kalahari to the Edge of the Universe

Monday, March 7, 2022 12:30 PM (25 minutes)

I will describe my journey in a broader context of Africa's journey in astrophysics, highlighting some key points along the way. The presentation will aim to celebrate and show selected astrophysics achievements and opportunities in Africa and beyond.

Abstract Category

Presenter: LEEUW, Lerothodi (University of Western Cape, South Africa)

Session Classification: Physics Plenary (1)

Contribution ID: 40

Type: **Invited Talk**

An Assessment of Atomic and Molecular Physics in Africa

Monday, March 7, 2022 1:00 PM (25 minutes)

The Atomic and Molecular field is a bedrock for modern science and emerging technologies owing to its connections to many disciplines of physical and biological sciences as well as important for future economic development. Specifically, the fundamental role that Atomic and Molecular physics (together with Optical physics) is playing in the ongoing revolution in the field of quantum information science and technology cannot be overemphasized. In this talk, I will discuss the current state and identifies the challenges, as well as the promising future presented by the Atomic, Molecular and Optical physics field in Africa.

Abstract Category

Presenter: ABAH, Obinna (Newcastle, UK)

Session Classification: Physics Plenary (1)

Contribution ID: 41

Type: **Invited Talk**

Road to SDG5: Role of Women in Astronomy and Physics for African Growth

Tuesday, March 8, 2022 10:00 AM (25 minutes)

Education and its contribution to science, technology, and innovation are the key points for combating poverty in the long term. Education is also a key point for empowering girls and women, which is fundamental for achieving the United Nations Sustainable Development Goals (SDGs). Astronomy is a powerful tool to promote education and science but, in addition to that, it is also one of the leading sciences for bringing strong technological developments and innovation. The status of astronomy and space science in Africa changed significantly over the past years, becoming emerging fields across the continent, and never before it was more possible to use astronomy for development as it is nowadays. This talk will summarise different activities carried out for empowering girls and women through astronomy in Ethiopia and across the continent, including the creation of the African Network of Women in Astronomy, and show how through them we can combat poverty in the long term, and increase in future our possibilities of attaining the United Nations SDGs, including SDG5, for the benefit of our all society. The last part of the talk will cover a list of recommendations for improving the strong gender gap that we still have in science across the world.

Abstract Category

Presenter: POVIC, Mirjana (ESSTI, Ethiopia)

Session Classification: Engagement Plenary

Contribution ID: 42

Type: **Invited Talk**

Status of Young Physicists Forum and the Importance for Education and Capacity Development for Africa

Tuesday, March 8, 2022 10:30 AM (25 minutes)

The Young Physicists Forum (YPF) was formed in 2021 as one of the engagement groups in the African School of Fundamental and Applied Physics (ASFAP) strategy. The forum was instituted to engage rising-star researchers, and is devoted to developing research and science for the benefit of the public. The main objectives of the forum are among others, to create a diverse continent of next-generation scientific leaders committed to playing an active role in collaborations pertaining to scientific research and educational issues in Africa. Furthermore, the Young Physicists Forum aims at developing the knowledge and skills of young African physicists, grooming them to acquire a fuller understanding of industrial, regional as well as global agendas. In addition, the forum focuses on communicating cutting-edge scientific research and positioning education on the continent within the context of science. Since its inception last year, the forum has played an active role in identifying the challenges and remedies for young scientists to flourish in various physics fields. To this effect, the forum has so far conducted several virtual meetings to share the knowledge. In the just ended January workshop, for example, the forum invited stakeholders to discuss some of the challenges and opportunities for young African physicists. Notable speakers included Dr. Marie Chantal (University of Rwanda) and Dr. Julia Gonski (Columbia University, United States). The panel discussion included experienced panelists who included Dr. Kétévi Assamagan (Brookhaven National Laboratory), Dr. Lawalley Cole (CAFOR), and Dr. Raissa Malu (IIP). To engage the community, the forum has also conducted a survey on various issues affecting young physicists on the continent. This talk, thus, focuses on the status of the Young Physicists Forum and the importance for education and capacity development for Africa. To join this forum, please start here, <https://twiki.cern.ch/twiki/bin/view/AfricanStrategy/AfYoungPhysicists>.

Abstract Category

Presenter: MULILO, Benard (University of Zambia)

Session Classification: Engagement Plenary

Contribution ID: 43

Type: **Invited Talk**

On making physics relevant to society in general and to scientists in particular: Closing the epistemic gap

Tuesday, March 8, 2022 11:00 AM (25 minutes)

Physics has a bad press: it is seen as a boring discipline ever since High School days. There is no glamour to it, just toil and pain, and for many who engaged in it, the end sight is unemployment. Could it be that physicists don't know how to communicate what their field entails to? I will be tackling the problematics of making physics relevant to society and the scientists in general. I will also be dealing with the methodological and educational aspects of teaching and practicing physics, and the need to close the epistemic gap between physics teaching and the physicist understanding ... By the way, do physicists understand physics?

Abstract Category

Presenter: MIMOUNI, Jamal (University Mentouri Constantine1, Algeria)

Session Classification: Engagement Plenary

Contribution ID: 44

Type: **Invited Talk**

The African Biophysics Landscape

Tuesday, March 8, 2022 12:00 PM (25 minutes)

In the past couple of decades, biophysics not only contributed to great advances in solving important and fundamental questions in biology, but it has also shown to be a notable source of innovation. In fact, biophysics is a fundamental enabling science in medicine, agribusiness, industrial biotechnology and even sustainable energy. Despite the important role it must play in the development of every country's bioeconomy, Africa remains woefully under-invested in biophysics. This presentation will discuss the current status and impact of biophysics in Africa in terms of education and research capacity development.

Abstract Category

Presenter: KRÜGER, Tjaart (University of Pretoria, South Africa)

Session Classification: Physics Plenary (2)

Contribution ID: 45

Type: **Invited Talk**

An introduction to quantum computing and quantum information

Tuesday, March 8, 2022 12:30 PM (25 minutes)

Since its discovery, Quantum Mechanics has been used to describe the behaviour of matter in the bulk, e.g. aggregates of atoms in the form of solids, liquids and gases. Technological advances in the past decades have now provided the possibility of manipulating single atoms, ions and photons. This will bring us to a new era which will most likely be dominated by quantum technologies. In this talk we will briefly review these developments and present a few open problems which can be simply formulated.

Abstract Category

Presenter: KARIMIPOUR, Vahid (Sharif University of Technology, Iran)

Session Classification: Physics Plenary (2)

Contribution ID: 46

Type: **Invited Talk**

Physics of the Earth

Tuesday, March 8, 2022 1:00 PM (25 minutes)

I will talk about frontier research in physics of the solid-Earth in Africa with emphasis on physics of natural hazards such as earthquakes and volcanic eruptions. I will also cover important milestones in the development of the ICTP partnership and community in this specific field in which fundamental physics has direct implications on the society and its resilience.

Abstract Category

Presenter: AOUDIA, Abdelkrim (ICTP)

Session Classification: Physics Plenary (2)

Contribution ID: 47

Type: **Invited Talk**

Physics education for capacity development and research in Africa

Wednesday, March 9, 2022 10:00 AM (25 minutes)

The acceleration of socio-economic development is intrinsically linked to the level of scientific development. While the existing scientific interventions within Africa played a transformative role in the enhancement of human capital development, adequate investment in research and development is required to make further significant strides going forward. Unlocking Africa's potential requires sustained investment in research and development. However, inadequate expenditure in research and development as a percentage of gross domestic product by African countries does not augur well for the progressive realisation of sustainable scientific development. This presentation highlights challenges afflicting physics education in Africa and provides a reflection on key areas for intervention to strengthen capacity building. Critical interrogation of enablers and constraints is required in order to harness the efficacy of capacity building efforts to engender fundamental transformative change in relation to meaningful enhancement of human capital development. Reconfiguration of the existing scientific interventions some of which yielded remarkable results remains a key strategic imperative in the long to medium term. The realisation of this key strategic imperative hinges to a large degree on the establishment of collaborative partnerships involving key stakeholders. Contextually appropriate recommendations for coherent acceleration of scientific development within the broader African context are advanced.

Abstract Category

Presenter: RAMAILA, Sam (University of Johannesburg, South Africa)

Session Classification: Physics Plenary (3)

Contribution ID: 48

Type: **Invited Talk**

African Energy Access and Development: Situation and Research State of the Art

Wednesday, March 9, 2022 10:30 AM (25 minutes)

Africa is facing a major challenge today, which is access to 100 % energy for the entire continent within ten years. This is a real challenge for researchers and actors working in the field of energy and renewable energy in particular. Indeed, the challenge is less the continent's universal access to energy but rather universal and sustainable access to protect and conserve natural resources and the least possible negative impact of the exploitation of the continent's resources. This, calls on, both politicians and stake-holders to find a balance between the right of access to energy and the socio-economic development of the continent and the sustainable and renewable exploitation of Africa's energy resources. Thus scientists, in particular physicist researchers working in the field of Energy, have an important role in decision-making through scientific and technical advice to be given to politicians and decision-makers.

In this communication, African's energy context will be presented followed by the scientific contribution of African researchers in the field of energy. A presentation of possible orientations for a sustainable and innovative exploitation of energy resources in Africa will be made.

Finally, we will present a review of some examples of results and innovations in the field of. energy in the continent.

Abstract Category

Presenter: KOBOR, Diouma (University Assane Seck of Ziguinchor (UASZ), Senegal)

Session Classification: Physics Plenary (3)

Contribution ID: 49

Type: **Invited Talk**

Status and Impact of Fluids and Plasma Physics for Education and Capacity Development in Africa

Wednesday, March 9, 2022 11:00 AM (25 minutes)

Oluwole Daniel Makinde

Faculty of Military Science, Stellenbosch University, Private Bag X2, Saldanha 7395, South Africa

Education and capacity development in the fields of fluid and plasma physics are extremely vital to technological advancement of any nation in generally and Africa in particular. Study of fluid and plasma enable prediction of space weather, medical treatments, and even water purification. Research in fluid and plasma physics are critical to the design of systems in nearly every field of engineering, including aeronautical, astronautical, mechanical, chemical, and civil engineering. In this talk, the three fundamental principles (mass conservation, Newton's second law and energy conservation) governing theoretical research in the field of fluid and plasma physics are discussed. The importance of research capacity development in the field fluid and plasma physics in Africa is emphasized.

Keywords: Importance of fluid and plasma physics; Conservation laws; Maxwell laws of electromagnetism; Africa research capacity development

Abstract Category

Presenter: MAKINDE, Daniel Oluwole (Stellenbosch University, South Africa)

Session Classification: Physics Plenary (3)

Contribution ID: 50

Type: **Invited Talk**

Light sources for capacity building and research in Africa

Wednesday, March 9, 2022 12:00 PM (25 minutes)

Light sources proved to be super-efficient in a wide range of applications such as physics, chemistry, biology, geology, biomedicine, agriculture, environment, materials science, cultural heritage and archeology. Therefore, their scientific and societal impact on education, science and technology development, besides capacity building, cannot be doubted. During the last two decades, a huge demand in the implementation of light sources all over the world is witnessed. This talk will highlight the light sources significance for Africa. A highlight on the ASFAP Light Sources working group will be also presented. The working group aims at advising on strategies towards light sources in Africa, with considerations of compact light sources, synchrotron light sources, and other related topics relevant to an African context such as the capacity building development.

Abstract Category

Presenter: KAMEL, Gihan (Helwan University Egypt and SESAME Light Source)

Session Classification: Physics Plenary (4)

Contribution ID: 51

Type: **Invited Talk**

Condensed Matter and Materials Physics Capacity building and Research for African Development

Wednesday, March 9, 2022 12:25 PM (25 minutes)

Africa has abundant materials that have not been fully utilized to make a significant impact on the development of the continent. Given that Condensed Matter and Materials Physics deals with properties of matter at ordinary chemical and thermal energy scales, it has the largest number of direct practical applications. Condensed Matter and Materials Physics has played a key role in the technological advances that have changed our lives so dramatically in the last 50 years as evidenced by many associated discoveries ranging from the integrated circuit, magnetic recording disks to high performance composite materials. Consequently, Condensed matter and Materials Physics is seen as the key to unlocking the potential that the abundant materials in Africa have for continental development.

The presentation will give an overview of the status of education, capacity building and research in Condensed Matter and Materials Physics on the African continent. It will also show initiatives in place and proposed way forward to improve the status.

Abstract Category

Presenter: CHIGOME, Samuel (Botswana Institute for Technology Research and Innovation)

Session Classification: Physics Plenary (4)

Contribution ID: 52

Type: **Invited Talk**

Welcome address

Wednesday, March 9, 2022 2:00 PM (10 minutes)

Abstract Category

Presenter: DARVE, Christine (European Spallation Source, Sweden)

Session Classification: ASP Forum

Contribution ID: 53

Type: **Invited Talk**

The African School of Fundamental Physics and Applications (ASP)

Wednesday, March 9, 2022 2:10 PM (25 minutes)

The African School of Fundamental Physics and Applications (ASP) is a biennial school in Africa. It is based on the observation that fundamental physics provides excellent motivation for students of science. The aim of the school is to build capacity to harvest, interpret, and exploit the results of current and future physics experiments and to increase proficiency in related applications. The participating students are selected from all over Africa. The school also offers a workshop to train high school teachers, an outreach to motivate high school pupils and a physics conference to support a broader participation of African research faculties. ASP was started in 2010, but has since evolved to be much more than a school—it has grown to become a program of continuous activities with directed ethos towards physics as an engine for development in Africa. In this talk, we will present the school and discuss strategies to make it sustainable.

Abstract Category

Presenter: ASSAMAGAN, Kétévi Adiklè (Brookhaven National Laboratory (US))

Session Classification: ASP Forum

Contribution ID: 54

Type: **Invited Talk**

ASP2022 — South Africa

Wednesday, March 9, 2022 2:40 PM (25 minutes)

By September 30, 2019, South Africa was among four African countries that have submitted proposals to the International Organizing Committee (IOC) of the African School of Fundamental Physics and Applications (ASP) to host ASP2022. After reviewing all the proposals, the IOC in December of 2019 unanimously selected the bid from South Africa with the main aim of boosting capacity in smaller universities and in rural regions. The venue for ASP2022 in South Africa will be the Nelson Mandela University in Gqeberha (formerly Port Elizabeth) in the Eastern Cape Province.

This presentation will highlight the journey since the announcement, the host, supporting activities, and the current status regarding ASP2022 logistics & preparations.

Abstract Category

Presenter: MURONGA, Azwinndini (Nelson Mandela University, South Africa)

Session Classification: ASP Forum

Contribution ID: 55

Type: **Invited Talk**

ASP Discussion

Wednesday, March 9, 2022 3:10 PM (25 minutes)

Abstract Category

Session Classification: ASP Forum

Contribution ID: 56

Type: **Invited Talk**

Vote of Thanks

Wednesday, March 9, 2022 3:40 PM (5 minutes)

Abstract Category

Presenter: CHABAB, Mohamed (Cadi Ayyad University (MA))

Session Classification: ASP Forum

Contribution ID: 57

Type: **Invited Talk**

STEM Capacity Building Strategies for African Development

Wednesday, March 9, 2022 4:15 PM (25 minutes)

Abstract Category

Presenter: MALU, Raissa (Investing In People (IIP) ASBL)

Session Classification: ASP Forum

Contribution ID: 58

Type: **Invited Talk**

Physics Research Strategies for African Development

Wednesday, March 9, 2022 4:45 PM (25 minutes)

Abstract Category

Presenter: KA, Oumar (Cheikh Anta Diop University, Senegal)

Session Classification: ASP Forum

Contribution ID: 59

Type: **Panel Discussion**

Panel Discussion —Theme: Physics education and research roadmap development and implementation in Africa

Wednesday, March 9, 2022 5:15 PM (1 hour)

Panelists:

1. Dr. Raissa Malu Directrice - Investing In People (IIP) ASBL Member of the Democratic Republic of Congo Presidential Panel to the African Union
2. Prof. Oumar Ka Université Cheikh Anta Diop de Dakar, Sénégal Founding member and current President of the Senegalese Physical Society Co-Vice President of the West African Physical Society
3. Dr. Melissa Denecke Director | Division of Physical and Chemical Sciences Department of Nuclear Applications, International Atomic Energy Agency
4. Prof. Catherine Jane Ngila The Acting Executive Director of the African Academy of Sciences (AAS)

Abstract Category

Presenters: NGILA, Catherine Jane (The African Accademy of Sciences); DENECKE, Melissa (IAEA); KA, Oumar (Senegalese Physical Society and Cheikh Anta Diop University, Senegal); MALU, Raissa (Investing In People (IIP) ASBL)

Session Classification: ASP Forum

Contribution ID: 60

Type: **Invited Talk**

Nuclear Physics in Africa –Education, Research and Challenges

Thursday, March 10, 2022 10:00 AM (25 minutes)

African development depends on its array of technological advancement and human-capital resources. Nuclear physics has proven to be part of the essential area that has contributed to the ongoing industrialization from the inception of Manhattan project. Meanwhile, African countries are still in the crawling stage despite the abundance of intellectual capacities and abundance resources. The focus of this talk will be on the available nuclear physics research facilities in Africa, as compiled by the IAEA physics section, and their various research applications ranging from basic and fundamental research, analytical services, medical, as well as environmental radiation. The role of African government policies towards the advancement of science and technology will also be mentioned.

Abstract Category

Presenter: USAM, Iyabo (University of the Witwatersrand, South Africa)

Session Classification: Physics Plenary (5)

Contribution ID: 61

Type: **Invited Talk**

On Particle Physics, ASFAP and Education in Africa: Status and Challenges

Thursday, March 10, 2022 10:30 AM (25 minutes)

In this this talk, I will give an overview of the particle physics community in Africa with a focus on some research groups actively involved in the LHC experiments.

It will also highlight the recent activities of the working group dedicated to this particle physics through ASFAP strategy whose aim is to provide a shared roadmap for the field. Finally, I will briefly discuss the impact of particle physics on education in the continent.

Abstract Category

Particle Physics

Presenter: CHABAB, Mohamed (Cadi Ayyad University (MA))

Session Classification: Physics Plenary (5)

Contribution ID: 62

Type: **Invited Talk**

Solar Powered Radiotherapy in Africa

Thursday, March 10, 2022 12:30 PM (25 minutes)

Title: Solar-powered Radiotherapy 4.0 –chance for Radio-Oncology in Africa

Author: Holger Wirtz, email: wirtz@strahlentherapie-singen.de; Phone: +49-7731-79768-17

Affiliation: Lake Constance Radiation Oncology Center, Singen Friedrichshafen

Introduction:

WHO estimate that 14 million people around the world are diagnosed with cancer each year and half of them live in developing countries. Around 70% of the people who die from cancer live now in low-income or medium-income countries. Cancer kills more people than HIV/AIDS, tuberculosis and malaria together. All these people share only 3% of the world's health care professionals and 1% of the world's total costs for health care. 50-60% of cancer patients require radiotherapy as important (and cost effective) part of their treatment. There is an estimated shortage of around 5.000 radiotherapy machines in low-middle-income-countries (LMICS). The majority of people in Africa suffering from cancer has no or limited access to radiotherapy technology. State of the art radiotherapy machines (linear-accelerators) need (uninterruptable) electrical power.

Project-plan, Implementation in Singen (Germany):

The Lake Constance Radiation Oncology Center, Singen run 2 Linacs of ELEKTA and 1 go.SIM-CT-Scanner of SIEMENS. The power consumption is about 150-170 MWh/a. The annual cost was about 35.000€ (dropped to 24.000€). Investigation on kW-peak-behavior of the ELEKTA-Linacs, CT, IT and cooling and a site-dependence computer-simulation on solarization was done to determine the solar-field. A cost-plan (return of investment) was developed. Each year the solar-harvest is about 55-60 MWh (based on 400m²-solar-field on the roof). It can be shown, that the annual cost can be cut by 30-40%; in summer the site is completely independent from public-grid. In case of low-sun periods electrical-power is purchased from public grid. In sunny periods the solar-generator feeds back energy in the neighborhood-hospital!

Project-cost-plan, Implementation in Ghana:

2016 the OiER (Organization for International Economic Relations, Vienna) and ELEKTA asked for a consultancy of planning a solar-power solution of the "Sweden Ghana Medical Centre". This site runs one ELEKTA-Linac, CT and MR. The annual consumption is about 270 MWh. Energy-cost from the grid is about 100.000€ in this region. A computerized simulation on solarization for this site was done. An installation schema was developed. An autarkic energy solution (solar panels + battery container) was preferred. Total cost of implementation was about 300.000€ (2017). Due to the unknown roof-shielding and the expected damage of the panels by radiation the concept of roof-mounting was converted into an area-mounting beside the main buildings minimizing cabling.

Perspective on Education, Training, Controlling:

It makes sense to expand treatment-capacity of existing sites. Increasing staff-number and staff-experiences is obligatory. Electrical power stability and autarkic, technical solutions must be included in purchasing-plans of radiotherapy-machines. Communication (Internet, Mobile, video-conferencing) need power as well. Help for low-experienced staff-group can be obtained from using automatic-planning of patients-therapy, checking and controlling with digital-assistance systems (online-dosimetry, portal-dosimetry, process-control and risk-control). All of those systems can be audited and supported via internet) as to be shown in our departments (Project: RADIO-THERAPY 4.0). Cyber-education on site by experienced remote-trainers can be ordered.

Abstract Category

Presenter: WIRTZ, Holger (Lake of Constance RadiationOncologyCenter, Germany)

Session Classification: Physics Plenary (7)

Contribution ID: 63

Type: **Invited Talk**

Laser Research in Africa

Thursday, March 10, 2022 12:00 PM (25 minutes)

Laser research remains a highly topical field, despite being more than half a century old. The history of laser research in Africa is nearly as long as the history of the laser itself, with research spanning the North and the South, from physics to biology. Lasers are now ubiquitous tools in most university laboratories, where world class research is done in a variety of fields. In this talk I will give a brief historical review of laser research in Africa, with a particular focus on South Africa, highlighting in particular the scientific achievements made over the past decade.

Abstract Category

Presenter: FORBES, Andrew (University of the Witwatersrand, South Africa)

Session Classification: Physics Plenary (6)

Contribution ID: 65

Type: **Invited Talk**

ASFAP Working Group Summary of Societal Engagements

Friday, March 11, 2022 10:00 AM (25 minutes)

This talk presents the summary of the ASFAP working meeting on Monday, March 7, at 16:30 about societal engagements, <https://indico.cern.ch/event/1060503/timetable/?view=standard#day-2022-03-07>.

Abstract Category

Presenter: LAASSIRI, Mounia (Mohammed V University, Morocco)

Session Classification: ASFAP Working Group Summaries

Contribution ID: 66

Type: **Invited Talk**

ASFAP Working Group Summary of Light Sources & Applications

Friday, March 11, 2022 10:30 AM (25 minutes)

This talk presents the summary of the ASFAP working meeting on Tuesday, March 8, at 16:30 about light sources and their applications, <https://indico.cern.ch/event/1060503/timetable/?view=standard#day-2022-03-08>.

Abstract Category

Presenter: HADDAD, Sonia (University of Tunis El Manar, Tunisia)

Session Classification: ASFAP Working Group Summaries

Contribution ID: 67

Type: **Invited Talk**

ASFAP Working Group Summary of Particle, (Astro)particle physics & Applications

Friday, March 11, 2022 11:00 AM (25 minutes)

This talk presents the summary of the ASFAP working meeting on Thursday, March 10, at 16:00 about particles and related fields, <https://indico.cern.ch/event/1060503/timetable/?view=standard#day-2022-03-10>.

Abstract Category

Presenter: MORENO LLACER, Maria (Univ. of Valencia and CSIC, Spain)

Session Classification: ASFAP Working Group Summaries

Contribution ID: 68

Type: **Invited Talk**

ASP COVID-19 Data Analysis Results

Friday, March 11, 2022 2:30 PM (25 minutes)

We studied the COVID-19 pandemic evolution in ten African Countries, namely Benin, Cameroon, Ghana, Kenya, Madagascar, Mozambique, Rwanda, South Africa, Togo, and Zambia. For each country considered, we modeled simultaneously the data of the active, recovered and death cases. In this study, we used a year of data since the first cases were reported. We estimated the time-dependent basic reproduction numbers, R_0 , and the fractions of infected but unaffected populations, to offer insights into containment and vaccine strategies in African countries. We found that $R_0 \leq 4$ at the start of the pandemic but has since fallen to $R_0 \sim 1$. The unaffected fractions of the populations studied vary between 1–10% of the recovered cases. The results are published in the Scientific African, <https://doi.org/10.1016/j.sciaf.2021.e00987>. We are continuing the study by including impacts of vaccination campaigns, and new countries such as Nigeria. In this talk, I will present the study and the results.

Abstract Category

Presenter: MABOTE, Toivo Samuel (Universidade Eduardo Mondlane, Mozambique)

Session Classification: ASP, ASFAP

Contribution ID: 69

Type: **Invited Talk**

IEEE Nuclear and Plasma Science Society

Friday, March 11, 2022 3:00 PM (25 minutes)

IEEE is the world's largest professional association with more than 400'000 engineers and physicists worldwide. It contains 46 societies, with the Nuclear and Plasma Sciences Society (NPSS) being one of them, with about 3'000 members. Since several years NPSS organizes instrumentation schools in the areas of instrumentation for particle physics and medical imaging (PET). The schools were mainly held in developing countries like Vietnam, South Africa, Malaysia and Senegal, and were a mixture of introductory lectures and practical hands-on sessions in electronics, data acquisition and analysis. Efforts are currently under way to join efforts and resources between ASP and NPSS for future schools.

Abstract Category

Presenter: RITT, Stefan (Paul Scherrer Institut (Switzerland))

Session Classification: ASP, ASFAP

Contribution ID: 70

Type: **Invited Talk**

ASFAP path forward & Feedback from IAC

Friday, March 11, 2022 3:30 PM (25 minutes)

Abstract Category

Presenter: QUEVEDO, Fernando (University of Cambridge, UK)

Session Classification: ASP, ASFAP

Contribution ID: 71

Type: **Invited Talk**

APS Forum on International Physics (FIP)

Friday, March 11, 2022 12:00 PM (25 minutes)

The Forum on International Physics (FIP) is a voluntary association of the American Physical Society (APS) members, who are interested in advancing the knowledge of physics and its diffusion by fostering cooperation and communication among physicists of all countries. The FIP organizes focused sessions at APS meetings and the PHYSICS MATTERS monthly colloquia series as a “Physics for Development” initiative in COVID times. The FIP also distributes nominations for Distinguished Students travel grants, APS fellowships, and a Wheatley Award.

The unique strength of the FIP lies in the openness of its agenda, which reflects the grassroots origin of this Forum.

This talk will describe the FIP program and will present possible synergies with the program of the African School of Fundamental Physics and Applications.

Abstract Category

Presenter: DARVE, Christine (European Spallation Source, Sweden)

Session Classification: International Institutes

Contribution ID: 72

Type: **Invited Talk**

Feedback from UNESCO

Friday, March 11, 2022 12:30 PM (25 minutes)

Abstract Category

Presenter: NAIR-BEDOUELLE, Shamila (Assistant Director-General for Natural Sciences of UNESCO)

Session Classification: International Institutes

Contribution ID: 87

Type: **Discussion Session**

Discussion on Societal Engagements: Community Engagement, Young Physicists, Women in Physics and Physics Education

Monday, March 7, 2022 5:30 PM (30 minutes)

Abstract Category

Presenters: MULILO, Benard (University of Zambia); TCHANICHE FANKAM, Bertrand (Alioune Diop University); BOYE, Diallo (Brookhaven National Laboratory, USA); JOY, Iroka Chidinma (National Space Research and Development Agency, Nigeria); MIMOUNI, Jamal (University Mentouri Constantine1); CYULINYANA, Marie Chantal (University of Rwanda); NIBAMUREKE, Marie Clementine Uwineza; LAASSIRI, Mounia (Mohammed V University, Morocco); BOYE FAYE, Ndeye Arame (University Cheikh Anta Diop, Senegal); RAMAILA, Sam (University of Johannesburg); RAICH, Uli (CERN-retired)

Session Classification: ASFAP Working Groups

Contribution ID: 88

Type: **Discussion Session**

Joint Session on Light Sources and Applications: Light Sources, Accelerators, biophysics, Earth Science, Atomic & Molecular, Condensed Matter & Materials Physics, Optics & Photonics, Energies, Instrumentation, and Computing

Tuesday, March 8, 2022 4:30 PM (1h 30m)

Abstract Category

Presenters: MAKINDE, Daniel Oluwole (Stellenbosch University, South Africa); KOBOR, Diouma (University Assane Seck of Ziguinchor (UASZ)); OFOSU, Eric (University of Energy and Natural Resources, Ghana); RAHAL, Ghita (Centre National de la Recherche Scientifique (FR)); KAMEL, Gihan; DRISSI, Lalla Btissam (Mohammed V University, Morocco); NORRIS, Lawrence (AfPS); STODART, Nieldane (iThemba LABS, National Research Foundation (ZA)); ABAH, Obinna (Newcastle, UK); GUEYE, Paul (Facility for Rare Isotope Beams); CHERIF, Rim (Université de Carthage, Tunisia); MUSEMBI, Robinson J. (University of Nairobi, Kenya); CHIGOME, Samuel (Botswana Institute for Technology Research and Innovation); HADDAD, Sonia; KENMOE, Stéphane (University of Duisburg-Essen, Germany); D'ALMEIDA, Thierry (Sèmè City, Benin); KRÜGER, Tjaart; GOERLACH, Ulrich (Centre National de la Recherche Scientifique (FR))

Session Classification: ASFAP Working Groups

Contribution ID: 90

Type: **Discussion Session**

Particles and Applications: Accelerators, Particle Physics, Nuclear Physics, Medical Physics, (particle)Astrophysics & Cosmology, Fluid & Plasma, Complex Systems, Instrumentation & Detectors, Computing, and Nuclear Energy

Thursday, March 10, 2022 4:00 PM (1h 30m)

Presenters: ABDELALIM, Ahmed Ali (Helwan University, also at CTP, Zewail City of Science and Tech.); ASABERE, Bernard (GSSTI, AVN Ghana); MAKINDE, Daniel Oluwole (Stellenbosch University, South Africa); KOBOR, Diouma (University Assane Seck of Ziguinchor (UASZ)); BUTHELEZI, Edith Zinhle (iThemba LABS, National Research Foundation (ZA)); OFOSU, Eric (University of Energy and Natural Resources, Ghana); RAHAL, Ghita (Centre National de la Recherche Scientifique (FR)); IBRAHIM, Hassan (Cairo Univerasity, Egypt); USMAN, Iyabo (University of the Witwatersrand, South Africa); MIRA, Joele (iThemba LABS); LEEUW, Lerothodi (University of Western Cape, South Africa); DALTON, Mark (Jefferson Lab); POVIC, Mirjana (ESSTI, Ethiopia); CHABAB, Mohamed (Cadi Ayyad University (MA)); USIKALU, Mojisola (Covenant University, Nigeria); STODART, Nieldane (iThemba LABS, National Research Foundation (ZA)); GUEYE, Paul (Facility for Rare Isotope Beams); MUHEKI, Priscilla (Mbarara University of Science and Technology, Uganda); MUSEMBI, Robinson J. (University of Nairobi, Kenya); MANXOYI , Sivuyile (South African Astronomical Observatory); AVERY, Stephen (University of Pennsylvania); GOERLACH, Ulrich (Centre National de la Recherche Scientifique (FR)); SEIF, Walaa (Cairo University, Egypt); AMHIS, Yasmine Sara (IJCLab (Orsay))

Session Classification: ASFAP Working Groups

Contribution ID: 132

Type: **Contributed Oral Presentation**

Determination of the thickness and optical properties by reflectance method

Monday, March 7, 2022 2:30 PM (12 minutes)

Abstract Category

Presenter: TCHENKA, abdelaziz (Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 133

Type: **Contributed Oral Presentation**

Structural, electronic and optical properties of CN, C₂N₂ and C₄N₂ nanotubes resulting from N-doping small (3,3) SWCNT : A DFT study

Monday, March 7, 2022 2:45 PM (12 minutes)

Abstract Category

Presenter: TAKASSA, Rabi (Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 134

Type: **Contributed Oral Presentation**

Electron-phonon and Spin orbit coupling in transition metal dichalcogenides quantum dot after short pulse excitation under magnetic field

Monday, March 7, 2022 3:00 PM (12 minutes)

Abstract Category

Presenter: FOBASSO, FLORETTE (UNIVERSITY OF DSCHANG, Cameroon)

Session Classification: Parallel Session 1

Contribution ID: 135

Type: **Contributed Oral Presentation**

Density functional study of conductive organic polymers derived from PPE-PPV

Monday, March 7, 2022 3:15 PM (12 minutes)

Abstract Category

Presenter: CHAABANI, Montassar (Université de Tunis El Manar, Tunisia)

Session Classification: Parallel Session 1

Contribution ID: 136

Type: **Contributed Oral Presentation**

Effect of chemical composition on the structure and dielectric properties of pure and doped Al₂O₃-ZrO₂ composites

Monday, March 7, 2022 3:30 PM (12 minutes)

Presenter: SAHU, DIPTIRANJAN (Namibia University of Science and Technology)

Session Classification: Parallel Session 1

Contribution ID: 137

Type: **Contributed Oral Presentation**

**Gamma-ray mass attenuation coefficient of
environmentally friendly
Bi_{0.5}Na_{0.34}K_{0.11}Li_{0.05}Ti_{1-x}Ni_xO₃ ceramics**

Monday, March 7, 2022 3:45 PM (12 minutes)

Abstract Category

Presenter: OLARINOYE, Oyeleke (Federal University of Technology, Minna, Nigeria)

Session Classification: Parallel Session 1

Contribution ID: 138

Type: **Contributed Oral Presentation**

A High-Granularity Timing Detector (HGTD) in ATLAS Phase-II Upgrade: Physics and performance with HGTD

Monday, March 7, 2022 2:48 PM (15 minutes)

Presenter: BENDEBBA, Fatima (Universite Hassan II, Ain Chock (MA))

Session Classification: Parallel Session 2

Contribution ID: 139

Type: **Contributed Oral Presentation**

Minimum bias simulation of parasitic collisions

Monday, March 7, 2022 3:24 PM (15 minutes)

Presenter: EZZARQTOUNI, Sanae (Universite Hassan II, Ain Chock (MA))

Session Classification: Parallel Session 2

Contribution ID: 141

Type: **Contributed Oral Presentation**

Search of new resonances decaying into top quark pairs in the lepton+jet final state in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector

Monday, March 7, 2022 2:30 PM (15 minutes)

Abstract Category

Presenter: NGAIR, Badr-Eddine (Universite Mohammed V (MA))

Session Classification: Parallel Session 2

Contribution ID: 142

Type: **Contributed Oral Presentation**

Search for charged Higgs boson via $H^\pm W^\mp$ at the LHC

Abstract Category

Presenter: OUCHEMHOU, Mohamed (Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 2

Contribution ID: 143

Type: **Contributed Oral Presentation**

Search for invisible Higgs bosons produced via vector boson fusion (VBF) at the LHC using the ATLAS detector

Monday, March 7, 2022 3:06 PM (15 minutes)

Presenter: ZAAZOUA, Mohamed (Universite Mohammed V (MA))

Session Classification: Parallel Session 2

Contribution ID: 144

Type: **Contributed Poster Presentation**

Structural and Optical proprieties of CuxS deposited by flash evaporation

Thursday, March 10, 2022 6:20 PM (5 minutes)

Abstract Category

Presenter: AMIRI, Lhoucin (Cadi Ayyad University, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 145

Type: **Contributed Oral Presentation**

Structural analysis and band gap engineering of 2D perovskite $\text{Cs}_2\text{XAg}(\text{I}_{1-x}\text{Br}_x)_6$ for solar cell applications using DFT method

Tuesday, March 8, 2022 2:45 PM (12 minutes)

Presenter: ELFATOUAKI, Fatima (LaMEE, Department of Physics, Faculty of Sciences Semlalia, Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 146

Type: **Contributed Oral Presentation**

Properties of the structure, electronics and opticals of AB and AA stacking bilayer graphene intercalated by Sr atom

Tuesday, March 8, 2022 3:00 PM (12 minutes)

Presenter: FARKAD, Omar (LaMEE, Department of Physics, Faculty of Sciences Semlalia, Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 147

Type: **Contributed Oral Presentation**

Structural, Electronic and Optical parameters of Zn₂VN₃ Compounds by Density functional theory

Tuesday, March 8, 2022 3:15 PM (12 minutes)

Presenter: HASSINE, Sanae (LaMEE, Department of Physics, Faculty of Sciences Semlalia, Cadi AyyadUniversity, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 148

Type: **Contributed Oral Presentation**

Preparation and characterization CNCTS thin films for solar cells without a sulfurization step

Tuesday, March 8, 2022 3:30 PM (12 minutes)

Abstract Category

Presenter: ABALI, Abdelaziz (LMEE,FSSM, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 149

Type: **Contributed Oral Presentation**

Structural, elastic, thermodynamic, electronic, optical and thermoelectric properties of lead-free double perovskites Cs₂NaBiX₆ (X= Cl, Br, I) from ab-initio calculations

Tuesday, March 8, 2022 3:45 PM (12 minutes)

Abstract Category

Presenter: OUHAMMOU, Ahmed (Hassan II University, Faculty of Sciences and Techniques, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 150

Type: **Contributed Oral Presentation**

Extended Higgs sector of 2HDM with real triplet : Theoretical and phenomenological studies at the LHC

Tuesday, March 8, 2022 2:30 PM (12 minutes)

Abstract Category

Presenter: AIT OUAZGHOOR, BRAHIM (Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 2

Contribution ID: 151

Type: **Contributed Oral Presentation**

Measurement of azimuthal angular correlations of D mesons with charged particles in pp collisions at $\sqrt{s} = 13$ TeV with ALICE at the LHC

Tuesday, March 8, 2022 3:00 PM (12 minutes)

Abstract Category

Presenter: NAIK, Bharati (University of the Witwatersrand, South Africa)

Session Classification: Parallel Session 2

Contribution ID: 152

Type: **Contributed Oral Presentation**

3-Dimensional BF Theory On Seifert Fibered Manifolds

Tuesday, March 8, 2022 2:45 PM (12 minutes)

Abstract Category

Presenter: KAKONA, Tony Mbambu (ICTP-EAIFR, Rwanda)

Session Classification: Parallel Session 2

Contribution ID: 153

Type: **Contributed Oral Presentation**

Multiplicity dependence of heavy-flavour production in small systems in ALICE

Tuesday, March 8, 2022 3:15 PM (12 minutes)

Abstract Category

Presenter: MHLANGA, Sibaliso (University of Cape Town, South Africa)

Session Classification: Parallel Session 2

Contribution ID: 154

Type: **Contributed Oral Presentation**

Light charged Higgs boson decays to a W^\pm and a BSM Higgs boson at the LHC

Monday, March 7, 2022 3:43 PM (15 minutes)

Presenter: KRAB, Mohamed (Research Laboratory in Physics and Engineering Sciences, Modern and Applied Physics Team, Polidisciplinary Faculty, Beni Mellal, 23000, Morocco.)

Session Classification: Parallel Session 2

Contribution ID: 157

Type: **Contributed Oral Presentation**

D-meson Suppression and Azimuthal Anisotropy in a Strongly Coupled Plasma at $\sqrt{s_{NN}} = 5.5$ TeV with Comparison to LHC Measurements

Thursday, March 10, 2022 2:00 PM (12 minutes)

Abstract Category

Presenter: NGWENYA, Blessed Arthur (University of Cape Town, South Africa)

Session Classification: Parallel Session 2

Contribution ID: 158

Type: **Contributed Oral Presentation**

On the DDM and ML quantum concepts in nuclear shape phase transitions of atomic nuclei

Thursday, March 10, 2022 2:15 PM (12 minutes)

Presenter: EL BATOUL, Abdelwahed (High Energy Physics and Astrophysics Laboratory, Faculty of Sciences Semlalia, Cadi Ayyad University P.O.B 2390, Marrakesh 40000, Morocco.)

Session Classification: Parallel Session 2

Contribution ID: 159

Type: **Contributed Oral Presentation**

Using Microphotonic Nuclear Forensics to Mediate Nuclear Security and Nuclear Safety

Thursday, March 10, 2022 2:30 PM (12 minutes)

Abstract Category

Presenter: ANGEYO KALAMBUKA, HUDSON (University of Nairobi-Department of Physics, Kenya)

Session Classification: Parallel Session 2

Contribution ID: 160

Type: **Contributed Oral Presentation**

Soil gas radon, indoor radon and its diurnal variation in Northern region of Cameroon

Thursday, March 10, 2022 2:45 PM (12 minutes)

Abstract Category

Presenter: SADJO, Sadjo (University of Maroua, Cameroon)

Session Classification: Parallel Session 2

Contribution ID: 161

Type: **Contributed Oral Presentation**

Evaluation of whole body dose absorbed by Geant4 simulation

Thursday, March 10, 2022 2:45 PM (12 minutes)

Abstract Category

Presenter: ETTOUFI, asmae (Hassan II University of Casablanca, Morocco)

Session Classification: Parallel Session 3

Contribution ID: 162

Type: **Contributed Oral Presentation**

Monte Carlo Simulation of the Biograph mCT PET scanner using GATE

Thursday, March 10, 2022 3:00 PM (12 minutes)

Presenter: EL KATIB, MAHMOUD (Faculty of Science, Ibn Tofail University, Kenitra, Morocco.)

Session Classification: Parallel Session 3

Contribution ID: 163

Type: **Contributed Oral Presentation**

The African Light Source

Friday, March 11, 2022 1:00 PM (25 minutes)

The world faces many challenges, articulated in the UN Sustainable Development Goals. African faces these challenges too and has in addition its own versions of them, as well as others. Consider also that we also need not only applied research to address these challenges, but also curiosity driven fundamental research. This advances knowledge and has longer timescales. It prepares humanity to address problems in new ways, and to address problems that have not yet manifested to the same extent as the previous ones. Having identified then the research issues, we can ask what science will contribute, and from there, what instrumentation. The single most significant instrument that emerges, is the modern light source, which is then surely a most transformative mega-research. Research is both fundamental and applied. Both streams lead to innovation, competitive industry, the solution of problems of particular relevance for Africa, high end human capacity development, building the culture of learning, the inspiration of young learners to greater efforts and building a new generation of competent and enabled youth. There are other aspects, such as science diplomacy, pan Africanism, the globalisation and democratisation of participation in new knowledge generation, the implication that the large scale research infrastructure is fed by a healthy regional and national capacity in terms of human and equipment infrastructure. The passionate belief in this positive role for mega-science in society has driven the momentum towards the African Light Source. A combination of African and International leadership towards an African Light Source is embodied in the project for a Light Source in Africa. These COVID times have seen the Light Source designated as an essential service, remaining open during lockdown, as the front-runner in the fight against this greatest scourge of our decade. Indeed, we would like to see Africa extend its already significant contribution, to combating this disease, and especially others of particular relevance to Africa, as well as those of the next Pandemics. This contribution details the progress on the Roadmap towards the African Light Source, and outlines especially the current and future projects.

Abstract Category

Presenter: CONNELL, Simon (University of Johannesburg, South Africa)

Session Classification: International Institutes

Contribution ID: 164

Type: **Contributed Oral Presentation**

Investigation of Subsurface Structures within Bosso Local Government for Groundwater Exploration Using Magnetic and Resistivity Data

Thursday, March 10, 2022 3:15 PM (12 minutes)

Abstract Category

Presenter: ABBASS ADEBAYO, ADETONA (Federal University of Technology Minna, Nigeria)

Session Classification: Parallel Session 2

Contribution ID: 165

Type: **Contributed Oral Presentation**

Natural Radionuclides assay in Nigerian Granite Rocks

Tuesday, March 8, 2022 3:30 PM (12 minutes)

Abstract Category

Presenter: OLARINOYE, Oyeleke (Federal University of Technology, Minna Nigeria)

Session Classification: Parallel Session 2

Contribution ID: 166

Type: **Contributed Oral Presentation**

**VERTICAL ELECTRICAL SOUNDING AND
PHYSICO-CHEMICAL ANALYSIS OF
GROUNDWATER AND SOIL SAMPLES IN THE
VICINITY OF MUNICIPAL SOLID WASTE IN
KONTAGORA, NIGER STATE**

Tuesday, March 8, 2022 3:45 PM (12 minutes)

Abstract Category

Presenter: RAFIU, Adewuyi Abdulwaheed (Federal University of Technolog, Minna, Niger State, Nigeria)

Session Classification: Parallel Session 2

Contribution ID: 167

Type: **Contributed Oral Presentation**

Physics Masterclasses in Africa and the World

Thursday, March 10, 2022 2:00 PM (15 minutes)

Uta Bilow, Technische Universität Dresden, Germany
Kenneth Cecire, University of Notre Dame, USA

International Masterclasses (IMC) enable high school students and teachers to work with particle physicists to analyze authentic data from contemporary experiments and experience being “physicists for a day”. The IMC program has a worldwide reach, including several universities and research institutes in Egypt, Algeria, Morocco, Cape Verde, and South Africa. As technical infrastructure in Africa improves, there is a great opportunity for many more African institutes to offer IMC on their premises. The authors will discuss the advantages of IMC to Africa, how institutes may join, and ways to overcome obstacles.

Abstract Category

Presenter: CECIRE, Kenneth William (University of Notre Dame (US))

Session Classification: Parallel Session 3

Contribution ID: 168

Type: **Contributed Oral Presentation**

Doing Digital Offline - The CO-VIDEO Project in South Africa

Thursday, March 10, 2022 2:17 PM (15 minutes)

Unizulu Science Centre (USC) in Richards Bay, South Africa, has been running face to face matric workshops for 25 years, presenting practicals and sharpening skills for over 200 000 matric science students. The 2020 lockdown presented a dilemma: matrics needed assistance more than ever, but schools were closed and large gatherings impossible. Many SC's around the world went online, making digital content available through the internet. Very few of the schools in which USC works have reliable internet and almost none of the homes, so this route was not possible. USC worked to convert a 4 hour contact workshop into 8 one-hour videos, highlighting the essential skills for Matric Science Paper 1 –the physics paper. While these videos were made available on the internet for download or streaming, they were physically distributed on memory sticks to teachers, along with an accompanying 48-page workbook. Local industry funding saw provision for the local school district (5500 students in 180 schools) and further South African Institute of Physics funding (with support from Allan Gray) saw a further 20 000 booklets printed and 500 memory sticks manufactured. These were distributed to schools in 3 other provinces and used as the basis for teacher training.

In 2021, the Physics booklet and videos were extensively rewritten and refilmed, adding about 50 % more content and updating with 2020 exams. In addition, projects are underway to make a video series for Life Science and Chemistry. The International Year of Basic Science for Sustainable Development in 2022 makes this project extremely relevant once again in the 2022 school year. Valuable lessons learnt in the process will be shared.

Abstract Category

Presenter: FISH, Derek (Universtiy of Zululand, South Africa)

Session Classification: Parallel Session 3

Contribution ID: 170

Type: **Contributed Oral Presentation**

Studies of an injected electron bunch into a superconducting cavity for BriXSinO's ERL

Tuesday, March 8, 2022 3:45 PM (12 minutes)

Abstract Category

Presenter: SAMSAM, Sanae (Sapienza University, Italy)

Session Classification: Parallel Session 3

Contribution ID: 171

Type: **Contributed Oral Presentation**

Plasma Physics and Fusion Devices and an Introduction to PMI

Monday, March 7, 2022 2:30 PM (12 minutes)

Abstract Category

Presenter: MOHAMED, Dalia (TutorMe Company)

Session Classification: Parallel Session 3

Contribution ID: 172

Type: **Contributed Oral Presentation**

Ubuntu reactors–Modelling Nuclear Reactors with Geant4

Monday, March 7, 2022 2:45 PM (12 minutes)

Abstract Category

Presenter: LAASSIRI, Mounia (Mohammed V University, Morocco)

Session Classification: Parallel Session 3

Contribution ID: 173

Type: **Contributed Oral Presentation**

New hybrid organic-inorganic ferrophoto voltaic perovskites nanoparticles for high voltage

Monday, March 7, 2022 3:00 PM (12 minutes)

Abstract Category

Presenter: NDIOUKANE, Remi (Universié de Ziguinchor, Senegal)

Session Classification: Parallel Session 3

Contribution ID: 174

Type: **Contributed Oral Presentation**

X-ray technological irradiation for TID studies on silicon sensor and electronic devices in a medical facility

Monday, March 7, 2022 3:15 PM (20 minutes)

Total Ionizing Dose (TID) effects tests are required not only for silicon particle sensors developed in high energy physics experiments, but also for electronic devices and elements used in commercial, automotive and space applications. These tests and studies can be performed not only in facilities explicitly built for this mission, but also in medical or biological research facilities when some minima requirements are satisfied. Generally this irradiations can be performed without interfering with the medical and biological tasks of the facility. In this talk will be shown why these studies are extremely relevant for research and industries, how to perform these irradiations and the minimum instrumentation required for this type of studies. Finally will be described the planification and realization of SiPM x-ray irradiations for TID characterization realized in the Italian TIFPA-INFN Trento Center laboratory, using instruments originally realized for medical or biological irradiations.

References

- [1] Di Ruzza, B.; Possibility of Total Ionizing Dose Effects measurements for LHC experiments elements in a medical facility: the TIFPA-INFN experience
doi: 10.22323/1.397.0247; <https://pos.sissa.it/397/247/>
- [2] Di Ruzza, B. et al.; Radiation damage on SiPMs for Space Applications
<https://arxiv.org/abs/2112.08089>

Abstract Category

Presenter: DI RUZZA, Benedetto (Universita e INFN, Padova, Italy)

Session Classification: Parallel Session 3

Contribution ID: 175

Type: **Contributed Oral Presentation**

Statistical Approach for Detection of Low-Level Radioactivity

Monday, March 7, 2022 3:38 PM (20 minutes)

Decommissioning involves activities such as the dismantling of power plants. Amongst the various technical challenges of decommissioning is to carry out accurate radioactivity measurements of a wide area of waste types. In this paper, we aim at measuring a low-activity uranium contamination on concrete surfaces, with varying enrichment encountered levels within a basic nuclear facility. In this context, we have developed an advanced method based on Bayesian inference. It allows to take a reasonable decision when using restricted and possibly conflicting information from various sources. The implementation of the Bayesian approach is based on a priori vectors constructed from the coupling of experimental data acquired within a basic nuclear facility using high-resolution gamma-ray spectrometry based on a high-purity germanium diode detector (HPGe), as well as simulated data with Monte Carlo N-Particles 6 transport code. The performance evaluation and characterization of Bayesian method were performed using classical receiver operating characteristic curves (ROC) with the study of the radiological background variations effect. The results clearly indicate that the proposed method allows to adjust the confidence degree in the stationarity of the radiological background. They also show that for a stable radiological background, our proposed approach provides a significantly higher tradeoff between specificity and sensitivity, close within 1 to the behavior of an ideal detection procedure with a little degradation in the case of the variability of the background radiation as expected under such constraints. Moreover, Bayesian inference proved their ability to ensure an acceptable tradeoff between the true detection rate (TDR), the false alarm rate (FAR) and the response time, in order to be compatible with the user's requirements.

Abstract Category

Presenter: ARAHMANE, Hanan (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France)

Session Classification: Parallel Session 3

Contribution ID: 176

Type: **Contributed Oral Presentation**

Assessment of Neutron and Gamma Ray Dose Equivalent Rates in Medical Linear Accelerators Operating at Energies Above 10 MV

Tuesday, March 8, 2022 2:30 PM (12 minutes)

Abstract Category

Presenter: AZAIRI, Fatima (EPRA, Department of Physics, Faculty of Sciences Semlalia , Morocco)

Session Classification: Parallel Session 3

Contribution ID: 177

Type: **Contributed Oral Presentation**

A semi empirical formula for dose calculation in brachytherapy treatment and evaluation of tissue composition effect on dose distribution

Tuesday, March 8, 2022 2:45 PM (12 minutes)

Presenter: HARIF, Said (EPRA, Department of Physics, Faculty of Sciences University Cadi Ayyad)

Session Classification: Parallel Session 3

Contribution ID: 178

Type: **Contributed Oral Presentation**

Dosimetric evaluation of Xio Elekta algorithm using an heterogeneous lung phantom

Tuesday, March 8, 2022 3:00 PM (12 minutes)

Abstract Category

Presenter: MAJJATE, ikram (Faculté des sciences Dhar Mehraz Fes, Morocco)

Session Classification: Parallel Session 3

Contribution ID: 179

Type: **Contributed Oral Presentation**

GEANT4 and SRIM evaluation of water equivalent ratio of some dosimetry materials in Carbon therapy beam

Tuesday, March 8, 2022 3:15 PM (12 minutes)

Presenter: ZAHAR, Naima (Hassan II University - Casablanca (MA))

Session Classification: Parallel Session 3

Contribution ID: 180

Type: **Contributed Oral Presentation**

Development of Supervised and Unsupervised Machine Learning Algorithms for Diagnosis of Malaria Parasites in Thin Blood Smears Using Orange Software

Tuesday, March 8, 2022 3:30 PM (12 minutes)

Highly sensitive malaria diagnosis methods that are satisfactory for point-of-care testing in high burden areas are essential for productive treatment of the disease. Microscopists often examine blood smears to diagnose disease and compute parasitemia. Hence, the need for highly trained experts to interpret the data. In this paper, machine learning algorithms for the detection of malaria parasite in thin blood smear images is developed to abolish the reliance on human proficiency. The datasets containing 27558 cell images were obtained from National Library of Medicine, NIH. For supervised learning, logistic regression and random forest classifiers were used for classification, in which logistic regression gave 93.5% accuracy for parasitized and 96.5% for uninfected and random forest gave 90.5% accuracy for parasitized and 90.4% for uninfected. For unsupervised learning, hierarchical clustering clustered parasitized images in one cluster and uninfected in another cluster and k-means discovered two clusters from the dataset. It is concluded that, although this method may not fully abolish the need for trained experts, the algorithms can be of great assistance in aiding the diagnostic decision-making process.

Abstract Category

Presenter: SULEIMAN, Jamila (Federal University of Technology, Minna. Nigeria)

Session Classification: Parallel Session 3

Contribution ID: 181

Type: **Contributed Oral Presentation**

Dark-fluid constraints of shear-free universes

Thursday, March 10, 2022 2:00 PM (25 minutes)

Recent studies into the nature of dark matter and dark energy have resulted in a number of dark-fluid cosmological models. Integrability conditions arising from general irrotational fluid-flow considerations of a universe dominated by one such dark fluid will be investigated under special assumptions on the nature of the spacetime shear. Special emphasis will be placed on linearized perturbations of quasi-Newtonian and anti-Newtonian spacetimes, whereby the conditions for the existence and consistent evolution of such spacetimes in the presence of the Chaplygin gas fluid model will be derived and discussed.

Abstract Category

Presenter: ABEBE, Amare (North-West University, South Africa)

Session Classification: Parallel Session 1

Contribution ID: 182

Type: **Contributed Oral Presentation**

Thermodynamics of a rotating and non-linear magnetic-charged black hole in the quintessence field

Thursday, March 10, 2022 3:13 PM (15 minutes)

Abstract Category

Presenter: NDONGMO, Ragil (University of Yaounde 1, Cameroon)

Session Classification: Parallel Session 1

Contribution ID: **183**

Type: **Contributed Oral Presentation**

Uncovering the fractional order phase transitions in AdS black holes

Thursday, March 10, 2022 2:56 PM (15 minutes)

Abstract Category

Presenter: IRAOUI, Samir (High Energy and Astrophysics Laboratory, Physics Department, FSSM, Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 1

Contribution ID: **184**

Type: **Contributed Oral Presentation**

Cosmic hierarchy in $f(R)$ gravity

Presenter: ABDULRAHMAN, Heba (North-West University, South Africa)

Session Classification: Parallel Session 1

Contribution ID: 185

Type: **Contributed Oral Presentation**

Status and perspectives of the Euclid mission

Thursday, March 10, 2022 2:28 PM (25 minutes)

Euclid is the M2 mission of ESA's Cosmic Vision program dedicated to the study of the dark universe: Dark Matter and Dark Energy, with launch scheduled for 2022. Euclid will observe 15,000 square degrees of extragalactic sky in the visible band with resolution of 0.1arcsec (VIS), in IR photometry for the Y, J, H bands and in slitless spectroscopy between 1 and 2 microns (NISP). Euclid will be able to measure the gravitationally induced distortion of the apparent shapes of about one billion of galaxies (Weak Lensing), and Galaxy Clustering (BAO and RSD), using several tens of millions of spectroscopic redshift determinations and billions of photometric redshifts. After a short introduction to the problem of the accelerated expansion of the Universe and Dark Energy the talk will illustrate the scientific objectives of Euclid and give an update of its status, along with the expected results and foreseen precision and accuracy [1,2].

References:

[1] Euclid Collaboration "Euclid preparation: VII. Forecast validation for Euclid cosmological probes" *A&A* 642, A191 (2020) [arXiv:1910.09273] doi:10.1051/0004-6361/202038071

[2] Euclid Collaboration "Euclid preparation: XV. Forecasting cosmological constraints for the Euclid and CMB joint analysis" *A&A* 657, A91 (2022) [arXiv:2106.08346] doi:10.1051/0004-6361/202141556

Abstract Category

Presenter: RENZI, Alessandro (INFN Padova, Italy)

Session Classification: Parallel Session 1

Contribution ID: 186

Type: **Invited Talk**

Introduction to Machine Learning and Artificial Intelligence

Thursday, March 10, 2022 11:00 AM (25 minutes)

As the amount of data collected from systems in operation increases, the need to effectively analyse this data to gain knowledge about the state of the system increases alike. Leveraging data-driven methods for this analysis allows us to process massive amounts of data more efficiently, as well as gain insights about our systems which we may otherwise have overlooked or not known of their presence altogether.

Machine Learning algorithms by design require large volumes of data to be able to accurately represent systems based on recorded data. This means that for systems which are highly measured, machine learning algorithms can be leveraged for further analysis. In addition, this representation that is learned from the data can be retained and employed for make future inferences without having to touch the data again. This is particularly useful for closed systems, for example, as inferences can be made in real-time allowing for timeous decision-making.

The applications of machine learning methods are far ranging and this talk will give an introductory overview of Machine Learning as well as a list of resources to help those who may be looking to learn how to apply such methods to their own work. It will also go over a very simplified example to show a machine learning model training cycle and some key aspects to think about when reviewing your trained model's metrics.

Abstract Category

Presenter: PHIRI, Mitchell (University of Johannesburg, South Africa)

Session Classification: Physics Plenary (5)

Contribution ID: **187**

Type: **Contributed Poster Presentation**

Expanding Universe in the frame of Deformed Phase Space

Thursday, March 10, 2022 5:55 PM (5 minutes)

Abstract Category

Presenter: TAHIR, TOGHRAI (Moulay Ismail University, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 188

Type: **Contributed Poster Presentation**

Natural radionuclides and radiological risk assessment of granite mining field in Ariskop, Windhoek, Namibia

Thursday, March 10, 2022 5:30 PM (5 minutes)

Presenter: ONJEFU , Sylvanus Ameh (Namibia University of Science and Technology)

Session Classification: Poster Session in Gather.Town

Contribution ID: **189**

Type: **Contributed Poster Presentation**

Solar cells and IoT

Thursday, March 10, 2022 5:30 PM (5 minutes)

Abstract Category

Presenter: MAMADOU, Ossénatou (Institute of Mathematics and Physics, University of Abomey--Calavi, Benin)

Session Classification: Poster Session in Gather.Town

Contribution ID: 190

Type: **Contributed Poster Presentation**

Structural, optical, electrical and dielectric study of Mg doped ZnO nanocrystals

Thursday, March 10, 2022 5:35 PM (5 minutes)

Abstract Category

Presenter: ABED, Chayma (Faculté des sciences de Tunis, Tunisia)

Session Classification: Poster Session in Gather.Town

Contribution ID: 191

Type: **Contributed Poster Presentation**

Theoretical study of two biquadratically coupled order parameters: Application to two-dimensional multiferroics

Thursday, March 10, 2022 5:40 PM (5 minutes)

Abstract Category

Presenter: TONGUE, Grâce (Université de Dschang, Cameroon)

Session Classification: Poster Session in Gather.Town

Contribution ID: 192

Type: **Contributed Poster Presentation**

Synthesis and study on structural, magnetic and ferroelectric properties of bismuth ferrite nanomaterials

Thursday, March 10, 2022 5:45 PM (5 minutes)

Presenter: SAHU, DIPTIRANJAN (Namibia University of Science and Technology)

Session Classification: Poster Session in Gather.Town

Contribution ID: 193

Type: **Contributed Poster Presentation**

Evaluation of radioactivity and radiological health implications of shore sediments along the Okavango riverbank, Namibia

Thursday, March 10, 2022 5:35 PM (5 minutes)

Abstract Category

Presenters: TJAKWANDA, Pedro (Namibia University of Science and Technology); ONJEFU, Sylvanus Ameh (Namibia University of Science and Technology)

Session Classification: Poster Session in Gather.Town

Contribution ID: 194

Type: **Contributed Poster Presentation**

Impact de la force tensorielle sur les propriétés fondamentales des isotopes de l'étain Sn

Thursday, March 10, 2022 6:10 PM (5 minutes)

Abstract Category

Presenter: EL ADRI, Mohamed (Cadi Ayyad University, Marrakesh, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 195

Type: **Contributed Poster Presentation**

Granulometric Discrimination of Marine Sediments

Thursday, March 10, 2022 5:50 PM (5 minutes)

Abstract Category

Presenter: NIANG, Modou (Cheikh Anta DIOP University, Senegal)

Session Classification: Poster Session in Gather.Town

Contribution ID: 196

Type: **Contributed Oral Presentation**

Biosensor based on photonic crystal for Checking whether the cell is cancerous or benign

Tuesday, March 8, 2022 2:30 PM (12 minutes)

Presenter: EL MOUNCHARIH, Abdelkarim (LaMEE, Department of Physics, Faculty of Sciences Semlalia, Cadi Ayyad University, Morocco)

Session Classification: Parallel Session 1

Contribution ID: 197

Type: **Contributed Poster Presentation**

Dynamics of Levitating Polaron on the thickness of the liquid helium films sandwich by two substrates under electromagnetic fields

Thursday, March 10, 2022 6:05 PM (5 minutes)

Abstract Category

Presenter: DJOMOU DJOMOU, Jules-Ronald (Université de Dschang, Cameroon)

Session Classification: Poster Session in Gather.Town

Contribution ID: 198

Type: **Contributed Poster Presentation**

New charged Higgs boson discovery channel at the LHC

Thursday, March 10, 2022 5:40 PM (5 minutes)

Abstract Category

Presenter: BOUKIDI, Mohammed (Cadi Ayyad University, Marrakech, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 199

Type: **Contributed Poster Presentation**

A High Granularity Timing Detector for the ATLAS detector Phase-II upgrade

Thursday, March 10, 2022 5:45 PM (5 minutes)

Presenter: IMAM, Hajar (Universite Hassan II, Ain Chock (MA))

Session Classification: Poster Session in Gather.Town

Contribution ID: 200

Type: **Contributed Poster Presentation**

One-loop radiative corrections to double Higgs production in the Inert Higgs Doublet Model in the Electron–Positron colliders

Thursday, March 10, 2022 6:05 PM (5 minutes)

Abstract Category

Presenter: ABOUABID, Hamza (Université Abdelmalek Essaadi, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 201

Type: **Contributed Poster Presentation**

Development of Ni-doped SnO₂ Dilute Magnetic Oxides for electronic and spintronics applications

Thursday, March 10, 2022 5:55 PM (5 minutes)

Abstract Category

Presenter: WORKU, Yared (University of South Africa)

Session Classification: Poster Session in Gather.Town

Contribution ID: 202

Type: **Contributed Poster Presentation**

Theoretical investigation of the molecular structure, vibrational spectra, thermodynamic and nonlinear optical properties of 4, 5-dibromo-2, 7-dinitro-fluorescein

Thursday, March 10, 2022 6:10 PM (5 minutes)

Presenter: FANKAM FANKAM, Jean Baptiste (University of Yaounde 1-Cameroon)

Session Classification: Poster Session in Gather.Town

Contribution ID: 203

Type: **Contributed Poster Presentation**

A green synthesis of zinc oxide nanoparticles for water treatment: absorbent for removal of copper from wastewater

Thursday, March 10, 2022 6:00 PM (5 minutes)

Abstract Category

Presenter: NANDJEMB, Selma Nuusiku Ndatitangi (Namibia University of Science and Technology)

Session Classification: Poster Session in Gather.Town

Contribution ID: 204

Type: **Contributed Poster Presentation**

Vacuum stability of the scalar potential in the compact 341 model

Thursday, March 10, 2022 6:00 PM (5 minutes)

Abstract Category

Presenter: DJOUALA, Meriem (Laboratoire de Physique Mathématique et Subatomique, Frères Mentouri University, Constantine1, Algeria)

Session Classification: Poster Session in Gather.Town

Contribution ID: 205

Type: **Contributed Poster Presentation**

Gluon in radiative charmonium decay

Thursday, March 10, 2022 5:50 PM (5 minutes)

Abstract Category

Presenter: BENHAMIDA, Azzeddine (University of Oran 1 Ahmed Ben Bella, Algeria)

Session Classification: Poster Session in Gather.Town

Contribution ID: 206

Type: **Contributed Poster Presentation**

Investigation of the influence of different terms of the density of states on the color-singlet QGP partition function and some related physical quantities

Thursday, March 10, 2022 5:45 PM (5 minutes)

Presenter: AIT EL DJOUDI, Amal (Laboratoire de Physique des Particules et Physique Statistique, Ecole Normale Supérieure-Kouba, B.P. 92, 16050, Vieux-Kouba, Algiers, Algeria)

Session Classification: Poster Session in Gather.Town

Contribution ID: 207

Type: **Contributed Poster Presentation**

Effects of color-neutrality on the density driven and thermally driven deconfinement phase transition in a finite volume

Thursday, March 10, 2022 5:30 PM (5 minutes)

Presenter: MOUSSAOUI, Bachir (Laboratoire de Physique des Particules et Physique Statistique Ecole Normale Supérieure-Kouba, B.P. 92, 16050, Vieux-Kouba, Algiers, Algeria)

Session Classification: Poster Session in Gather.Town

Contribution ID: 208

Type: **Contributed Poster Presentation**

Some characteristics of the deconfinement phase transition in a finite volume: Finite-mass effects on some response functions

Thursday, March 10, 2022 5:35 PM (5 minutes)

Abstract Category

Presenter: DJIDA, Rokaya (Ecole Normale Supérieure - Kouba, Algeria)

Session Classification: Poster Session in Gather.Town

Contribution ID: 209

Type: **Contributed Poster Presentation**

Calculation of Radiative Corrections of the Tadpole for the Scalar field for the Gauge Field Propagator of Noncommutative Gauge Supersymmetric Theory

Thursday, March 10, 2022 5:40 PM (5 minutes)

Abstract Category

Presenter: ZAIBAK, Kenza (École Normale Supérieure de Kouba (ENS), Kouba, Algeria)

Session Classification: Poster Session in Gather.Town

Contribution ID: **210**

Type: **Discussion Session**

Physics Education Discussion

Thursday, March 10, 2022 2:34 PM (11 minutes)

Abstract Category

Session Classification: Parallel Session 3

Contribution ID: 211

Type: **Contributed Poster Presentation**

Laser-assisted processes in standard model and beyond

Thursday, March 10, 2022 5:50 PM (5 minutes)

Abstract Category

Presenter: OUHAMMOU, Mohamed (Sultan Moulay Slimane University, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 212

Type: **Contributed Poster Presentation**

Effet du champ laser sur les rapports de branchement du pion chargé négativement

Thursday, March 10, 2022 5:55 PM (5 minutes)

Abstract Category

Presenter: MOUSLIH, Said (Université Sultan Moulay Slimane, Beni Mellal, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 213

Type: **Contributed Poster Presentation**

Elastic scattering of a muon neutrino by an electron assisted by laser

Thursday, March 10, 2022 6:00 PM (5 minutes)

Presenter: EL ASRI, Sabine (Université Sultan Moulay Slimane, Faculté Polydisciplinaire, Équipe de Recherche en Physique Théorique et Matériaux (ERPTM), Béni Mellal, 23000, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 214

Type: **Contributed Poster Presentation**

Muon pair production at e^+e^- colliders in the presence of a circularly polarized laser field

Thursday, March 10, 2022 6:05 PM (5 minutes)

Presenter: OUALI, Moha (Recherche Laboratory in Physics and Engineering Sciences, Team of Modern and Applied Physics, FPBM, USMS, Morocco.)

Session Classification: Poster Session in Gather.Town

Contribution ID: 215

Type: **Contributed Poster Presentation**

Laser-assisted Z-boson decay

Thursday, March 10, 2022 6:10 PM (5 minutes)

Abstract Category

Presenter: MOHAMED, JAKHA (Sultan Moulay Slimane University, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 216

Type: **Contributed Oral Presentation**

Magnetic Resonance Brain Image Classification

Thursday, March 10, 2022 3:15 PM (12 minutes)

Abstract Category

Presenter: HUSSAINI, Ahmed (Federal University of Technology, Minna, Nigeria)

Session Classification: Parallel Session 3

Contribution ID: 217

Type: **Contributed Poster Presentation**

Natural Radioactivity and Associated Radiological Health Hazards Assessment in soil collected around the Van Eck Coal-Fired thermal power plant, Namibia

Thursday, March 10, 2022 6:15 PM (5 minutes)

Presenters: HITILA, Markus (Namibia University of Science and Technology); ONJEFU , Sylvanus Ameh (Namibia University of Science and Technology)

Session Classification: Poster Session in Gather.Town

Contribution ID: **218**

Type: **Contributed Poster Presentation**

SPIRAL2 (SP2)

Thursday, March 10, 2022 6:15 PM (5 minutes)

Abstract Category

Nuclear Physics

Primary author: Dr GHRIBI, Adnan (GANIL, France)

Presenter: Dr GHRIBI, Adnan (GANIL, France)

Session Classification: Poster Session in Gather.Town

Contribution ID: 220

Type: **Contributed Oral Presentation**

Laser-assisted high-energy processes

Thursday, March 10, 2022 3:00 PM (12 minutes)

In this presentation, I will talk about some laser-assisted. processes in high energy physics. Through this theoretical study, we will show that the physical properties of charged particles change when they are subjected to an intense electromagnetic field.

Abstract Category

Particle Physics

Primary authors: MANAUT, Bouzid (Research Laboratory in Physics and Engineering Sciences, Modern and Applied Physics Team, Polidisciplinary Faculty, Beni Mellal, 23000, Morocco.); BENBRIK, Rachid; TAJ, Souad (Sultan Moulay Slimane University)

Presenter: JAKHA, Mohammed (Université Sultan Moulay Slimane, Faculté Polydisciplinaire, Équipe de Recherche en Physique Théorique et Matériaux (ERPTM), Béni Mellal, 23000, Morocc)

Session Classification: Parallel Session 2

Contribution ID: 221

Type: **Contributed Poster Presentation**

Effect of annealing time on the properties of $\text{Cu}_2\text{Fe}_{1-x}\text{Co}_x\text{SnS}_4$ (75% Co) thin film

Thursday, March 10, 2022 6:15 PM (5 minutes)

Abstract Category

Primary author: DRISSI, Safia (Laboratory of Materials, Energy and Environment (LMEE), Cadi Ayyad University, PB, 2390, Marrakech, Morocco)

Presenter: DRISSI, Safia (Laboratory of Materials, Energy and Environment (LMEE), Cadi Ayyad University, PB, 2390, Marrakech, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 222

Type: **Contributed Poster Presentation**

QUANTUMDISTANT CONTROL: QUANTUMGATES TELEPORTATION

Thursday, March 10, 2022 6:20PM (5 minutes)

Abstract Category

Primary authors: EL ALLATI, ABDERRAHIM (Abdelmalek Essaadi University, Morocco); SEIDA, CHAIBATA (Mohammed V University, Morocco)

Presenter: SEIDA, CHAIBATA (Mohammed V University, Morocco)

Session Classification: Poster Session in Gather.Town

Contribution ID: 223

Type: **Invited Talk**

Announcement of 3 best poster presentations

Friday, March 11, 2022 2:15 PM (5 minutes)

Presenter: ABEBE, Amare (North-West University)

Session Classification: General

Contribution ID: 224

Type: **Invited Talk**

Announcement of 3 best oral presentations

Friday, March 11, 2022 2:20 PM (5 minutes)

Presenter: YITAMBEN, Esmeralda

Session Classification: General

Contribution ID: 225

Type: **Invited Talk**

Certificates of participation

Friday, March 11, 2022 2:25 PM (5 minutes)

Presenter: ASSAMAGAN, Ketevi Adikle (Brookhaven National Laboratory (US))

Session Classification: General

Contribution ID: 226

Type: **Invited Talk**

Physics Education status and plan

Monday, March 7, 2022 4:30 PM (13 minutes)

Abstract Category

Presenter: RAMAILA, Sam (University of Johannesburg)

Session Classification: ASFAP Working Groups

Contribution ID: 227

Type: **Invited Talk**

Community Engagement status and plan

Monday, March 7, 2022 4:45 PM (13 minutes)

Abstract Category

Presenter: BOYE FAYE, Ndeye (Laboratory of Atoms Lasers, Department of Physics, Faculty of Sciences and Techniques, University Cheikh Anta Diop, Dakar, 5005 Senegal)

Session Classification: ASFAP Working Groups

Contribution ID: 228

Type: **Invited Talk**

Young Physicists Forum status and plan

Monday, March 7, 2022 5:00 PM (13 minutes)

Abstract Category

Presenter: BOYE, Diallo (Brookhaven National Laboratory)

Session Classification: ASFAP Working Groups

Contribution ID: 229

Type: **Invited Talk**

Women in Physics Forum status and plan

Monday, March 7, 2022 5:15 PM (13 minutes)

Abstract Category

Presenter: CYULINYANA, Marie Chantal (University of Rwanda)

Session Classification: ASFAP Working Groups

Contribution ID: 231

Type: **not specified**

Condensed Matter & Materials Physics

Tuesday, March 8, 2022 4:40 PM (10 minutes)

Abstract Category

Presenter: HADDAD, Sonia

Session Classification: ASFAP Working Groups

Contribution ID: 232

Type: **not specified**

Biophysics

Tuesday, March 8, 2022 4:40 PM (10 minutes)

Abstract Category

Presenter: KRÜGER, Tjaart

Session Classification: ASFAP Working Groups

Contribution ID: 233

Type: **not specified**

Earth Science

Tuesday, March 8, 2022 4:40 PM (10 minutes)

Presenter: VON DER HEYDEN, Bjorn

Session Classification: ASFAP Working Groups

Contribution ID: 234

Type: **not specified**

Atomic & Molecular

Tuesday, March 8, 2022 4:40 PM (10 minutes)

Presenter: OBINNA, Abah ((Newcastle, UK))

Session Classification: ASFAP Working Groups

Contribution ID: 235

Type: **not specified**

Energies

Presenter: KOBOR, Diouma (University Assane Seck of Ziguinchor (UASZ))

Session Classification: ASFAP Working Groups

Contribution ID: 236

Type: **not specified**

Light Sources

Tuesday, March 8, 2022 4:30 PM (10 minutes)

Presenter: KAMEL, Gihan

Session Classification: ASFAP Working Groups

Contribution ID: 237

Type: **not specified**

Physics for Sustainable Development in Africa

Friday, March 11, 2022 4:30 PM (1 hour)

More than 60 years after independence, almost all African countries are still trying to achieve economic development. Several action plans to achieve this goal have been adopted and all of them stressed the need to put science and technology in the service of development by reinforcing the autonomous capacity of our countries in this field. From the Monrovia Strategy in 1979, the Lagos Plan of Action (LPA) for the economic development of Africa [1980-2000] to the Consolidated Plan of Action (CPA) which consists of three inter linked pillars: capacity building, knowledge production and technological innovation, African countries are trying to advance education, science and technology, and human capital development in the continent. The current AU Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024) places STI at the epicentre of Africa's social and economic development within the long-term AU Agenda 2063. Through the implementation of STISA-2024, science, technology, and innovation are expected to impact critical sectors including agriculture, energy, environment, health, infrastructure, mining, security, and water, among others. This strategy is designed to respond to the need of transforming Africa into a Knowledge-based and Innovation-led Society. The fact is that Africa is changing, economic, social and infrastructural progress is visible, but at what pace and under what conditions, which raises questions about the strategic choices facing African decision-makers in a world where the knowledge economy dominates. In this presentation, we try to give some thoughts on the role that Physics could play in the achievement of Africa's sustainable development goals. The focus will be on the potential contribution of Physics to achieving the objectives of the Agenda 2063 flagship projects.

Presenters: BOYE FAYE, Arame Ndeye (Laboratory of Atoms Lasers, Department of University Cheikh Anta Diop, Senegal); KA, Oumar (Cheikh Anta Diop University)

Session Classification: Colloquium