

The Scientific Program of ACP2021

Monday, March 7, 2022 - Friday, March 11, 2022

Virtual Event



**Second African Conference on
Fundamental and Applied Physics
ACP2021**

Book of Abstracts

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Physics Plenary (3) / 48

What Research and Innovation for African Innovative and Sustainable Energy Access and Development?

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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.

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Physics Plenary (3) / 49

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Physics Plenary (4) / 50

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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)

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

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

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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

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

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Determination of the thickness and optical properties by reflectance method

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Parallel Session 1 / 133

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

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Electron-phonon and Spin orbit coupling in transition metal dichalco-

genides quantum dot after short pulse excitation under magnetic field

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

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Parallel Session 1 / 136

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

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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

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

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Minimum bias simulation of parasitic collisions

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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

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

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Parallel Session 2 / 143

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

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Structural and Optical proprieties of Cu_xS deposited by flash evaporation

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Structural analysis and band gap engineering of 2D perovskite $Cs_2XAg(I_{1-x}Br_x)_6$ for solar cell applications using DFT method

Parallel Session 1 / 146

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

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Parallel Session 1 / 147

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

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

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

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

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

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3-Dimensional BF Theory On Seifert Fibered Manifolds

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Parallel Session 2 / 153

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

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

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

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

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Using Microphotonic Nuclear Forensics to Mediate Nuclear Security and Nuclear Safety

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

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Parallel Session 3 / 161

Evaluation of whole body dose absorbed by Geant4 simulation

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Monte Carlo Simulation of the Biograph mCT PET scanner using GATE

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The African Light Source

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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.

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Parallel Session 2 / 164

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

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Natural Radionuclides assay in Nigerian Granite Rocks

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Parallel Session 2 / 166

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

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Physics Masterclasses in Africa and the World

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

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

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Plasma Physics and Fusion Devices and an Introduction to PMI

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Ubuntu reactors– Modelling Nuclear Reactors with Geant4

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

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

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Statistical Approach for Detection of Low-Level Radioactivity

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

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

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Dosimetric evaluation of Xio Elekta algorithm using an heterogeneous lung phantom

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

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

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Dark-fluid constraints of shear-free universes

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Abstract Category:

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

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Abstract Category:

Parallel Session 1 / 183

Uncovering the fractional order phase transitions in AdS black holes

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Abstract Category:

Parallel Session 1 / 184

Cosmic hierarchy in $f(R)$ gravity

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Parallel Session 1 / 185

Status and perspectives of the Euclid mission

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Abstract Category:

Physics Plenary (7) / 186

Introduction to Machine Learning and Artificial Intelligence

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Abstract Category:

Poster Session in Gather.Town / 187

Expanding Universe in the frame of Deformed Phase Space

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Abstract Category:

Poster Session in Gather.Town / 188

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

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Poster Session in Gather.Town / 189

Solar cells and IoT

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Abstract Category:

Poster Session in Gather.Town / 190

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

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Abstract Category:

Poster Session in Gather.Town / 191

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

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Abstract Category:

Poster Session in Gather.Town / 192

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

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Poster Session in Gather.Town / 193

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

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Poster Session in Gather.Town / 194

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

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Abstract Category:

Poster Session in Gather.Town / 195

Granulometric Discrimination of Marine Sediments

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Abstract Category:

Poster Session in Gather.Town / 196

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

Poster Session in Gather.Town / 197

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

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Abstract Category:

Poster Session in Gather.Town / 198

New charged Higgs boson discovery channel at the LHC

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Abstract Category:

Poster Session in Gather.Town / 199

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

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Poster Session in Gather.Town / 200

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

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Abstract Category:

Poster Session in Gather.Town / 201

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

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Poster Session in Gather.Town / 202

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

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Poster Session in Gather.Town / 203

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

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Poster Session in Gather.Town / 204

Vacuum stability of the scalar potential in the compact 341 model

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Abstract Category:

Poster Session in Gather.Town / 205

Gluon in radiative charmonium decay

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Abstract Category:

Poster Session in Gather.Town / 206

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

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Poster Session in Gather.Town / 207

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

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Poster Session in Gather.Town / 208

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

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Abstract Category:

Poster Session in Gather.Town / 209

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

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Abstract Category:

Parallel Session 3 / 210

Physics Education Discussion

Abstract Category:

Poster Session in Gather.Town / 211

Laser-assisted processes in standard model and beyond

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Abstract Category:

Poster Session in Gather.Town / 212

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

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Abstract Category:

Poster Session in Gather.Town / 213

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

Poster Session in Gather.Town / 214

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

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Poster Session in Gather.Town / 215

Laser-assisted Z-boson decay

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Abstract Category:

Parallel Session 3 / 216

Magnetic Resonance Brain Image Classification

Abstract Category:

Poster Session in Gather.Town / 217

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

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Poster Session in Gather.Town / 218

SPIRAL2 (SP2)

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Abstract Category:

Nuclear Physics

Parallel Session 2 / 220

Laser-assisted high-energy processes

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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

Poster Session in Gather.Town / 221

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

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Abstract Category: