First Biennial African Conference on Fundamental Physics and Applications

Report of Contributions

https://indico.cern.ch/e/ACP2018

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

Opening

Presenter: SINGH, Dharm (Namibia University of Science and Technology (NUST))

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

General Talks

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

ASP Forum Agenda

Wednesday 4 July 2018 14:00 (5 hours)

Session Classification: ASP Forum

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

New Fuzzy-Variable Gain PI Control of WECS Based on a Doubly Fed Induction Generator

Abstract
This paper presents a study of powers control for a Doubly Fed Induction Generator (DFIG) used in Wind Energy Conversion System (WECS). For this purpose, a new topology using hybrid controller is applied for the powers generated by the DFIG. The hybridization consists to combine a variable gain PI with Non Entire Degree (VGPI-NED) controller with a fuzzy logic one. The results of simulation show that this technique can be realized and leads to good performances as disturbance rejection and robustness with respect of operating variation and parametric variation of the machine.
Keywords—DFIG, vector control, WESC, power control, VGPI, non entire degree, fuzzy logic, hybridization.

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Contribution ID: **5** Type: **Poster**

Wind Energy Assessment and Adaptive Wind turbine model for the Installation of an Onshore Wind Farm in Cameroon.

Located on the Gulf of Guinea and also known as the economic power house of the central African sub-region, Cameroon's population and industrialization has more than doubled in the last three decades. Douala, Limbe and Kribi are three of its main coastal industrial cities. The rapid increase in the population of these industrial cities, post a problem to energy shortages and distribution especially as the country solely relies on hydroelectric power and a very small percentage of thermal power generation to meet its energy demand. To meet this increase in energy demand, a thorough wind energy assessment is carried out by the application of statistical techniques like the commonly used Weibull statistics for the sole purpose of selecting the best site for the installation of an onshore wind farm. The Weibull parameters are estimated by the method of maximum likelihood, the mean power densities, the maximum energy carrying wind speeds and the most probable wind speeds are also calculated and compared over these three cities. Finally, the cumulative wind speed distributions over the wet and dry seasons are also analyzed. The result presented here show that Kribi is the best site but the wind speeds in all three locations are very low, below the cut-in wind speeds of most modern wind turbines.

Our next approach is to design a wind turbine that can adapt and function at these low wind speeds. Here, we focused more on modeling wind turbine blade geometry by varying the airfoil thickness and Reynold's number in a software called Qblade. The result of our simulations show that the best airfoil for a turbine to be used at Kribi is that with a high-lift and low Reynold's number.

Moreover, we develop a complex nonlinear model for a single-mesh helical gear train for a wind turbine gearbox by including a time varying mesh stiffness, axial vibrations, torsional vibrations, shaft and bearing damping, generator back EMF and gear backlashes. With the help of a time series and the Fast Fourier Transform (FFT) frequency spectrum, the effects of these nonlinear terms on the wind turbine and generator rotational speeds are studied under different excitation conditions by numerically integrating the associated equations using the RK4 algorithm. The results show that more damped, quasi-harmonic vibrations are attained at higher damping, tortional and axial stiffness, big helical angles will generally induce heavy nonlinear vibrations in the turbine and generator, smaller mesh frequency will induce extra noise in the generator, the external excitation due to wind gust has a greater influence in the nonlinearity of the wind turbine dynamic as compared to the internal excitations due to static transmission errors, time varying mesh stiffness and the generator back EMF.

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Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

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

Uncertainties in Measuring the Lifetime of a Nuclear Excited State via $\gamma - \gamma$ Coincidences using NaI (Tl) Scintillators

Metrological difficulties in measurement of lifetimes of nuclear states have posed controversies in the quest to answer the fundamental question of whether lifetimes of nuclear states are invariable or not. Although several studies have suggested the possibility of slight variations of lifetimes depending on conditions of the nucleus [1, 2, 3], it is important to note that any claims of non-constancy of lifetimes as a consequence of deviation from the exponential decay curve can only be considered upon verification and accountability of stability and uncertainty of the devices used during the experiment [4]. Consequently, studying the uncertainties in lifetime measurement is a crucial step towards studying the possibility of variation of the lifetime of a nuclear-excited state when the nucleus is subjected to resonance conditions via multiple emission and reabsorption of gamma rays as suggested in [5]. We have, therefore, design a system to precisely measure the lifetime of the state via gamma-gamma coincidences using multiple fast scintillators. Measurement uncertainties were thoroughly studied using a pair of NaI (Tl) detectors on a simple bench-top setup. All possible sources of lifetime measurement uncertainties with their magnitudes are presented in the uncertainty budget. A measurement uncertainty of 0.661 % was observed indicating the suitability of the system for observing the variations of the lifetime that range from 1 % of the known value.

Keywords: nuclear state, lifetime of a nuclear state, uncertainty, resonance conditions, metrology

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5. Il-Tong Cheon (2015). Physics behind modification of the nuclear lifetime by the gamma-ray boomerang effect. Physical Science International Journal 5(1), 12 -17

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Presenter: Dr LUGENDO, Innocent Jimmy (University of Dar es Salaam)

Contribution ID: **7** Type: **Oral Presentation**

Measuring transitional matrix elements using first-order perturbation theory in Coulomb excitation

The low-energy structure of the stable light nucleus 20Ne has been examined using Coulomb excitation at the TRIUMF Facility in Vancouver, Canada. The highly-efficient and segmented TIGRESS HPGe gamma-ray array permits accurate Coulomb-excitation studies of the high-lying 2ˆ+ state found in 20Ne. Beams of 20Ne(5+) at approximately 1.7x10ˆ7 ions/s were accelerated to 3.235 MeV/u and bombarded onto a 1.56 mg/cmˆ2 110Pd target. Six TIGRESS HPGe clover detectors covering approximately 19% of 4(pi) were used to detect the gamma rays emitted in the de-excitation of the levels populated in beam and target nuclei, while scattered ions were detected using annular double-sided, CD-type silicon detector. The angular coverage of the silicon detector allows for a clean measurement of transitional matrix elements without second-order effects such as static quadrupole moment and nuclear polarizability.

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Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **8** Type: **Oral Presentation**

SYNTHESIS, STRUCTURAL AND ELECTRICAL PROPERTIES OF NANOCRYSTALLINE BARIUM TITANATE CERAMIC USING MACHANOCHEMICAL METHOD

Barium Titanate (BaTiO3 or BT) ceramics were synthesized by using a combination of solid state and mechanochemical method. The thermal decomposition, phase formation, microstructure and electrical behavior are investigated by TG-DSC analysis, X-ray diffraction, FE-SEM measurements and Impedance Analyzer respectively. The X-ray diffraction patterns show cubic symmetry without secondary phase. The lattice parameter a, c/a ratio and crystal size was found to be 4.0070 A˚, 1.0000 and 31.2 nm respectively. The Porosity of the samples has been obtained through X-ray density and bulk density. The FESEM results indicated dense microstructure with an average grain size of 144.53 nm. Frequency dependence of dielectric permittivity and loss, have been studied in the range of 30-150oC and 40 Hz–1 MHz, respectively. Frequency dependent dielectric study of the sample shows a normal ferroelectric phase transition behavior. The dielectric constant and loss of BT at room temperature are 1600 and 0.77 respectively. The temperature dependence of dielectric permittivity shows that phase transition seems to be shifted towards lower room temperature with phase transition temperature observed at 90oC. The hysteresis loop was observed having a remanent polarization (Pr) and coercive field (Ec) of 0.27 Pr (μC/cm2) and 581.73 Ec (V/cm) respectively. The Cole-Cole plots of complex dielectric constant showed a non-Debye type of dielectric relaxation. Relaxation time was found to decrease with increasing temperature and to obey the Arrhenius relationship. The value of activation energy 〖(E〗_a) for the bulk, as calculated from the slope of versus 〖τ〗_g Temperature curve, is observed to be 1.47 eV.

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Presenter: Dr UMAR, sadiq

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **9** Type: **Oral Presentation**

Study and Development of High Power Pulsed Laser System based on an Injected Enhancement Cavity for MariX

MariX Project focuses on the development of a compact machine to produce beams of high brilliance mono-chromatic tunable X-rays with energy in the range from 30 to 150 keV, exploit methods currently used at synchrotrons and implement them in a laboratory size. The goal is to provide an X-rays average flux up to 10^13ph/s. the X-rays are generated by head-on collisions between bunches of electrons and laser light pulses. This work is based on the photon machine for the ICS X-ray source. The development of the photon machine, aimed at delivering a CW train of laser pulses with a repetition rate of 100 MHz and about 10 mJ of energy per pulse (1 MW average power), address the construction of a high finesse Fabry-Perot cavity injected by a high average power (100 W) and high repetition rate pulsed laser system.

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Presenter: SAMSAM, Sanae (ESMAR, Faculty of Sciences, Mohammed V University, Rabat, Morocco)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **11** Type: **Oral Presentation**

Self-Made Particle Detectors for High Schools and Universities

Particle physics in schools but also during undergraduate studies can be taught most effectively by designing and conducting own experiments. In the past years, we developed two construction manuals for fully functional cloud chambers as well as a counting detectors using only material which can be purchased by private persons with total costs below 200 USD. We tested the construction of these detectors with undergraduate students during lectures on detector physics. The resulting prototype detectors can be further used in high schools. In this presentation we will summarize the construction manuals, discuss the performance of the detectors as well as present on the feedback which we received from students and high school teachers alike.

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Presenter: SCHOTT, Matthias (Johannes Gutenberg Universitaet Mainz (DE))

Session Classification: Physics Education

Track Classification: Physics Education

Contribution ID: **12** Type: **Oral Presentation**

High Efficiency Terahertz Generation in Periodically Poled Lithium-Niobate by Pulse Recycling

1.Motivation
High energy multi-cycle (narrow band) terahertz pulses are necessary for linear electron acceleration \[1\]. Due to the low damage threshold of periodically poled Lithium Niobate (PPLN) crystals, high absorption of the material at the terahertz frequencies and low quantum efficiency, efficient generation of high energy terahertz beams is extremely challenging.
Here, we consider a consecutive arrangement of PPLNs as shown in Fig.1 that recycles the pump pulse for further terahertz generation. The arrangement increases the effective length (L_{eff}) and circumvents excessive terahertz absorption through the out-coupling of the terahertz pulse after each stage. An quartz out-coupler is designed. The terahertz experiences Brewster's angle refraction at both S_1, S_2 surfaces, whereas the pump refracts at Brewster's angle at S_3 surface (see Fig.1(a)). The transmission efficiency and terahertz beam profile with respect to incident angle, terahertz beam size and variation of the refractive index are examined.
The simulation is based on 2-D cylindrical coordinate using the split step Fourier method, 3-point finite difference method and low storage Runge-Kutta update scheme \[2\], which largely enhances computational performance and saves memory. The entire problem is updating in propagation direction z explicitly rather than in time t. The calculation is performed in $C++$ with MPI and openmp for parallelization. The illustration of the numerical method is shown in Fig.2.

2.Conclusion
A 2-D simulation from terahertz generation in PPLN to out-coupling though quartz is developed to calculate high efficiency terahertz generation with pump recycling.

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Presenter: Ms WANG, Lu (DESY)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **13** Type: **Oral Presentation**

Dark Interactions

Hidden sector or dark sector states appear in many extensions to the Standard Model, to provide a candidate for the dark matter in the universe or to explain astrophysical observations of positron excesses. A hidden or dark sector can be introduced with an additional $U(1)_d$ dark gauge symmetry. The presence of the dark sector could be inferred either from deviations from the SM-predicted rates of Drell-Yan (DY) events or from Higgs boson decays through exotic intermediate states. The discovery of the Higgs boson during Run 1 of the Large Hadron Collider opens a new and rich experimental program that includes the search for exotic decays H —> Z Zdark —> 4l and. H —> Zdark Zdark ->4l, where Zdark is a dark vector boson.

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Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **14** Type: **Poster**

Space-time based evolution of pollutants in the planetary boundary layer

BACKGROUND: In this article, we focus on environmental protection and sustainable development, in particular the control of air pollutants and greenhouse effect (GHG). In a nutshell, the prevalence and impact of the consequences on the atmospheric boundary layer (PBL) and the recurring interests of the PBL study are the understandable aspects of the solutions offered by physicists.

OBJECTIVE: We present a physical model that unifies the transport and dispersion of chemical elements in the atmosphere; In our case, we are interested in the pollution by carbon dioxide that occurs at the planetary boundary layer. Thus, the source of pollution is assimilated to a point of which density should increase strongly due to a limnic or phreatic eruption.

This source is located in the lake. In addition, Lake Nyos is a maar with basaltic scoria scones. Our field of research is in accordance with national policies and the efforts of researchers who tend to materialize the interdependence between the practice of experimental sciences and the search for solutions to the natural phenomena that have a hold on human life. Thus, in order to follow the evolution of this phenomenon of atmospheric pollution, we combine the WKB approximation with the Sturm-Liouville problem and we arrive at a form of well-known solution in Gaussian form.

INTERVENTION: This model takes into account hydrological and meteorological parameters in a heterogeneous vital environment. The study is related to the K-theory according to which the flux of turbulent concentration is proportional to the average concentration gradient. Therefore, the mathematical development of the advection dispersion equation associated with homogeneous boundary conditions leads to a closed-form analytic solution of the Advection dispersion equation.

MAIN RESULTS: The performance of the model is evaluated by statistical parameters (Hanna and Chang, 2009), whose data were collected during the Pararie Grass measurement campaign (ML BARAD, 1958), Convergence of the solution according to the theoretical model and the model Experimental, shows that this process can be used for simulating the dispersion of pollutants in the atmosphere. The concordance of the results and the data found in the literature show that it is therefore possible to evaluate the evolution of the concentration with the distance as a function of the different heights of the source.

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Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **16** Type: **Oral Presentation**

Dielectric and ferroelectric properties of PZN-4.5PT thin films on nanostructured silicon substrate

Ferroelectric lead compounds having a perovskite structure, such as Pb(Zn1/3Nb2/3)O3 (PZN) 1, Pb(Mg1/3Nb2/3)O3 (PMN) 2, and their solid solutions with PbTiO3 (PT), have been investigated for high-performance ultrasonic transducer applications [3-4]. The integration of such materials as thin films have attracted considerable attention these last years thanks to their outstanding performances that allow to consider new features for the realization of photovoltaic device. Ferroelectric thin films, especially those derived from BaTiO3 composition, have been studied for about thirty years for microelectronics, telecommunications and optics applications. For most applications, it is necessary to approach the single crystal in a thin layer, in order to limit losses (dielectric, optical ...). The advantage of thin films relative to the solid material is then multiple: ability to embed on microcircuits, lower cost than single crystals and geometry for new efficient designs. PZN-4.5PT thin films properties, or ferroelectric materials in general, change significantly with the structural and constitutive properties of considered material. Thus, to consider their integration in applications such as microsystems, it is essential to determine beforehand the influence of these parameters on the electrical performance of the studied materials.
Our study focuses to investigate structural, dielectric and ferroelectric properties of PZN-4.5PT nanoparticles thin films on Silicon substrate.
Keywords: perovskite, nanoparticles, thin film

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Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **18** Type: **Poster**

Feasibility of solar tracking systems for hybrid PV/T panels in hot and cold Regions in Cameroon

According to previous studies, PV solar tracking systems can capture 20% to 50% more solar radiation than fixed systems; and the advantage of the solar tracking system is that the yield of photovoltaic panels is increased by 30 to 40% compared to the fixed inclined one. A solar tracker is a device that keeps photovoltaic panels in a perpendicular form to the sun's rays. The objective of this work is to assess the performance of a PV solar tracking system in order to make a comparison with the fixed one, through the development of a mathematical model that will allow us to have more ideas on solar photovoltaic tracking systems. Thanks to the results obtained for the weather conditions in the locality of Garoua (North Cameroon) and DSHANG (West Cameroon) we can propose a method to follow the sun in clear conditions.

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Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **19** Type: **Oral Presentation**

Density Functional Based Investigation on Electronic Properties of Fe-Ni Invars

The present talk focuses on the computed results of electronic band structure, electronic density of states, electronic charge density plots and Fermi surfaces of Fe-Ni invar materials namely L12 FeNi3, taenite L10 FeNi, L12 Fe3Ni, D03 Fe3Ni, Z1 Fe3Ni, D03 FeNi3 and tetrataenite L10 FeNi. The investigation carried out based on the density functional theory as implemented in Quantum Espresso. As Fe and Ni are well known ferromagnetic transition metals, the combination of Fe and Ni i.e. Fe-Ni invar like materials exhibit complex magnetic behaviour.

The electronic band structures of all the seven Fe-Ni phases under consideration are not showing any energy gap at Fermi level hence predicts metallic behaviour for them. All electronic bands are well dispersive in nature which concludes the high electron mobility in the Invar like systems. It is concluded from the PDOS of Fe-Ni phases under consideration that d-Fe and d-Ni electrons significantly contribute to the total electronic density of states. The structural stability of the intermetallic compound is also predicted from the position of EF on the deep valley (pseudo gap) in the PDOS. The position of EF in the PDOS of L12 FeNi3 and taenite L10 FeNi predicts structural stability of L12 FeNi3 and taenite L10 FeNi at 0 K. From the DOS of L12 FeNi3 and D03 FeNi3, it is concluded that L12 FeNi3 is highly stable compared to D03 FeNi3. The charge density plots for L12 FeNi3, taenite L10 FeNi and L12 Fe3Ni predict comparatively strong metallic bonding between Fe and Ni compared to between the Fe-Fe metal atoms. The L12 Fe3Ni shows weak metallic bonding between Ni-Ni compared to Fe-Ni metal atoms. The taenite L10 FeNi exhibit slightly strong metallic bonding between Fe and Ni atoms compared to that in L12 FeNi3 and L12 Fe3Ni. In D03 Fe3Ni, Fe metal atoms at a far distance predict comparatively strong metallic bonding between them in comparison to nearest Fe-Fe atoms while the same strong metallic bonding is also observed for two far Ni-Ni metal atoms in D03 FeNi3. Z1 Fe3Ni suggests weak metallic bonding between Fe-Ni compared to that of Fe-Fe and Ni-Ni metal atoms. The complicated shape of comprehensive Fermi surfaces are observed for most of the Fe-Ni phases which occurred from the merging of all individual Fermi surfaces due to corresponding band crossing at Fermi level EF.

Thus the preset talk will cover very exhaustive and large number of results obtained at our group on electronic properties of L12 FeNi3, taenite L10 FeNi, L12 Fe3Ni, D03 Fe3Ni, Z1 Fe3Ni, D03 FeNi3 and tetrataenite L10 FeNi by employing density functional theory.

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Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **20** Type: **Poster**

USE OF DIATOMACEOUS EARTH (DE) WASTES FOR NANO-POROUS COMPOSITE MEMBRANES IN WATER PURIFICATION SYSTEMS

The outbreaks of water-borne diseases are a common occurrence in developing countries and has claimed millions of lives in the recent years despite the many water purification approaches in use. This is because most of these water purification systems are inefficient in removal of all pathogens especially viruses from drinking water. Furthermore, the diatomaceous earth (DE) wastes have not found direct application in science. Thus, the wastes pose a challenge to DE industries. In this work, the nano-materials of diatomaceous earth wastes and activate carbon are employed in the design of efficient and effective water filtration membranes capable of eliminating pathogens and viruses from water. The DE waste and activated carbon raw materials were ground to the range of 86.0 nm to 200.0 nm. The DE wastes were characterized in terms of chemical analysis. They were found to contain 89% silica and a total flux content of 11.0% (4.14% of Al2O3, 3.88 of CaO, 0.85% of K2O, 0.19% of MgO and 5.10% of Na2O) making it a suitable material for water filter membranes. The samples for the filter membranes were fabricated from a mixture of DE and activated carbon in various ratios and fired at 900 oC. The pore size of the finished filter was in the range of 22.0 nm –150 nm. The mechanical strength of the filter membranes was enhanced by use of plant derived binders ("Mrenda") thereby increasing the filter flow rate without compromising on its structural reliability.

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Presenter: Ms SIMIYU, Mary (University of Nairobi)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **22** Type: **Oral Presentation**

Growth and fabrication of dye sensitized solar cells on multilayer transparent conductive film

Abstract:

Dye sensitized solar cells (DSSC) are of great interest for the conversion of solar energy into electrical energy and are future alternatives to silicon solar cells. The increase in conversion efficiency of DSSC depends not only the differences in the conductivities of the transparent layers but on the antireflection of the multilayers and the transmittance of the incident light. Therefore, proper arrangement of the thickness of each layer in the multilayer film along with suitable deposition of nanocrystalline TiO2/dye stack is necessary for a high photocurrent and conversion efficiency of the DSSC. In this work suitable multilayer of doped ZnO and metal are synthesized using sputtering process and used as transparent layer. Small quantity of ZnO incorporated TiO2 matrix is used for the fabrication of DSSC. Chemical vapour deposition method is used to prepare ZnO covered TiO2 film. The DSSC on the Al doped ZnO and Ag multilayer covered with ZnO/TiO2 film yielded an overall cell efficiency 5.45 % at one sun light intensity. The dye sensitization process with the low-cost mercurochrome is sensitive in ZnO based multilayer. The overall energy conversion efficiency of the DSSC using low cost transparent conducting oxide film and mercurochrome dye is a nice step to develop DSSC. Details study on the optimization of the film preparation along with the merits of such film as an electrode with reference to TiO2 film electrode in DSSC will presented during presentation
Keywords: DSSC, TiO2, Transparent conducting layer, transmittance

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Presenter: Dr SAHU, Dipti R (Namibia University of Science and Technology)

Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **23** Type: **Oral Presentation**

Transport properties of doped multiferroic transition metal doped bismuth ferrite

Transition-metal perovskite oxides are studied theoretically and experimentally because of their various exotic properties, including ferroelectrics, ferromagnetism, superconductivity, multiferroic and colossal magnetoresistance effects. Now Multiferroics have found intensive interest among researcher due to its excellent relation between spin, phonon, charge ordering and FE ordering. The transitions of magnetic orders and complex competitions of various interactions and various physical phenomenon at low temperature make the materials more interesting for the study of electrical and magnetic response at different temperature. Transition metal doped multiferroic RMnO3 with R = Gd, Tb and Dy are synthesized using chemical and solid-state recation method. Thee bulk samples are polycrystalline in nature having orthorhombic structure and Pbnm space group. The bulk sintered sample showed frequency independent dielectric anomaly at room temperature. The SEM micrograph indicates porous nature of the ceramics with fine and coarse grain connected with each other. All these bulk materials showed good ferroelectric behavior around room temperature with high dielectric constant value which is very important for microelectronic industry. Detail transport phenomena and applications will be discussed during presentation

Keywords: Multiferroics, Transition metal, Transport, Ferroelectric and Dielectric

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Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **24** Type: **Oral Presentation**

Application of Nonnegative Tensor Factorization for neutron-gamma discrimination of Monte Carlo simulated fission chamber's output signals

For efficient exploitation of research reactors, it is important to discern neutron flux distribution inside the reactor with the best possible precision. For this reason, fission and ionization chambers are used to measure the neutron field. In these arrays, the sequences of the neutron interaction points in the fission chamber can correctly be identified in order to obtain true neutron energies emitted by nuclei of interest. However, together with the neutrons, gamma-rays are also emitted from nuclei and thereby affect neutron spectra. The originality of this study consists in the application of tensor based blind source separation methods to extract independent components from signals recorded at the fission chamber preamplifier's output. The objective is to achieve software neutron-gamma discrimination using Nonnegative Tensor Factorization tools. For reasons of nuclear safety, we first simulate the neutron flux inside the TRIGA Mark II Reactor using Monte Carlo methods under Geant4 platform linked to Garfield++. Geant4 simulations allow the fission chamber construction whereas linking the model to Garfield++ permits to simulate drift parameters from the ionization of the filling gas, which is not possible otherwise.

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Co-authors: HAMZAOUI, El-Mehdi (CNESTEN - Morocco); CHERKAOUI EL MOURSLI, Rajaa (Mohammed V University)

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

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **25** Type: **Oral Presentation**

The effect of Dynamic Jahn Teller interaction on the Raman peaks in manganites

We report here a microscopic theoretical model showing the influence of dynamic Jahn-Teller (J-T) distortion on the Raman active excitation peaks in the CMR manganite systems. This model Hamiltonian for the system consists of J-T distortion in e_g band, the double-exchange interaction and the Heisenberg spin-spin interaction among the core electrons. Further the phonons are coupled to e_g band electrons, J-T distorted e_g band as well as the double exchange interaction. The phonon Green's function is calculated by Zubarev's double time Green's function technique. The Raman spectral intensity is calculated from the imaginary part of the phonon Green's function. The intensity exhibits three Raman active peaks. The effect of dynamic Jahn-Teller coupling on these peaks is discussed.

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Presenter: Dr SAHU, A. K (Seemanta Engineering College)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **26** Type: **Oral Presentation**

Optimization of 6,13(bis-triisopropylsilylethynyl)-pentacene (TIPS-pentacene) organic field effect transistor: annealing temperature and solvent effect

Since the discovery of organic polymers in 1977,remarkable progress has been made in the development of organic electronics. However, OFET performances are limited by poor charge carriers mobility. Recent studies show several parameters that can influence the performance of the field effect mobility and then the electrical performance of electronics devices. In this study, we demonstrate the effect of solvents and annealing temperature in 6,13(bistriisopropylsilylethynyl)-pentacene (TIPS-pentacene) film. We find that the optical band gap of TIPS-pentacene dissolved in three differents solvents (chlorobenzene, toluene and tetrahydrofuran (THF)) is slightly influenced. The obtained values from the optical spectroscopy of the film from our three solvents are between 1.67 and 1.83 eV. However, the electrical characteristics of filed-effect transistor show the influence of both solvents and annealing temperature. The field-effect mobility varies from cm2.V-1.s-1, cm2.V-1.s-1 and cm2.V-1.s-1 respectively for no-annealed to heating at 120℃ and 150℃ from toluene as solvent. The relationship between solvent and morphology was also investigated and shows that the solvent nature could influence the deposited film morphology. we also investigate the temperature effect effect on crystal struture by XRD characterization and found that the film could crystalized even it doesn't be annealed.

Primary authors: DIALLO, Abdoul kadri (Université Assane Seck de Ziguinchor); FALL , Sadiara (Université de Strasbourg); KOBOR, Diouma (Université Assane Seck de Ziguinchor); Prof. PASQUINELLI, Marcel (Université Aix Marseille); Prof. HEISER, Thomas (Université de Strasbourg); ESCOUBAS, Stéphanie (Université Aix Marseille); DOUCHE, David (Université Aix Marseille); DIALLO, Abdou Karim (Université Gaston Berger)

Presenter: DIALLO, Abdoul kadri (Université Assane Seck de Ziguinchor)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **27** Type: **Oral Presentation**

Updates on the African Synchrotron Light Source (AfLS) Project

Monday 2 July 2018 11:35 (25 minutes)

Africa is the only habitable continent without a synchrotron light source. There are many socio-economic benefits to positioning a synchrotron in Africa such as,
• Boosting African Scientific Research, Research Capacity, and Capacity Building
• Establishing a Global Research Community on the continent of Africa
• Tackling Disease from a molecular level using protein crystallography
• Opportunity for researchers to pursue "unique to Africa"research related to the environment, energy (e.g. solar, geothermal, wind, etc.), study of human origins and the origins of human culture, mineral extraction, agriculture, etc.
• Using Science for Peace (e.g. the SESAME Light Source Project)
• Return of the African Science Diaspora –by presenting a new opportunity for young excellent scientists
• An opportunity for African countries to take control of their destinies and become major players in the international community.
Momentum is building for an African light source, as a collaboration involving several African countries. An interim Steering Committee was formed on August 16, 2014 in Dakar, Senegal at the African School on Fundamental Physics. The interim steering committee's role was to plan the African Light Source Conference and Workshop. A workshop was held at the European Synchrotron Radiation Facility (ESRF) on Nov. 16-19, 2015 where 72 presentations were delivered. Among those presentations, 32 were scientific talks, 16 were policy strategy talks and 20 were posters (many highlighting research of African students performed at synchrotron light sources). The meeting concluded with large group discussions on the Roadmap for Africa, Workshop Resolutions, and Terms of Reference. A fully mandated Steering Committee was elected. A second conference on the African Light Source will be held on Jan 28 to Feb 2, 2019 in Accra, Ghana. This ACP2018 talk will highlight key points of my presentation delivered at the World Science Forum in November of 2017. The full presentation can be found at https://worldscienceforum.org/?ajax=1&block=Wsfresztvevok_Dow
. For additional information and updates on the AfLS project, see also http://www.africanlightsource.org
or follow on Twitter @AfSynchrotron.

Presenter: Prof. DOBBINS, Tabbetha (Rowan University)

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **28** Type: **Oral Presentation**

Plasma Accelerators / Compact Accelerators

Friday 29 June 2018 11:00 (25 minutes)

Presenter: ASSMANN, Ralph Wolfgang (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **29** Type: **Oral Presentation**

Research at iThemba LABS and Long Range Plan

Friday 29 June 2018 11:30 (25 minutes)

The iThemba Laboratory for Accelerator Based Sciences has been operating a K=200 Separated Sector Cyclotron for nuclear physics research, isotope production and hadron therapy since about 1986. The conflicting demands of these diverse application place severe restrictions on research capacity and on the possibility to respond to future demands.

To increase the beam time for research and isotope production, the establishment of a new facility, the South African Isotope Facility (SAIF) has been proposed. The new facility will consist of two parts:
1. The Accelerator Centre for Exotic Isotopes (ACE Isotopes) will be a dedicated facility for radioisotope production. A commercial high-current 70 MeV H- cyclotron for this purpose will free the SSC and allow an increase in beam time for nuclear physics and related research.
2. The Accelerator Centre for Exotic Beams (ACE Beams) will be a radioactive ion beam (RIB) facility for nuclear physics research. The SSC will be used as a driver for an isotope separation on-line (ISOL) facility. A 66 MeV proton beam of up to 50 μA will be delivered by the SSC for producing radioactive beams from a target ion source. The first stage of this project will be a low-energy radioactive ion beam (LERIB) project without post acceleration. The second stage will be the post acceleration of the radioactive beams with a linear accelerator to energies of between 4 and 5 MeV per nucleon.
After a brief overview of iThemba LABS facilities and research opportunities he talk will describe how the Long Range Plan of iThemba LABS will create the South African Isotope Facility (SAIF) which will put South Africa in a prominent position in the future to address the new challenges both in research and training within the subatomic field and beyond.

Presenter: LAWRIE, Kobus (iThemba LABS)

Session Classification: Accelerator, Medical and Radiation Physics

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

Contributed Talks on Future Accelerators

Contribution ID: **31** Type: **Oral Presentation**

The LHC, HL-LHC and FCC

Tuesday 3 July 2018 14:00 (25 minutes)

The LHC is in its sixth year of operation and performing well. The HL-LHC is major upgrade of the existing machine due to come into operation in 2026. Aiming at delivering an annual integrated luminosity of around 250 fb-1 a year to both ATLAS and CMS, it is now in the prototype and construction phase. The essential principles of LHC operation are recalled, and the key aims and components of the upgrade are discussed.

The Future Circular Collider (FCC) is a CERN led study investigating the possibilities of constructing a 98 km circular tunnel housing, in the first instance, a electron-postiron collider (FCC-ee) with a centre-of-mass energy range spanning the range from the Z pole (90 GeV) to above the top pair threshold (˜400 GeV). The lepton machine would make way for a proton-proton collider (FCC-hh) with a centre-of-mass energy of 100 TeV. A brief outline of the goals and challenges is presented.

Presenter: LAMONT, Mike (CERN)

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **32** Type: **Oral Presentation**

The Large Hadron Collider and Experiments

The Large Hadron Collider Project (LHC) at CERN is one of the largest and most ambitious scientific experiments ever conducted. Planning for and operation of the accelerator and its many experiments has spanned several decades, and will span several more. This talk focuses on the technological details of how the accelerator and the major particle detection systems function. It also covers some of the instrumentation upgrades planned in the near future.

Presenter: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **33** Type: **Oral Presentation**

Medical Accelerators

Tuesday 3 July 2018 16:10 (25 minutes)

The application of particle accelerators in medicine started with the discovery of x-rays by W. Roentgen in 1895. Nowadays there are more than 20,000 particle accelerators in operation worldwide, most of them employed for biomedical uses. Modern medical accelerators can essentially be divided into three classes: 1) electron linacs for conventional radiation therapy, including advanced modalities such as cyberknife, intra-operative radiation therapy (IORT) and intensity modulated radiation therapy (IMRT), 2) low-energy cyclotrons for the production of radionuclides for medical imaging and 3) medium-energy cyclotrons and synchrotrons for hadron therapy with protons (250 MeV) or light ion beams (400 MeV/u 12C ions). The operating principle of the electron linac, the cyclotron and the synchrotron will be briefly reviewed. The lecture will then mainly focus on the use of accelerators for cancer radiation therapy.

Presenter: SILARI, Marco (CERN)

Session Classification: Accelerator, Medical and Radiation Physics

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

Radioisotope Production (I)

Presenter: NAIDOO, Clive (iThemba LABS)

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

Radioisotope Production

Tuesday 3 July 2018 16:40 (25 minutes)

Background / Aims: In the 1970's and 80's major accelerator facilities operating at 100 MeV and higher were developed and installed in many of the national labs and used for production of radionuclides at much higher energies than can be achieved on the small compact machines. These high energy accelerators play a critical role in supplying radionuclides such as Sr-82 used in Sr-82/Rb-82 generators for cardiac imaging and Ge-68 used in Ge-68/Ga-68 generators for imaging to quantitate receptor imaging for targeted therapy applications. They continue to be upgraded to increase production yields by installing beam rastering systems that have allowed higher intensities and thus higher production yields. Demand for isotopes that can be produced by these systems have also increased. Linear accelerators such as the one at Brookhaven National Laboratory when operating at maximum proton energy of 200 MeV can have simultaneous production of several medically relevant isotopes. Among those are Ac-225 (T1/2=10.0 d), Cu-67 (T1/2=64.83 h), Se-72/As-72 (T1/2=26 h), Sr-82/Rb-82 (T1/2=1.26 min) and Ti-44/Sc-44 (T1/2=3.97 h). Production of these novel radionuclides and recent enhancements will be presented.

Cathy S. Cutler* , Dmitri Medvedev, Leonard Mausner, Vanessa Sanders, Lisa Muench

Collider Accelerator Department, Brookhaven National Laboratory, Upton, NY, United States

Presenter: CUTLER, Cathy (BNL)

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **36** Type: **Oral Presentation**

Indoor Radon levels and the associated effective dose rate in selected buildings at the Namibia University of Science and Technology

Tuesday 3 July 2018 15:20 (15 minutes)

Studies on radon and its progeny provides strong and compelling evidence that it is the greatest contributor of inhalation dose in the living environment. Indoor radon and the annual effective doses measurements were performed in office buildings at the National University of Science and Technology (NUST), Namibia, using CR-39 nuclear track detectors exposed for 3 months in the offices. The office buildings were classified according to age, occupancy, number of floors and size of the rooms. Based on the dosimetric approach and epidemiological determination conversions for radon exposures the annual effective doses were calculated and compared. The radon concentration in the selected office buildings varied from 32.0 Bq/m3 to 90.5 Bq/m3 in new and buildings old buildings respectively, with an average value of 58.6 Bq/m3. The annual effective dose due to exposure to indoor radon and its progeny was also found to vary from 0.4 to 1.70 mSv/yr. The radon concentration in all the office buildings were significantly lower than 600 Bq/m3 receipted by International Commission on Radiological Protection (ICRP) as the action level for a closed space.

Keywords
Indoor radon, annual effective dose, exposure, nuclear track detectors, Namibia University of Science and Technology

Presenter: ZIVUKU, Munyaradzi

Session Classification: Accelerator, Medical and Radiation Physics

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

Standard Model and Higgs physics

Thursday 28 June 2018 09:40 (25 minutes)

The Large Hadron Collider at CERN has raised its collision energy, and collision rate, since the discovery of the Higgs boson in 2012. This provides a huge, rapidly growing, data sample enabling increasingly sophisticated studies of the Higgs boson, including of its production and decay, from which the couplings to the other Standard Model particles can be inferred. The large data sample also allows new high statistics studies of the electroweak gauge bosons. Selected key results in these areas from the ATLAS and CMS experiments are discussed in this talk.

Presenter: CHARLTON, Dave (University of Birmingham (GB))

Session Classification: Nuclear and Particle physics

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

Searches for Physics beyond the Standard Model at the LHC

Thursday 28 June 2018 10:05 (25 minutes)

At the Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN), protons and heavy ions are made to collide together near the speed of light to study particle interactions and give us an insight to the fundamental laws of nature. Three experiments that are located on the circular ring of the LHC specialize in proton-proton collisions, namely a toroidal LHC apparatus (ATLAS), a compact muon solenoid (CMS), and the large hadron collider beauty (LHCb). The energy and intensity of the particle beams at the LHC are unprecedented. The data recorded by the detectors that are located on the circular ring of the LHC already exceeded 200 petabytes in summer last year, and a petabyte a day is processed at the CERN data center alone. These data are used to study known particles of the well-established Standard Model of particle physics including the long expected and recently discovered Higgs boson.

With predictions such as the existence of the W and Z bosons, gluon, top and charm quarks, and Higgs boson, and experimental confirmations with good precision, the standard model is the most successful theory of particle physics to date describing the strong, weak and electromagnetic forces of nature. The standard model cannot, however, accommodate experimentally observed phenomena like gravity, neutrino masses, and dark matter. The theory can also be theoretically unsatisfying as a result of parameters that go unexplained, such as the value of the Higgs mass despite its large quantum corrections, implying a lack of understanding. For this reason, in addition to precision measurements of standard model observables, experiments search for new physics beyond the the standard model that could explain some of the shortcomings of the standard model. A selection of results for searches for new physics beyond the Standard Model using data recorded by ATLAS, CMS, and LHCb are presented in this talk.

Presenter: SONNEVELD, Jory (Hamburg University (DE))

Session Classification: Nuclear and Particle physics

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

Overview of results from heavy-ions collisions at ultra-relativistic energies

Friday 29 June 2018 15:00 (25 minutes)

We will review the most relevant results on heavy-ion physics at ultra-relativistic energies. This will include a brief overview of the current status on the characterization of the QGP medium created in a heavy-ion collision and will also touch on the intriguing finding of collective-like phenomena exhibited by results obtained in small collision systems.

Presenter: BUTHELEZI, Edith Zinhle (iThemba LABS, National Research Foundation (ZA))

Session Classification: Nuclear and Particle physics

Contribution ID: **40** Type: **Oral Presentation**

Physics with radioactive ion beams

Thursday 28 June 2018 11:30 (25 minutes)

The models of atomic nuclei as we know them today have largely been developed based on results from experiments using stable isotopes as beams and targets, or from beta-decay experiments following fission or spallation. However, such experiments have inherent limitations. Due to the tendency of the heavier elements to have a neutron excess compared to the number of protons, an effect of Coulomb repulsion, stable beam on stable target experiments create fusion products that lie dominantly on the neutron deficient side of stability. Some other possibilities exist, e.g. via particle transfer and deep-inelastic reactions to create residues away from stability, but the neutron rich isotopes remain largely unexplored using reactions. This is an interesting situation since we also know that the neutron drip line should extend far beyond the current limits of known isotopes. There are presumably still thousands of isotopes that could be synthesized and studied in the laboratory that are yet unknown.

For practical reasons it is most reasonable to pursue reactions where radioactive isotopes are involved by creating a beam of the isotope in question. Two techniques, in-flight fragmentation and Isotope Separation OnLine (ISOL) exist today, and are pursued at laboratories in Europe, North America and Japan. I will introduce both methods with some focus on ISOL and discuss a handful of physics cases, stretching from fundamental physics to applications, that can be addressed with radioactive beams.

Presenter: CEDERKALL, Joakim (Lund University (SE))

Session Classification: Nuclear and Particle physics

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

Neutrino Physics

Thursday 28 June 2018 11:55 (25 minutes)

After a short introduction to neutrino physics in general the lecture will focus on accelerator-based neutrino-oscillation experiments. A summary of the current status and results of running experiments, in particular NOvA and T2K will be given, to be followed by an overview of the status of the proposed long-baseline experiments Hyper-K, DUNE and ESSnuSB with a special focus on the potential for discovery of leptonic CP violation.

Presenter: EKELOF, Tord Johan Carl (Uppsala University (SE))

Session Classification: Nuclear and Particle physics

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

Studying hadrons with electron beams

Thursday 28 June 2018 12:20 (25 minutes)

High energy electron beams have enabled the study of the nucleus and nucleons with unprecedented statistical and systematic precision. This is achieved using continuous wave beam with high intensity and 90% polarization, while interacting through the well modeled electroweak interaction aids interpretation. This opens up a wide variety of physical studies including the longitudinal, transverse and 3D structure of hadrons, studies of the hadronic spectrum, searches for physics beyond the Standard Model and searches for dark sector particles. This talk will focus on nuclear physics using electron beams, presenting a basic introduction and highlighting a few of the more surprising of the rich and varied recent results that have emerged.

Presenter: DALTON, Mark (JLab)

Session Classification: Nuclear and Particle physics

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

Director of Ceremony

Thursday 28 June 2018 08:40 (10 minutes)

Session Classification: Opening

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

Welcoming Address

Thursday 28 June 2018 08:50 (10 minutes)

Presenter: VICE CHANCELOR (NUST)

Session Classification: Opening

Contribution ID: **45** Type: **Oral Presentation**

Guest Honor Address

Thursday 28 June 2018 09:00 (20 minutes)

Presenter: MINISTER OF HIGHER EDUCATION, TRAINING AND INNOVATION

Session Classification: Opening

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

Acknowledgments

Thursday 28 June 2018 09:20 (10 minutes)

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

Session Classification: Opening

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

Research Tools for Publications

Presenter: SRIVASTAV, Suvira (Springer IN)

Session Classification: General

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

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

Thursday 28 June 2018 16:30 (30 minutes)

I will present my journey from a childhood in the South African Kalahari, to studying physics at the Massachussetts Institute of Technology (MIT), then specializing in astrophysics for graduate studies, working at the NASA Ames Research Centre – among others, and eventually becoming a Professor at the University of South Africa (UNISA). The presentation will include results from the submillimeter-bright galaxies that I study and a small tribute to one of my heros and inspirations, Professor Stephen Hawking, who just passed on this year.

Presenter: LEEUW, Lerothodi (UNISA)

Session Classification: General

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

Physics and Psychology –an interdisciplinarity journey

Thursday 28 June 2018 17:05 (30 minutes)

Abstract:
Physics, the study of the basic principles that rule the physical world, was instrumental in the "Scientification"of Psychology, the study of the mind and behaviour. The physicist and philosopher, Gustave Theodor Fechner (1801-1887), coined the term of psychophysics in his seminal work Elemente der Psychophysik in 1860 which aimed at connecting physical stimuli to the different components of consciousness, particularly sensation. Although, psychophysics presents today rather a chapter in the history of psychology –the interdisciplinary journey between physics and psychology continued –and it needed to continue because "mental processes are connected with material processes"(Ebbinghause, 1990). My lecture will provide an overview of this more than a century lasting journey by presenting examples that will not only outline how physics shaped the methodological approaches and theories of psychology but also how psychological knowledge shaped the physical sciences.

Presenter: DUMONT, Kitty (UNISA)

Session Classification: General

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

Solar Energy Applications

Tuesday 3 July 2018 09:00 (25 minutes)

Solar energy can be used for heat generation and electricity supply. According to the International Energy Agency (IEA) solar installations will supply approximately 45% of world energy demand in 2050. This will happen through a wide variety of system configurations for various applications. This paper presents a summary of such systems and applications. The case of novel non-concentrating evacuated flat-plate solar collectors for medium temperature applications will be presented in details.

Presenter: PALMIERI, Vittorio (TVP SOLAR)

Session Classification: Renewable energies and Energy efficiency

Contribution ID: **51** Type: **Oral Presentation**

Growth and fabrication of dye sensitized solar cells on multilayer transparent conductive film

Tuesday 3 July 2018 09:30 (25 minutes)

Dye sensitized solar cells (DSSC) are of great interest for the conversion of solar energy into electrical energy and are future alternatives to silicon solar cells. The increase in conversion efficiency of DSSC depends not only the differences in the conductivities of the transparent layers but on the antireflection of the multilayers and the transmittance of the incident light. Therefore, proper arrangement of the thickness of each layer in the multilayer film along with suitable deposition of nanocrystalline TiO2/dye stack is necessary for a high photocurrent and conversion efficiency of the DSSC. In this work suitable multilayer of doped ZnO and metal are synthesized using sputtering process and used as transparent layer. Small quantity of ZnO incorporated TiO2 matrix is used for the fabrication of DSSC. Chemical vapour deposition method is used to prepare ZnO covered TiO2 film. The DSSC on the Al doped ZnO and Ag multilayer covered with ZnO/TiO2 film yielded an overall cell efficiency 5.45 % at one sun light intensity. The dye sensitization process with the low-cost mercurochrome is sensitive in ZnO based multilayer. The overall energy conversion efficiency of the DSSC using low cost transparent conducting oxide film and mercurochrome dye is a nice step to develop DSSC. Details study on the optimization of the film preparation along with the merits of such film as an electrode with reference to TiO2 film electrode in DSSC will presented during presentation
Keywords: DSSC, TiO2, Transparent conducting layer, transmittance.

Presenter: SAHU, Dipti Ranjan (NUST)

Session Classification: Renewable energies and Energy efficiency

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

General Situation of Energy Production and Consumption in Africa

Tuesday 3 July 2018 10:00 (25 minutes)

Despite huge energy potentials in Africa, the energy production costs are high and the consumption is low as compared to other World regions. Less than 40 % of Sub-Saharan Africans have access to electrical energy. Lack of electrical energy hampers the rapid development of the continent. The present yearly economic growth of˜ 5-6% will be higher if sufficient electrical energy and infrastructure are present. However, Africa cannot embark on the same path as Europe, USA and China for its development by relying only or strongly on non environment-friendly energy sources. This is imperative in order to achieve the Sustainable Development Goals (SDGs) (2016-2030) and the resolution of COP 21 of maintaining the world temperature rise not above 1.5 ℃. The appropriate use of the abundant solar energy and other renewable energy sources can be regarded as a solution to the African energy problem. This requires highly qualified human resources at all levels. The presence of local qualified skills lead to acceptance by the population of the renewable energy technologies and reduction of energy end-price.

This lecture will present the energy situation of Africa followed by an overview of capacity building activities (training, education and research) going on, especially actions taken to address the low experimental research budget in most African institutions of higher learning.

Presenter: EGBE, Daniel (ANSOLE & BALEWARE)

Session Classification: Renewable energies and Energy efficiency

Contribution ID: **53** Type: **Oral Presentation**

Impacts of Incident angle modifier on PV modules performance

The performance of a photovoltaic (PV) module depends on miscellaneous parameters. Of course, these latter parameters vary from an indoor measurement experiment to an outdoor operation on the field. One of them is the panel's angle of orientation. In fact, depending on the angle of orientation, the panel can receive more or less irradiance. As many research papers found in the literature proved it, a module's performance is angular dependent. Meaning that if the irradiance rays are not perfectly normal to the incidence surface, reflection loss always occurs and the performance of the module decreases. To account for those optical losses, the incident angle modifier (IAM) is used; it is a performance factor that characterizes the irradiance really reaching the panel's surface with respect to the normal and angle of incidences of the irradiance. Unfortunately, the IAM changes from a given technology module to another one. For that reason, this work is an experimental investigation of the impacts that the angles of incidence can have on the performance of different modules.

Presenter: JEAN PHILIPPE TEVI, Gabriel

Session Classification: Renewable energies and Energy efficiency

Contribution ID: **54** Type: **Oral Presentation**

Biomass to energy an opportunity for Africa

Tuesday 3 July 2018 10:55 (25 minutes)

Providing a solution to deforestation is an environmental issue for the development of the developing countries, especially those in the south. Yet, a significant part of the forest has disappeared quite rapidly in recent years. Environment problems are compounded by health problems. According to 2012 WHO reports, 1.6 millions of women and children die each year from wood and charcoal smoke. So, we are all concerned because one of the most worrying threats at the moment is global warming due to greenhouse gas emissions. Open burning of agricultural residues and deforestation for the production of firewood and charcoal make the recycling and conversion of biomass waste a priority. Moreover, Biomass valorization can be a solution to generate revenue from agro-forestry waste and to produce Green Energy in order to protect the global environment because the awareness of using Eco-friendly & Non-conventional Bio-coal / Bio-fuel is increasing day-to-day due to the increasing of the conventional fuel cost.
Africa is a region with the most significant amount of underutilized renewable energy sources, but ⋯slow at mobilizing this potential.
However, the establishment of sustainable technologies adapted to the recovery of such residues requires prerequisites of technical (conversion costs related to conversion technologies, biomass costs and fossil fuels price) and regulatory (Public policies that affect supply and demand and in some cases the cost of biomass and climate regulations).
And it is in this sense that we try to make our contribution so that this renewable energy obtained from biomass move to bioenergy and biochemicals nationally, regionally and globally.

Presenter: NDIAYE, Lat Grand (Université de Ziguinchor Senegal)

Session Classification: Renewable energies and Energy efficiency

Contribution ID: **55** Type: **Oral Presentation**

Dielectric and ferroelectric properties of PZN-4.5PT thin films on nanostructured silicon substrate

Tuesday 3 July 2018 11:25 (25 minutes)

Ferroelectric lead compounds having a perovskite structure, such as Pb(Zn1/3Nb2/3)O3 (PZN) 1, Pb(Mg1/3Nb2/3)O3 (PMN) 2, and their solid solutions with PbTiO3 (PT), have been investigated for high-performance ultrasonic transducer applications [3-4]. The integration of such materials as thin films have attracted considerable attention these last years thanks to their outstanding performances that allow to consider new features for the realization of photovoltaic device. Ferroelectric thin films, especially those derived from BaTiO3 composition, have been studied for about thirty years for microelectronics, telecommunications and optics applications. For most applications, it is necessary to approach the single crystal in a thin layer, in order to limit losses (dielectric, optical ...). The advantage of thin films relative to the solid material is then multiple: ability to embed on microcircuits, lower cost than single crystals and geometry for new efficient designs. PZN-4.5PT thin films properties, or ferroelectric materials in general, change significantly with the structural and constitutive properties of considered material. Thus, to consider their integration in applications such as microsystems, it is essential to determine beforehand the influence of these parameters on the electrical performance of the studied materials.
Our study focuses to investigate structural, dielectric and ferroelectric properties of PZN-4.5PT nanoparticles thin films on Silicon substrate.
Keywords: perovskite, nanoparticles, thin film.

Presenter: KOBOR, Diouma (Université Assane Seck de Ziguinchor (Senegal))

Session Classification: Renewable energies and Energy efficiency

Contribution ID: **56** Type: **Oral Presentation**

Dark Matter searches with the ATLAS Detector

Cosmological and astrophysical observations strongly support the presence of a non-baryonic dark matter component in the universe. A broad search program was designed to look for dark matter particles in the cosmos, either by searching for direct interaction or dark matter annihilation. Alternatively, dark matter particles might be produced in the laboratory. The Large Hadron Collider (LHC) might produce dark matter particles via proton-proton interactions. The LHC offers a unique opportunity to search for low mass dark matter particles and provides complementary information at higher masses. Since dark matter particles will escape detection, these particles will have a signature characterised by missing transverse momentum. An overview of recent searches for dark matter production in association with visible particles with the ATLAS detector at LHC will be presented. The constraints placed by the ATLAS searches will be compared to direct dark matter detection experiments.

Primary author: RIFKI, Othmane (Deutsches Elektronen-Synchrotron (DE))

Presenter: RIFKI, Othmane (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

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

Developments in SADC Cyber-infrastructure for Open Data and Open Science: Opportunities in Space Sciences

Wednesday 4 July 2018 11:00 (25 minutes)

There are significant number of data (and compute) intensive projects and initiatives of National, regional and international consequence hosted or driven in Africa –including in the areas of earth and spaces sciences –for example, The Square Kilometre. In this area, Africa will host the largest high resolution radio telescope to do fundamental Astrophysiscs science as the continent has access to the Southern hemisphere skies, and quiet zones with respect to minimal radio frequency interference. For this reason - South Africa and SKA African partner countries are investing in space science and astronomy as building blocks for a knowledge economy through developing necessary supporting platforms. Data challenges for next generation telescopes including the SKA have been widely discussed and currently driving innovations in to meet envisaged computational, data storage, processing and high speed networking requirements

There are also significant projects in Earth observation, environment, climate and weather modelling and applications therein in early warning systems and applications including in agrometeorology and hydrometeorology. For example, the African Development Bank is resourcing a Southern Africa Development Community (SADC) Climare Center for a project that recognises the need to generate, disseminate and use reliable and high quality climate information to help decrease the negative impacts of extreme weather and climate related phenomena and risks in the Southern Africa Development Community (SADC) region.

Collectively, all these projects necessitate and facilitate the creation of requisite computational, network and data infrastructure through regional cyber-infrastructures; facilitate collaborative networks; stimulate discussions around data policy frameworks; address issues around data generation, data analysis, data sharing challenges and negotiating fairness in these domains.

Higher up the value chain, through these projects, it is envisaged they will provide necessary impetus in creating new cohorts of scientists, engineers, researchers and technicians ready to work on world-class projects. This will drive the human capital development programme including in transferable skills such as in data science and as consequence, contribute to stemming the historical brain drain away from the continent and spillovers into countries'economies.

As a result of all this activity, there is an increasing need for governments to put in place the necessary legislation, policies and governance structures to facilitate data sharing and its exploitation for research, innovation and for development. In addition to policy, there is awareness for the need of substantial investments in reliable ICT infrastructure that can sufficiently support data hosting, sharing and analysis. Furthermore, for researchers to generate, curate, manage and preserve and analyse data, they also need specialised skill sets and requisite training.

For the SKA readiness, the Southern African Development Community countries are developing a SADC Cyberinfrastructure and a HPC Ecosystem through a SADC Cyber-infrastructure Framework regional policy instrument.

Presenter: MOTSHEGWA, Tshiamo (University of Botswana)

Session Classification: High Performance Computing

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

Python in Africa

Wednesday 4 July 2018 11:25 (25 minutes)

I will talk about why researchers should care about Python. I will also talk about the different Python communities in Africa and how one can join the Python Namibia society. I will also talk about the importance of RSE (Research Software Engineers) support groups and the Carpentry workshops. I will also talk about the community aspect of Python in Africa and introduce PyCon Namibia.

Presenter: UPANI, Jessica

Session Classification: High Performance Computing

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

The role libraries and open access in modern science

Presenter: BASAGLIA, Tullio (CERN)

Session Classification: Physics Communication

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

CERN and the Public

Presenter: GODINHO, Ana (CERN)

Session Classification: Physics Communication

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

Telecommunication and impact on development in Africa

Presenter: NKURIKIYIMFURA , Didier (smart Africa)

Session Classification: Physics Communication

Contribution ID: **62** Type: **Oral Presentation**

Physics Education : Contextual Review, Assessment of Impact and Advice on the Way Forward

Monday 2 July 2018 09:00 (30 minutes)

Global competitiveness is intrinsically linked to the level of scientific development. Adequate investment in research and development remains a key factor in fostering meaningful capacity building. While coordinated efforts have been made towards the realisation of sustainable capacity building within the broader African context, there is a crucial need to go beyond capacity building with a view to reverse the African science diaspora. This talk provides a contextual review in terms of the impact of existing scientific interventions geared towards sustainable capacity building within Africa. 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. Regular assessment of the impact of existing scientific interventions ought to be undertaken as a key strategic imperative through the establishment of the African evaluation and monitoring committee. Inadequate expenditure in research and development as a percentage of gross domestic product by African countries paints a gloomy picture in terms of the realisation of sustainable scientific development. Yet, Africa is expected to play a meaningful role as part of the global community of nations. Key recommendations providing a roadmap in intensifying and harnessing capacity building efforts for purposes of accelerating socio-economic development within Africa are advanced.

Primary author: Dr RAMAILA, Sam (University of Johannesburg)

Presenter: Dr RAMAILA, Sam (University of Johannesburg)

Session Classification: Physics Education

Contribution ID: **63** Type: **Oral Presentation**

Self-Made Particle Detectors for High Schools and Universities

Monday 2 July 2018 09:30 (25 minutes)

Particle physics in schools but also during undergraduate studies can be taught most effectively by designing and conducting own experiments. In the past years, we developed two construction manuals for fully functional cloud chambers as well as a counting detectors using only material which can be purchased by private persons with total costs below 200 USD. We tested the construction of these detectors with undergraduate students during lectures on detector physics. The resulting prototype detectors can be further used in high schools. In this presentation we will summarize the construction manuals, discuss the performance of the detectors as well as present on the feedback which we received from students and high school teachers alike.

Presenters: DUDDER, Andreas Christian (Johannes Gutenberg Universitaet Mainz (DE)); SCHOTT, Matthias (Johannes Gutenberg Universitaet Mainz (DE))

Session Classification: Physics Education

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

Physics Education : Panel Discussion

Monday 2 July 2018 09:55 (30 minutes)

The Physics Education session concludes with a panel discussion to enable further discussion of topics covered in the session as well topics suggested by the panelists or those in attendance. Each panelist will give a 2-3 minute introduction; this will be followed by discussions between panelists and attendees in a question-and-answer format. The overall theme will center on finding ways forward to foster understanding of fundamental physics and applications by learners and appropriate support for and development of instructors at all levels of education in Africa.

Presenters: CECIRE, Kenneth (University of Notre Dame); Prof. STEENKAMP, Riann (University of Namibia); Mrs NAMWANDI, Saara (Physics teacher from Omaheke, Namibia); RAMAILA, Sam (University of Johannesburg)

Session Classification: Physics Education

Contribution ID: **65** Type: **Oral Presentation**

Health risk assessment of natural occurring radionuclides in shore sediment collected from Ovambo beach, Walvis Bay, Namibia

Abstract
The activity concentration of primordial radionuclides such as 238U, 232Th and 40K were determined in shore sediment samples in the Ovambo beach of Walvis bay, Namibia. The activity concentrations were carried out by gamma spectrometry. The average activity measurements were found to range from BDL –276.39 Bq.kg - 1 with a mean of 142.79 Bq.kg –1 for 238U, BDL –40.80 Bq.kg –1 with a mean of 29.69 Bq.kg –1 for 232Th and 319.26 –516.45 Bq.kg –1 with a mean of 359.78 Bq.kg –1 40K. The concentrations were converted to assess radiological risks where the values of effective dose, radium equivalent activity, hazard index, excess life cancer risk were evaluated. The assessed values were found to be higher than the maximum allowed levels. Therefore, there is human radiological health risk envisaged along the Ovambo beach.
Keywords
Shore sediment, Radioactivity, Gamma spectrometry, Ovambo beach, Walvis Bay,

Primary author: Dr ONJEFU, Sylvanus Ameh (Namibia University of Science and Technology)

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

Session Classification: Accelerator, Medical and Radiation Physics

Track Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **66** Type: **Oral Presentation**

Simulation of the electrical behavior of a fully printed current switch using PSPICE

In this work, fully printed and flexible current switches are demonstrated, an approach of simulating and predicting their electrical response using electronics simulator is also proposed. Planar printed flexible transistor operating as current switches were produced on plain paper (80 g/m^2), using silver as electrodes and silicon as the active material. The active material and the devices were characterized and an analytic model of their electrical operation was proposed.

The electrical behaviour of the switches were obtained experimentally, they operation were described by a triangle of varistors or a system of anti-parallel diodes. Subsequently, A novel approach to simulate and predict the electrical operation of such devices was demonstrated. Namely, a PSPICE circuit model of the devices was built using varistors from the EPCOS library and other conventional PSPICE components. The electrical characteristics of the simulated circuit were in extraordinary agreement with the experimental data. We employed different varistors in our model to predict the behaviour of future printed devices. We then produced and characterized the devices simulated with the varistor S07K140 and showed that their electrical behaviour was similar to the prediction. we concluded that this method of prediction could be generalized or explore for other types of printed electronics components, as to reduce the trial and error method, reduce the cost of production per device, improve the devices' performance and optimize their productions.

Primary authors: Dr ZAMBOU, Serges (Ecole d'Ingenierie Industrielle, Bagangte); Prof. ZEKENG, Serge Sylvain (University of Yaounde 1)

Presenter: Dr ZAMBOU, Serges (Ecole d'Ingenierie Industrielle, Bagangte)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **67** Type: **Oral Presentation**

Study of job satisfaction amongst high school teachers' holding a PhD in Cameroonian public schools

The increasing rate of high school teachers' attrition has triggered several studies on the job satisfaction of high school teachers in developed countries. Their findings show that school context, teachers' ages and the environment are the factors that influence the teachers' decision to remain in the school, profession or to leave. However, those results can not be applied in most developing countries due to the significant difference of environment, job availability, and work context. The oversupply of PhD in certain non-industrialized countries like Cameroon means, more PhD holders most take jobs in lower qualification, very often it is high school teaching. We study the job satisfaction amongst Cameroonian high school teachers holding a PhD. In this study, various parameters such as motivation, satisfaction, sense of belonging, financial remuneration, job stability, difficulty to leave the profession, their aspiration to be in tertiary education, relation with supervisors/authorities, social pressure, etc were studied through a questionnaire.The data produced by more than 50 high school teachers holder of a PhD, shows that unlike in developed country, job and salary security coupled with the relative free time in high school were amongst the top factors that motivate the studied group. Many do consider a career change, however, due to low job prospect, they will rather remain in high school. A high level of dissatisfaction was noticed amongst that population, amongst others, they have lost their sense of belonging as more aspired to join the university workforce. A high sense of boredom, low-status perception, low financial remuneration and lack of career perspective were the top motivating factor to leave the high school but not the profession. Despite, the high level of dissatisfaction, many teachers would still consider the profession and the high school, if they were to restart.

Primary authors: ZAMBOU, Serges (Ecole d'Ingenierie Industrielle de Bagangte (E2i), Camerou); Mrs DJUNE TCHINDA, Anita (University of Yaounde 1); Prof. KENFACK DJIOTSA, Aurelien (University of Yaounde 1)

Presenter: ZAMBOU, Serges (Ecole d'Ingenierie Industrielle de Bagangte (E2i), Camerou)

Session Classification: Physics Education

Track Classification: Physics Education

Contribution ID: **69** Type: **Oral Presentation**

Rapid Nuclear Forensics Analysis Via Laser Based Spectroscopy and Spectral Imaging Coupled With Chemometrics

Nuclear Forensics (NF) involves the laboratory analysis of intercepted nuclear and radiological material (NRM) for nuclear attribution (origin and intended use). The aim of NF analysis is to establish the relationship between seized NRM and their attribution to monitor and strengthen nuclear security. The critical challenge in NF at the moment is the lack of direct, rapid and non-invasive analytical techniques for detection, microanalysis and imaging of NRM. Laser based spectroscopic techniques namely Laser Induced Breakdown Spectroscopy (LIBS) and Laser Raman Spectromicroscopy (LRS) combined together has the potential to overcome these limitations to a great extent. LIBS is an emission spectroscopic technique which fingerprints the element associated with the spectral peaks. On the other hand, LRS identifies the molecular bands associated with specific chemical compounds and microstructure in a given sample based on molecular vibrations following little or no sample preparation. The practical utility of these techniques is limited by the complexity of the spectra in air at atmospheric pressure and (multivariate) data interpretation. Coupling LIBS and LRS with chemometrics enables data dimensionality reduction besides extracting subtle NF signatures from the spectra and images. Uranium lines at U II 385.464 nm, U II 385.957 nm and U II 386.592 nm were identified as the NF signatures of uranium for rapid detection of trace uranium in uranium ore surrogates. Principal Component Analysis performed on the LIBS spectra of the uranium-bearing mineral ores collected from different regions of Kenya (South Ruri, Magadi, Coast) successfully grouped the samples to their mineral mines (origin). A multivariate calibration strategy for the quantification of uranium bearing mineral ores was developed using artificial neural network (ANN) (feed forward back-propagation algorithm) utilizing spectral feature selection and making use of (ii) resonant uranium lines (iii) weak uranium peaks (to demonstrate the power of ANN to model noisy LIBS spectra for trace quantitative analysis). NF signatures of uranium molecule were identified using multi-photon (λ⊠= 532 nm, 785 nm) LRS in uranium trioxide, uranyl nitrate, uranyl sulphate and uranium chloride bound in cellulose at 848 cm-1, 865 cm-1, 868 cm-1 and 861 cm-1 respectively. These molecular signatures were utilized to infer the presence of uranium compounds in the various HBRA soils. Spectral imaging performed on a pellet spiked with trace level of uranium in cellulose (to mimic uranium trafficked in concealed condition) displayed the distribution of uranium on the pellet surface. Thus, LIBS and LRS coupled with chemometrics have the potential to detect trace level of uranium in NRM rapidly under concealed condition without destroying the integrity of the sample.

Primary author: Mrs BHATT, Bobby (University of Nairobi)

Co-authors: Dr HUDSON ANGEYO , Kalambuka (University of Nairobi); Dr DEHAYEM-MASSOP, Alix (University of Nairobi)

Presenter: Mrs BHATT, Bobby (University of Nairobi)

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

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

Graphene: The Wonder 2D-material of the 21st century

Friday 29 June 2018 08:55 (25 minutes)

New materials have always added to new technology and subsequently new society. The simplest example can be going to history where we can see the transitions from Stone Age which developed into Bronze and then Iron Age. Each age is levelled by the material, bearing the new technology and new society. The present age is levelled by the Silicon material and is known as Silicon age. Now question is –what will be the next age? Scientists assume that age may be the CARBON or GRAPHENE age because the carbon/graphene is the substitute of silicon material. Graphene is a one-atom-thick planar sheet of sp2-bonded carbon atoms that are densely packed in a honeycomb crystal lattice that can be viewed as an atomic-scale chicken wire made of carbon atoms and their bonds. It is the world's first two dimensional (2D) material isolated from graphite in 2004 by two physicists Andre Gem and Konstantin Novoselov who received the novel prize on physics in 2010. Graphene, the "wonder material", is made of a single atom thick carbon atom layer in a honeycomb-like hexagonal lattice and is the thinnest, strongest and hardest material available. Graphene is strongest, lightest, thinnest and smallest material in the world. The last few years have seen extensive research into the properties and applications of graphene, and the material has been suggested as being the potential replacement for silicon in many electronics applications. It is highly stretchable, transparent and impermeable and useful in different device applications in our day to day life. Graphene has several useful properties that include high mechanical strength, very high electron mobility, and superior thermal conductivity. Graphene could be used to create electronic components which are transparent and flexible, creating a new paradigm in electronic product design. Graphene is flexible, transparent electronics and closer to reality with the creation of graphene-based electrodes.

In conclusion, graphene is a promising material for new types of system, circuits and devices where several functionalities can be combined into a single material. Presently, highly critical issues with the extensive use of graphene in electronics are related to manufacturing. Although growth on copper surfaces has made bulk manufacture of large area graphene layers possible, there are a number of technical challenges to be overcome both in terms of cost and quality before the first consumer products using graphene are actually commercialized.

In this present talk, I will present the process of extraction of graphene, its different properties and various applications. In addition magnetic properties of graphene and graphene oxide will be discussed for the future spintronic applications.

Presenter: Prof. SEKHAR, Chandra Ray (UNISA)

Session Classification: Material Physics

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

TBD

Presenter: Prof. CHETTY, Nithaya (Universty of Pretoria)

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

Theoretical studies of two dimensional systems

Thursday 28 June 2018 14:10 (25 minutes)

Since the discovery of graphene in 2004, many new 2 dimensional materials have been synthesised. These form ideal systems to model quantum mechanically and to modify computationally, for example by doping or the creation of various defects, with the view to alter the physical, electronic, magnetic, etc., properties. Within the framework of density functional theory, a number of 2D systems will be discussed for their often unique and novel properties. In addition, a new theoretical scheme will be presented that enables the computation of the elastic properties of these materials.

Presenter: CHETTY, Nithaya (Universty of Pretoria)

Session Classification: Material Physics

Contribution ID: **73** Type: **Oral Presentation**

Ultrasmall Angle Xray Scattering (USAXS) and WideAngle Xray Scattering (WAXS) Studies on the Complex Metal Hydride NaAlH4

This research seeks to understand the role of ScCl3, ZrCl4, and VCl3 catalysts in NaAlH4. Some researchers suggests that the catalyst serves to decrease the H2 gas desorption temperature in these materials by influencing the reaction rates. Others suggest that the catalyst acts more as a dopant, thereby mitigating (enhancing) diffusion rates is in the solid phases. Changes in the hydride powders during desorption occurs at multiple length scales. To study this problem, we have examined these hydrides at multiple length scales using an Xray scattering instrument which is capable of capturing nine decades of scattering intensity from a scattering wave vector, Q, of 0.0001Å to 6.0 Å . The ultrasmall angle Xray scattering (USAXS) instrument sector 9ID-D of the Advanced Photon Source (APS) offers the capability to simultaneously collect morphology information using USAXS and SAXS data while examining the crystallographic changes using wideangle
Xray scattering (WAXS) data. Studies were performed on aspurchased, neat, and catalyzed NaAlH during insitu heating up to 170C (just below the H desorption temperature for uncatalyzed NaAlH4). Results showed that NaAlH has a surface fractal (highly porous) morphology. Isothermal studies performed at 30C, 65C, 100C, 135C, and 170C reveals changes at low Q (Q˜.001 Å to 0.01 Å) associated with highly interconnected intraparticle porosity which is suitably described by a power-law slope for a Gaussian polymer chain structure of p˜2. At high scattering wave vector, Q˜0.03Å , the presence of a pore population which obeys Porod scattering and appears to have a size at 21nm is present. These fine pores increase in their population density as temperature is elevated. These morphological changes are all believed to occur because of hydrogen diffusion out of the powders. The WAXS data reveals thermal expansion to occur, but no solid state phase transformation to the product phase. Next steps will involve correlating these changes with hydrogen desorption temperatures for each catalyzed sample.

Primary authors: Prof. DOBBINS, Tabbetha (Rowan University); Dr ILAVSKY, Jan (Advanced Photon Source)

Presenter: Prof. DOBBINS, Tabbetha (Rowan University)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **74** Type: **Oral Presentation**

Indoor Radon levels and the associated effective dose rate in selected buildings at the Namibia University of Science and Technology (NUST), Namibia.

Abstract
Studies on radon and its progeny provides strong and compelling evidence that it is the greatest contributor of inhalation dose in the living environment. Indoor radon and the annual effective doses measurements were performed in office buildings at the National University of Science and Technology (NUST), Namibia, using CR-39 nuclear track detectors exposed for 3 months in the offices. The office buildings were classified according to age, occupancy, number of floors and size of the rooms. Based on the dosimetric approach and epidemiological determination conversions for radon exposures the annual effective doses were calculated and compared. The radon concentration in the selected office buildings varied from 32.0 Bq/m3 to 90.5 Bq/m3 in new and buildings old buildings respectively, with an average value of 58.6 Bq/m3. The annual effective dose due to exposure to indoor radon and its progeny was also found to vary from 0.4 to 1.70 mSv/yr. The radon concentration in all the office buildings were significantly lower than 600 Bq/m3 receipted by International Commission on Radiological Protection (ICRP) as the action level for a closed space.

Keywords
Indoor radon, annual effective dose, exposure, nuclear track detectors, Namibia University of Science and Technology

Primary author: Mr ZIVUKU, Munyaradzi (Namibia University of Science and Technology)

Co-authors: Ms KEENDJELE , Justina (Namibia University of Science and Technology); Mr ONJEFU, Sylvanus (Namibia University of Science and Technology)

Presenter: Mr ZIVUKU, Munyaradzi (Namibia University of Science and Technology)

Session Classification: Accelerator, Medical and Radiation Physics

Track Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **75** Type: **Poster**

Studies on natural radioactivity in shore sediments of Swakopmund beach, Erongo region, Namibia

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4 International Center for Environmental and Nuclear Sciences, University of West Indices, Mona Campus, Kingston, Jamaica
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Abstract
The study deals with investigation of natural radioactivity in shore sediments of Swakopmund beach. The measurements were done using a high purity germanium detector (HPGe). The results obtained were compared with those of similar studies. The absorbed dose rate, annual effective dose rate, radiological hazard radium-equivalent activity, external and internal indices and excess life time cancer risk were evaluated and compared with internationally recommended values.
Keyword: HPGe detector, radioactivity, shore sediment, Swakopmund

Primary author: Dr ONJEFU, Sylvanus Ameh (Namibia University of Science and Technology)

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

Contribution ID: **76** Type: **Oral Presentation**

Linear and non-linear properties of ternary chalcopyrite semiconductors

Chalcopyrite semiconductors are an important class of materials, which are having potential applications in new cutting-edge classes of electronic, photovoltaic and optoelectronic devices. The AIBIIIC2VI and AIIBIVC2V groups of semiconductors crystallize in the chalcopyrite structure, which is a superlattice of the zinc blende structure obtained by doubling its unit cube along the z-axis that becomes the c-axis of the chalcopyrite structure. A considerable amount of experimental and theoretical work has been done on the synthesis and growth of AIBIIIC2VI (A = Cu, Ag; B =Al, Ga, In; C = S, Se, Te) and AIIBIVC2V (AII= Zn, Cd; BIV= Si, Ge, Sn; C2V= P, As) groups of chalcopyrite semiconductors 1. New chalcopyrite compounds of AIIBIVC2V group have been developed by replacing AII type atom with Be 2, Mn 3 and Mg 4 atoms. These new chalcopyrite materials are also having potential applications in the areas of magnetically controllable NLO devices and spintronics, which are less studied and only few papers are available on these materials. Recently, defect chalcopyrites of AIIB2IIIC4VI family have been reported in the literature, which are obtained from their parent chalcopyrites I-III-VI2 and their grandparent II-VI compounds, and having huge applications in frequency conversion and phase matching. This is because of their large birefringence, high second harmonic generation coefficients and better figure of merit. The models proposed by earlier workers for the calculation of various properties of ternary chalcopyrites are complex in nature and require experimental values of number of parameters, which are not known for some of these materials, especially the new chalcopyrites of AIIBIVC2V family and defect chalcopyrites of AIIB2IIIC4VI family. In the present research work, various linear properties such as homopolar energy gap, heteropolar energy gap, average energy gap, ionicity and dielectric constant have been studied for these materials using plasma oscillation theory of solids. The refractive index and electronic polarizability have been calculated for these chalcopyrites, 13 new magnetic materials of AIIBIVC2V family, and AIIB2IIIC4VI group of defect chalcopyrite semiconductors. Further, the nonlinear optical properties have been investigated for AIBIIIC2VI semiconductors and second order NLO tensor coefficients (d36) of whole family have been calculated. In almost all cases, our calculated values are in better agreement with the experimental values than the values reported by earlier workers which in turn demonstrate the soundness of the present calculations.

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3 Medvedkin G A and Voevodin V G, J. Opt. Soc. Am. B 22 1884(2005)
4 Shaposhnikov V L, Krivosheeva A V, Borisenko V E, Lazzari J L, and d'Avitaya F A, Phys. Rev. B 85 205201(2012)

Primary author: JHA, Vijeta

Presenter: JHA, Vijeta

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **77** Type: **Oral Presentation**

The Large Hadron Collider and Experiments

The Large Hadron Collider Project (LHC) at CERN is one of the largest and most ambitious scientific experiments ever conducted. Planning for and operation of the accelerator and its many experiments has spanned several decades, and will span several more. This talk focuses on the technological details of how the accelerator and the major particle detection systems function. It also covers some of the instrumentation upgrades planned in the near future.

Primary author: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Presenter: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **78** Type: **Poster**

The Large Hadron Collider and Experiments (Posters)

A set of posters describing this experiment: The Large Hadron Collider Project (LHC) at CERN is one of the largest and most ambitious scientific experiments ever conducted. Planning for and operation of the accelerator and its many experiments has spanned several decades, and will span several more. This talk focuses on the technological details of how the accelerator and the major particle detection systems function. It also covers some of the instrumentation upgrades planned in the near future.

Primary author: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Presenter: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

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

Auto-stabilzed Electron

Thursday 28 June 2018 14:40 (25 minutes)

We include effects of self-gravitation in the self-interaction of single electrons with the electromagnetic field. When the effect of gravitation is included there is an inevitable cut-off of the k-vector - the upper limit is finite. The inward pressure of the self-gravitating field balances the outward pressure of self-interaction. Both pressures are generated by self-interactions of the electron with two fields - the vacuum electromagnetic field and the self-induced gravitational field. Specifically we claim that gravitational effects must be introduced to stabilize the electron. We use the Einstein equation to perform an exact calculation of the bare mass. We find a close-form solution. We find the electron radius $r_e = \sqrt{\alpha/4\pi}\sqrt{\hbar G/c^3}$. Traditionally the second quantity which is called the Planck length ℓ_P, is educed here from first principles. We find that the electromagnetic and gravitational fields merge at $\sqrt{\alpha/16\pi} of the interior and exterior metrics at \mathrm{r}_e$.

Presenter: Prof. KARIM, Munawar (St. Johan Fisher College, USA)

Session Classification: Material Physics

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

Ultrasmall Angle Xray Scattering (USAXS) and WideAngle Xray Scattering (WAXS) Studies on the Complex Metal Hydride NaAlH4

Friday 29 June 2018 09:20 (25 minutes)

This research seeks to understand the role of ScCl3, ZrCl4, and VCl3 catalysts in NaAlH4. Some researchers suggests that the catalyst serves to decrease the H2 gas desorption temperature in these materials by influencing the reaction rates. Others suggest that the catalyst acts more as a dopant, thereby mitigating (enhancing) diffusion rates is in the solid phases. Changes in the hydride powders during desorption occurs at multiple length scales. To study this problem, we have examined these hydrides at multiple length scales using an Xray scattering instrument which is capable of capturing nine decades of scattering intensity from a scattering wave vector, Q, of 0.0001Å to 6.0 Å . The ultrasmall angle Xray scattering (USAXS) instrument sector 9ID-D of the Advanced Photon Source (APS) offers the capability to simultaneously collect morphology information using USAXS and SAXS data while examining the crystallographic changes using wideangle
Xray scattering (WAXS) data. Studies were performed on aspurchased, neat, and catalyzed NaAlH during insitu heating up to 170C (just below the H desorption temperature for uncatalyzed NaAlH4). Results showed that NaAlH has a surface fractal (highly porous) morphology. Isothermal studies performed at 30C, 65C, 100C, 135C, and 170C reveals changes at low Q (Q˜.001 Å to 0.01 Å) associated with highly interconnected intraparticle porosity which is suitably described by a power-law slope for a Gaussian polymer chain structure of p˜2. At high scattering wave vector, Q˜0.03Å , the presence of a pore population which obeys Porod scattering and appears to have a size at 21nm is present. These fine pores increase in their population density as temperature is elevated. These morphological changes are all believed to occur because of hydrogen diffusion out of the powders. The WAXS data reveals thermal expansion to occur, but no solid state phase transformation to the product phase. Next steps will involve correlating these changes with hydrogen desorption temperatures for each catalyzed sample.

Presenter: Prof. DOBBINS, Tabbetha (Rowan University)

Session Classification: Material Physics

Contribution ID: **81** Type: **Poster**

Statistical-based Tuning of Ericsson Model Parameters Employing Robust LAD Algorithm for Improved Radio Frequency Propagation Loss Prediction.

Improving the prediction capability of propagation models by means of their parameter tuning with robust field test measurement has been a dynamic area of research in literature, but mostly using the least square (LS) tuning approach. One major drawback of propagation model parameter tuning using standard LS method is that it requires varying and incrementing one parameter repeatedly in steps up to 2 to 4 times, before attaining a near global minimum. In this paper, a better approach tagged Adaptive least absolute deviation (ALAD) is proposed to robustly tune the offset parameters of Ericsson model to accurately map field measurement. The optimal prediction of the proposed ALAD tuning algorithm over the LS tuning approach have been demonstrated on measured loss data acquired over two different cell sites locations of a recently deployed LTE radio cellular network in Port Harcourt. In terms of the mean percentage error and coefficient of efficiency. The outcome in study locations show that prediction accuracy attained using the tuned Ericsson model with the LAD algorithm outperform the conventional LS tuning technique by 20%, 19 % , 24% and 22%, 25 % , 21% on the measured LTE propagation loss data, in term of root mean square error, mean absolute percentage error and correlation coefficient respectively in the study two locations.

Keywords: Propagation loss, Propagation Model tuning, prediction accuracy, Least Absolute deviation regression, least square regression.

Primary author: Dr OJUH, Divine (Benson Idahosa University)

Co-author: Dr ISABONA, Joseph (Federal University, Lokoja, Nigeria)

Presenter: Dr OJUH, Divine (Benson Idahosa University)

Session Classification: Physics Communication

Track Classification: Physics Communication

Contribution ID: **82** Type: **Oral Presentation**

Impacts of Incident angle modifier on PV modules performance

The performance of a photovoltaic (PV) module depends on miscellaneous parameters. Of course, these latter parameters vary from an indoor measurement experiment to an outdoor operation on the field. One of them is the panel's angle of orientation. In fact, depending on the angle of orientation, the panel can receive more or less irradiance. As many research papers found in the literature proved it, a module's performance is angular dependent. Meaning that if the irradiance rays are not perfectly normal to the incidence surface, reflection loss always occurs and the performance of the module decreases. To account for those optical losses, the incident angle modifier (IAM) is used; it is a performance factor that characterizes the irradiance really reaching the panel's surface with respect to the normal and angle of incidences of the irradiance. Unfortunately, the IAM changes from a given technology module to another one. For that reason, this work is an experimental investigation of the impacts that the angles of incidence can have on the performance of different modules.

Primary author: TEVI, Gabriel Jean-Philippe (Université Gaston Berger)

Co-authors: DICHIARA, Patrick (Cologne University of Applied Sciences (TH Köln)); Prof. BLIESKE, Ulf; FAYE, Marie Emmilienne; SENE, Moustapha; Prof. SEIDOU MAIGA, Amadou; DIENG, Babacar

Presenter: TEVI, Gabriel Jean-Philippe (Université Gaston Berger)

Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **83** Type: **Oral Presentation**

Theoretical studies of two dimensional systems

Since the discovery of graphene in 2004, many new 2 dimensional materials have been synthesised. These form ideal systems to model quantum mechanically and to modify computationally, for example by doping or the creation of various defects, with the view to alter the physical, electronic, magnetic, etc., properties. Within the framework of density functional theory, a number of 2D systems will be discussed for their often unique and novel properties. In addition, a new theoretical scheme will be presented that enables the computation of the elastic properties of these materials.

Primary author: Prof. CHETTY, Nithaya (University of Pretoria)

Presenter: Prof. CHETTY, Nithaya (University of Pretoria)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **84** Type: **Oral Presentation**

The ABC of Feynman Integrals

Feynman integrals are important for describing elementary particle interactions in quantum field theory. From the mathematical point of view, they give rise to interesting special functions. The latter can be computed from differential equations that the integrals satisfy. I will review methods for transforming the equations to a canonical form, from which the answer can be conveniently read off.

Primary author: HENN, Johannes

Presenter: HENN, Johannes

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **85** Type: **Oral Presentation**

PROBING THE REIONIZATION EPOCH WITH THE SIMONS OBSERVATORY

Reionization was a very critical process in the Universe in the transition from an opaque to a transparent Universe. However, we do not fully understand how this event happened. Using the kinetic Sunyaev-Zel'dovich Effect (kSZ), we can look critically into the reionization epoch of the Universe. This work predicts how well we can constrain cosmological parameters using forecasted data from the Simons Observatory (SO), to explain the transition from dark matter to stars. We use the model developed by alvarez et. al. to test whether we can determine the shape of the kSZ spectrum from patchy reionization. Using different specifications for SO, we find the best configuration of telescope parameters that provide tight constraints on the cosmological parameters.

Primary authors: Prof. HLOZEK, Renee (Dunlap Institute for Astronomy and AStrophysics, University of Toronto); Dr ALVAREZ, Marcelo; Ms IKAPE, Margaret (Dunlap institute for Astronomy and AStrophysics, University of Toronto)

Presenter: Ms IKAPE, Margaret (Dunlap institute for Astronomy and AStrophysics, University of Toronto)

Session Classification: Astrophysics & Cosmology

Track Classification: Astrophysics and Cosmology

Contribution ID: **86** Type: **Oral Presentation**

Chalcogenide Glasses-New advances

Chalcogenide glasses containing S, Se or Te constitute a rich family of vitreous semiconductors. There has been intense research activity based on these glasses in the view of basic Physics as well as device technology. The freedom allowed in the preparation of glasses in varied composition brings about changes in their short-range order and thus results in variation of their physical properties. It is therefore easy to tailor their various properties as desired for technological applications. These materials have a wide range of applications such as making optical fibers, memory devices, reversible phase change optical recording etc. Besides the wide commercial/device applications like switching, memory and xerography etc. of Se, it also exhibits a unique property of reversible transformation . This very property makes it very useful in optical memory devices.
The effects of impurities on the electronic properties of amorphous chalcogenide glasses have been the subjects of serious debate ever since their discovery . It has long been known that these glasses, which behave like intrinsic P-type semiconductors, are insensitive to doping and that this behavior is attributed to the local valence saturation of the dopant atom. Fermi level is considered to be pinned due to the equilibrium between the negatively and positively charged (D- and D+) daggling (D) bonds . The concept of pinned Fermi level is not consistent with the discovery of the surprising phenomenon of P-N transition or conductivity type reversal first observed in bismuth germanium chalcogenide glasses. This discovery has led to extensive research on these materials and to a reconsideration of the existing theories of electronic structure of chalcogenide glasses. The carrier type reversal in germanium chalcogenides requires incorporation of a significant amount of bismuth.
In this talk we present a overview of recent trends and research on these materials and our contribution towards understanding their optical and structural properties and applications.

Primary author: Prof. SATHIARAJ, T.Stephen (BIUST, Palapye, Botswana)

Presenter: Prof. SATHIARAJ, T.Stephen (BIUST, Palapye, Botswana)

Session Classification: Material Physics

Track Classification: Material Physics

Contribution ID: **87** Type: **Oral Presentation**

Degradation of poly-crystalline photovoltaic module after a few operating years outdoor exposure in hot and hymide climate of casamance in Senegal

Abstract
PV modules are often considered to be the most reliable component of a photovoltaic system. The alleged reliability has led to the long warranty period for modules up to 25 years. Currently, failures resulting in module degradation are generally not considered because of the difficulty of measuring the power of a single module in a PV system and the lack of feedback on the various degradation modes of PV modules. In the present study, degradation analysis of 9 poly-crystalline silicon PV modules of solar pump are study after four years exposition in outdoor in a subguineen climate. A comprehensive analysis has been carried out through visual inspection, I-V characteristic After few operation years under subguineen climate environment, the global degradation and the degradation rate of electrical. characteristics such as I-V and P-V curves, open-circuit voltage (Voc), short-circuit current (Isc), maximum ouput current (Imax), maximum output voltage (Vmax), maximum power output (Pmax) and fill factor (FF) are evaluate at standard test conditions (STC). The study has shown that Pmax, Imax, Isc and FF are the most degraded performance characteristics for all PV modules. The global degradation of power output (Pmax) presents the highest loss that cand be from 8,75%/year to 22,45%/.

Primary author: FAYE, Issa (Université Assane Seck Ziguinchor (Senegal))

Co-authors: NDIAYE, Ababacar (Université Assane Seck (Ziguinchor) Sénégal); KOBOR, Diouma (Université Assane Seck Ziguinchor Sénégal); THIAME, Moustapha (Université Assane Séck (Ziguinchor))

Presenter: FAYE, Issa (Université Assane Seck Ziguinchor (Senegal))

Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **88** Type: **Poster**

Effect of Swift Heavy Ions irradiation in the migration of Silver Implanted into polycrystalline SiC

Silver (Ag) ions of 360 keV were implanted into polycrystalline SiC to a fluence of 2×1016 cm-2 at room temperature. Some of the as-implanted samples were irradiated with xenon (Xe) ions of 167 MeV to a fluence of 3.4×1014 cm-2 at room temperature. Both the as-implanted and implanted then irradiated samples were isochronal annealed at temperatures ranging from 1100 oC to 1500 oC in steps of 100 oC for 5 h. The as-implanted, irradiated and annealed samples were characterized by Rutherford backscattering spectrometry (RBS), Raman spectroscopy and scanning electron microscopy (SEM). Implantation of Ag at room temperature amorphized SiC, while swift heavy ion (SHI) irradiation of the as-implanted samples caused some recrystallization of the amorphized layer. SHI irradiation causes no migration of implanted Ag. Diffusion of implanted Ag was already taking place at 1100 oC for irradiated sample while its started at 1200 oC for Un-irradiated sample. This was due to difference in grain boundary diffusion in the two samples. Irradiated samples had fine grains after annealing at 1100 oC, this lead to the fast diffusion of Ag combined with loss of about 70% of Ag from the surface. While un-irradiated samples had relatively larger grains, this caused less diffusion of silver. Decomposition of SiC were observed after annealing at 1500 oC for both samples.

Primary authors: Mr ABDELBAGI, Hesham (University of Pretoria); Prof. MALHERBE, Johan (University of Pretoria); Dr HLATSHWAYO , Thulani (University of Pretoria); Dr SKURATOV, Vladmer (Joint Institute for Nuclear Research); Dr NJOROGE, Eric (University of Pretoria); Dr MOTLOUNG, S.V (Sefako Makgatho Health Science University); Dr MLAMBO, Mbuso (University of Pretoria)

Presenter: Mr ABDELBAGI, Hesham (University of Pretoria)

Track Classification: Material Physics

Contribution ID: **89** Type: **Oral Presentation**

Argon Emulation in The Simulation of The ATLAS Transition Radiation Tracker

Implementation of gas type emulation in the digitization software of the ATLAS TRT. The primary purposes of emulation are to be able to accommodate for a sudden change in the gas mixture used for data, and for efficiently simulating different gas type geometries to test particle identification performance.

Primary author: Mr HAMDAOUI, Hassane (Universite Mohammed V (MA))

Presenter: Mr HAMDAOUI, Hassane (Universite Mohammed V (MA))

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **90** Type: **Poster**

Power Analysis of Selected Configuration Modes of a Solar Powered Ultrasound Pest Control System

A solar powered ultrasound pest control system comprising of the standalone device and the booster units were designed, implemented and their performance evaluated both in laboratories and in farms. The concern of this work is to explore better configuration options which can be applied in large farm type, formulate the mathematical expressions relating the area of ultrasound coverage on a farm to the number of booster units required and the associated power analysis indicating the solar panel and battery requirement when such configurations are implemented.

Primary authors: Dr IBRAHIM, Aku (Federal University of Technology, Minna, Nigeria); Prof. OYEDUM, David (Federal University of Technology, Minna, Nigeria)

Presenter: Dr IBRAHIM, Aku (Federal University of Technology, Minna, Nigeria)

Session Classification: Renewable energies and Energy efficiency

Track Classification: Renewable Energies and Energy Efficiency

Contribution ID: **91** Type: **Oral Presentation**

DETERMINATION OF THE NATURAL RADIONUCLIDE CONTENT AND ASSOCIATED RADIATION HAZARDS IN SOIL SAMPLES COLLECTED FROM THE OHORONGO CEMENT PLANT NEAR OTAVI, NAMIBIA.

The concentrations of naturally occurring radionuclides 238U, 232Th, and 40K in the soil samples collected from the Ohorongo Cement Plant near Otavi, Namibia have been determined and used to estimate the baseline natural radiation level in the cement plant. A total of 50 soil samples were collected from inside and outside of the plant and analyzed using an HPGe detector. The concentrations vary from 7.3 ± 1.2 to 25.6 ± 1.8 Bq/kg with an average of 15.0 ± 4.7 Bq/kg for 238U, 12.7 ± 2.0 to 43.1 ± 3.5 Bq/kg with an average of 25.1 ± 9.9 Bq/kg for 232Th, and 132.2 ± 9.7 to 507.8 ± 22.5 Bq/kg with an average of 310.7 ± 97.2 Bq/kg for 40K. These concentrations were used to calculate the mean absorbed dose rate and the mean annual effective dose for the plant. The value of 0.04 mSv obtained for the mean annual effective dose is less than the maximum permissible dose of 1 mSv a year recommended for the public by the International Commission on Radiological protection. In order to evaluate the associated health hazard, the concentrations were also used to calculate the mean Radium equivalent activity (Req) and the mean external hazard index (Hex) for the plant. The values of 74.9 Bq/kg and 0.20 obtained respectively for Req and Hex are again much below their respective permissible values. These results and the low value obtained for the mean annual effective dose indicate that radiation hazard is negligible in the plant.

Primary author: Mrs NAMBINGA, Monica (University of Namibia)

Co-author: Prof. OYEDELE, James (University of Namibia)

Presenter: Mrs NAMBINGA, Monica (University of Namibia)

Session Classification: Accelerator, Medical and Radiation Physics

Track Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **92** Type: **Oral Presentation**

Modern BigData technologies to store and access metadata for the ATLAS experiment

Structured data storage technologies evolve very rapidly in the IT world, driven by BigData projects. LHC experiments, and ATLAS in particular, select and use these technologies to store a wealth of metadata, balancing the performance for a given set of use cases with the availability, ease of use and of getting support, and stability of the product. We definitely and definitively moved from the "one fits all"(or "all has to fit into one") paradigm to choosing the best solution for each group of data or metadata and for the applications that use these data. This talk describes the solutions in use, or under study, for the ATLAS experiment and their selection process and performance.

Primary author: BARBERIS, Dario (Università e INFN Genova (IT))

Presenter: BARBERIS, Dario (Università e INFN Genova (IT))

Session Classification: High Performance Computing

Track Classification: High Performance Computing

Contribution ID: **93** Type: **Oral Presentation**

The ATLAS experiment and the high luminosity LHC program. Detector upgrade and Physics expectations

This talk would present the HL-LHC upgrade program of the ATLAS detector. High luminosity constraints and expected performances will be covered. A review of the planned upgrades for the Tracking system (ITK), the muon spectrometer, level-0 and HLT trigger and the new high granularity timing detector (HGTD). Finally, expectations on SM and Higgs boson measurements as well as searches for new physics (Dark matter, SUSY, beyond SM processes) will be presented.

Primary author: MAZINI, Rachid (Academia Sinica (TW))

Presenter: MAZINI, Rachid (Academia Sinica (TW))

Session Classification: Nuclear and Particle physics

Track Classification: Nuclear and particle physics

Contribution ID: **94** Type: **Oral Presentation**

Contextual Review, Assessment of Impact and Advice on the way Forward

Global competitiveness is intrinsically linked to the level of scientific development. Adequate investment in research and development remains a key factor in fostering meaningful capacity building. While coordinated efforts have been made towards the realisation of sustainable capacity building within the broader African context, there is a crucial need to go beyond capacity building with a view to reverse the African science diaspora. This talk provides a contextual review in terms of the impact of existing scientific interventions geared towards sustainable capacity building within Africa. 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. Regular assessment of the impact of existing scientific interventions ought to be undertaken as a key strategic imperative through the establishment of the African evaluation and monitoring committee. Inadequate expenditure in research and development as a percentage of gross domestic product by African countries paints a gloomy picture in terms of the realisation of sustainable scientific development. Yet, Africa is expected to play a meaningful role as part of the global community of nations. Key recommendations providing a roadmap in intensifying and harnessing capacity building efforts for purposes of accelerating socio-economic development within Africa are advanced.

Primary author: RAMAILA, Sam (University of Johannesburg)

Presenter: RAMAILA, Sam (University of Johannesburg)

Session Classification: Physics Education

Track Classification: Physics Education

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

Modern BigData technologies to store and access metadata for the ATLAS experiment

Wednesday 4 July 2018 11:50 (25 minutes)

Structured data storage technologies evolve very rapidly in the IT world, driven by BigData projects. LHC experiments, and ATLAS in particular, select and use these technologies to store a wealth of metadata, balancing the performance for a given set of use cases with the availability, ease of use and of getting support, and stability of the product. We definitely and definitively moved from the "one fits all"(or "all has to fit into one") paradigm to choosing the best solution for each group of data or metadata and for the applications that use these data. This talk describes the solutions in use, or under study, for the ATLAS experiment and their selection process and performance.

Presenter: BARBERIS, Dario (Università e INFN Genova (IT))

Session Classification: High Performance Computing

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

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Contribution ID: **97** Type: **Oral Presentation**

Uncertainties in Measuring the Lifetime of a Nuclear Excited State via $\gamma - \gamma$ Coincidences using NaI (Tl) Scintillators

Metrological difficulties in measurement of lifetimes of nuclear states have posed controversies in the quest to answer the fundamental question of whether lifetimes of nuclear states are invariable or not. Although several studies have suggested the possibility of slight variations of lifetimes depending on conditions of the nucleus [1, 2, 3], it is important to note that any claims of non-constancy of lifetimes as a consequence of deviation from the exponential decay curve can only be considered upon verification and accountability of stability and uncertainty of the devices used during the experiment 4. Consequently, studying the uncertainties in lifetime measurement is a crucial step towards studying the possibility of variation of the lifetime of a nuclear-excited state when the nucleus is subjected to resonance conditions via multiple emission and reabsorption of gamma rays as suggested in [5]. We have, therefore, design a system to precisely measure the lifetime of the state via gamma-gamma coincidences using multiple fast scintillators. Measurement uncertainties were thoroughly studied using a pair of NaI (Tl) detectors on a simple bench-top setup. All possible sources of lifetime measurement uncertainties with their magnitudes are presented in the uncertainty budget. A measurement uncertainty of 0.661 % was observed indicating the suitability of the system for observing the variations of the lifetime that range from 1 % of the known value.

Keywords: nuclear state, lifetime of a nuclear state, uncertainty, resonance conditions, metrology

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4. Pomme'S. (2015). The uncertainty of the half-life. Metrologia 52, (2015), S51 –S65
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Presenter: LUGENDO, Innocent

Session Classification: Nuclear and Particle physics

Contribution ID: **98** Type: **Oral Presentation**

Rapid Nuclear Forensics Analysis Via Laser Based Spectroscopy and Spectral Imaging Coupled With Chemometrics

Presenter: Mrs BHATT, Bobby (University of Nairobi)

Contribution ID: **99** Type: **Oral Presentation**

Measuring transitional matrix elements using first-order perturbation theory in Coulomb excitation

The low-energy structure of the stable light nucleus 20Ne has been examined using Coulomb excitation at the TRIUMF Facility in Vancouver, Canada. The highly-efficient and segmented TIGRESS HPGe gamma-ray array permits accurate Coulomb-excitation studies of the high-lying 2ˆ+ state found in 20Ne. Beams of 20Ne(5+) at approximately 1.7x10ˆ7 ions/s were accelerated to 3.235 MeV/u and bombarded onto a 1.56 mg/cmˆ2 110Pd target. Six TIGRESS HPGe clover detectors covering approximately 19% of 4(pi) were used to detect the gamma rays emitted in the de-excitation of the levels populated in beam and target nuclei, while scattered ions were detected using annular double-sided, CD-type silicon detector. The angular coverage of the silicon detector allows for a clean measurement of transitional matrix elements without second-order effects such as static quadrupole moment and nuclear polarizability.

Presenter: MASANGO, Senamile (University of the Western Cape (ZA))

Session Classification: Nuclear and Particle physics

Contribution ID: **100** Type: **Oral Presentation**

Revisiting the Dark Photon Interpretation of the Muon g-2 anomaly

Monday 2 July 2018 14:30 (20 minutes)

We investigate the parameter space in which the dark photon may still explain the muon g-2 anomaly. We consider a model of an inelastic dark sector which couples directly to the dark photon. This scenario may lead to semi-visible decays of the dark photon leading to a parameter space in which the dark photon interpretation of the muon g-2 anomaly may still be viable as opposed to both exclusively visible and invisible decays, which have been excluded by experiments. Furthermore, we show that one of the dark sector states may contribute to the required dark matter relic abundance.

Presenter: MOHLABENG, Gopolang (BNL)

Session Classification: Nuclear and Particle physics

Contribution ID: **101** Type: **Oral Presentation**

The Large Hadron Collider and Experiments

Presenter: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Accelerator, Medical and Radiation Physics

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

Argon Emulation in The Simulation of The ATLAS Transition Radiation Tracker

Monday 2 July 2018 14:55 (15 minutes)

Implementation of gas type emulation in the digitization software of the ATLAS TRT. The primary purposes of emulation are to be able to accommodate for a sudden change in the gas mixture used for data, and for efficiently simulating different gas type geometries to test particle identification performance.

Presenter: HAMDAOUI, Hassane (Universite Mohammed V (MA))

Session Classification: Nuclear and Particle physics

Contribution ID: **103** Type: **Oral Presentation**

Dark Matter searches with the ATLAS Detector

Monday 2 July 2018 15:15 (15 minutes)

Cosmological and astrophysical observations strongly support the presence of a non-baryonic dark matter component in the universe. A broad search program was designed to look for dark matter particles in the cosmos, either by searching for direct interaction or dark matter annihilation. Alternatively, dark matter particles might be produced in the laboratory. The Large Hadron Collider (LHC) might produce dark matter particles via proton-proton interactions. The LHC offers a unique opportunity to search for low mass dark matter particles and provides complementary information at higher masses. Since dark matter particles will escape detection, these particles will have a signature characterised by missing transverse momentum. An overview of recent searches for dark matter production in association with visible particles with the ATLAS detector at LHC will be presented. The constraints placed by the ATLAS searches will be compared to direct dark matter detection experiments.

Presenter: RIFKI, Othmane (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Nuclear and Particle physics

Contribution ID: **104** Type: **Oral Presentation**

Searches for Dark Sector States with ATLAS

Monday 2 July 2018 16:05 (15 minutes)

Hidden sector or dark sector states appear in many extensions to the Standard Model, to provide a candidate for the dark matter in the universe or to explain astrophysical observations of positron excesses. A hidden or dark sector can be introduced with an additional U(1)d dark gauge symmetry. The presence of the dark sector could be inferred either from deviations from the SM-predicted rates of Drell-Yan (DY) events or from Higgs boson decays through exotic intermediate states. The discovery of the Higgs boson during Run 1 of the Large Hadron Collider opens a new and rich experimental program that includes the search for exotic decays H —> Z Zdark —> 4l and. H —> Zdark Zdark ->4l, where Zdark is a dark vector boson.

Presenters: BOYE, Diallo (University of Johannesburg (ZA)); ASSAMAGAN, Ketevi Adikle (Brookhaven National Laboratory (US))

Session Classification: Nuclear and Particle physics

Contribution ID: **105** Type: **Oral Presentation**

The ATLAS experiment and the high luminosity LHC program. Detector upgrade and Physics expectations

Monday 2 July 2018 16:45 (15 minutes)

This talk would present the HL-LHC upgrade program of the ATLAS detector. High luminosity constraints and expected performances will be covered. A review of the planned upgrades for the Tracking system (ITK), the muon spectrometer, level-0 and HLT trigger and the new high granularity timing detector (HGTD). Finally, expectations on SM and Higgs boson measurements as well as searches for new physics (Dark matter, SUSY, beyond SM processes) will be presented.

Presenter: MAZINI, Rachid (Academia Sinica (TW))

Session Classification: Nuclear and Particle physics

Contribution ID: **106** Type: **Oral Presentation**

The ABC of Feynman Integrals

Monday 2 July 2018 14:05 (20 minutes)

Feynman integrals are important for describing elementary particle interactions in quantum field theory. From the mathematical point of view, they give rise to interesting special functions. The latter can be computed from differential equations that the integrals satisfy. I will review methods for transforming the equations to a canonical form, from which the answer can be conveniently read off.

Presenter: HENN, Johannes

Session Classification: Nuclear and Particle physics

Contribution ID: **107** Type: **Oral Presentation**

Chalcogenide Glasses-New advances

Friday 29 June 2018 09:45 (25 minutes)

Chalcogenide glasses containing S, Se or Te constitute a rich family of vitreous semiconductors. There has been intense research activity based on these glasses in the view of basic Physics as well as device technology. The freedom allowed in the preparation of glasses in varied composition brings about changes in their short-range order and thus results in variation of their physical properties. It is therefore easy to tailor their various properties as desired for technological applications. These materials have a wide range of applications such as making optical fibers, memory devices, reversible phase change optical recording etc. Besides the wide commercial/device applications like switching, memory and xerography etc. of Se, it also exhibits a unique property of reversible transformation . This very property makes it very useful in optical memory devices.
The effects of impurities on the electronic properties of amorphous chalcogenide glasses have been the subjects of serious debate ever since their discovery . It has long been known that these glasses, which behave like intrinsic P-type semiconductors, are insensitive to doping and that this behavior is attributed to the local valence saturation of the dopant atom. Fermi level is considered to be pinned due to the equilibrium between the negatively and positively charged (D- and D+) daggling (D) bonds . The concept of pinned Fermi level is not consistent with the discovery of the surprising phenomenon of P-N transition or conductivity type reversal first observed in bismuth germanium chalcogenide glasses. This discovery has led to extensive research on these materials and to a reconsideration of the existing theories of electronic structure of chalcogenide glasses. The carrier type reversal in germanium chalcogenides requires incorporation of a significant amount of bismuth.
In this talk we present a overview of recent trends and research on these materials and our contribution towards understanding their optical and structural properties and applications.

Presenter: SATHIARAJ, Stephen

Session Classification: Material Physics

Contribution ID: **108** Type: **Oral Presentation**

SYNTHESIS, STRUCTURAL AND ELECTRICAL PROPERTIES OF NANOCRYSTALLINE BARIUM TITANATE CERAMIC USING MACHANOCHEMICAL METHOD

Barium Titanate (BaTiO3 or BT) ceramics were synthesized by using a combination of solid state and mechanochemical method. The thermal decomposition, phase formation, microstructure and electrical behavior are investigated by TG-DSC analysis, X-ray diffraction, FE-SEM measurements and Impedance Analyzer respectively. The X-ray diffraction patterns show cubic symmetry without secondary phase. The lattice parameter a, c/a ratio and crystal size was found to be 4.0070 A˚, 1.0000 and 31.2 nm respectively. The Porosity of the samples has been obtained through X-ray density and bulk density. The FESEM results indicated dense microstructure with an average grain size of 144.53 nm. Frequency dependence of dielectric permittivity and loss, have been studied in the range of 30-150oC and 40 Hz–1 MHz, respectively. Frequency dependent dielectric study of the sample shows a normal ferroelectric phase transition behavior. The dielectric constant and loss of BT at room temperature are 1600 and 0.77 respectively. The temperature dependence of dielectric permittivity shows that phase transition seems to be shifted towards lower room temperature with phase transition temperature observed at 90oC. The hysteresis loop was observed having a remanent polarization (Pr) and coercive field (Ec) of 0.27 Pr (μC/cm2) and 581.73 Ec (V/cm) respectively. The Cole-Cole plots of complex dielectric constant showed a non-Debye type of dielectric relaxation. Relaxation time was found to decrease with increasing temperature and to obey the Arrhenius relationship. The value of activation energy 〖(E〗_a) for the bulk, as calculated from the slope of versus 〖τ〗_g Temperature curve, is observed to be 1.47 eV.

Presenter: MUAZU, ALHASSAN

Session Classification: Material Physics

Contribution ID: **109** Type: **Oral Presentation**

Study and Development of High Power Pulsed Laser System based on an Injected Enhancement Cavity for MariX

Presenter: SAMSAM, Sanae (ESMAR, Faculty of Sciences, Mohammed V University, Rabat, Morocco)

Contribution ID: **110** Type: **Oral Presentation**

High Efficiency Terahertz Generation in Periodically Poled Lithium-Niobate by Pulse Recycling

Monday 2 July 2018 17:25 (20 minutes)

1.Motivation
High energy multi-cycle (narrow band) terahertz pulses are necessary for linear electron acceleration 1. Due to the low damage threshold of periodically poled Lithium Niobate (PPLN) crystals, high absorption of the material at the terahertz frequencies and low quantum efficiency, efficient generation of high energy terahertz beams is extremely challenging.
Here, we consider a consecutive arrangement of PPLNs as shown in Fig.1 that recycles the pump pulse for further terahertz generation. The arrangement increases the effective length (Leff) and circumvents excessive terahertz absorption through the out-coupling of the terahertz pulse after each stage. An quartz out-coupler is designed. The terahertz experiences Brewster's angle refraction at both S1,S2 surfaces, whereas the pump refracts at Brewster's angle at S3 surface (see Fig.1(a)). The transmission efficiency and terahertz beam profile with respect to incident angle, terahertz beam size and variation of the refractive index are examined.
The simulation is based on 2-D cylindrical coordinate using the split step Fourier method, 3-point finite difference method and low storage Runge-Kutta update scheme 2, which largely enhances computational performance and saves memory. The entire problem is updating in propagation direction z explicitly rather than in time t. The calculation is performed in C++ with MPI and openmp for parallelization. The illustration of the numerical method is shown in Fig.2.

2.Conclusion
A 2-D simulation from terahertz generation in PPLN to out-coupling though quartz is developed to calculate high efficiency terahertz generation with pump recycling.

Presenter: WANG, Lu (DESY)

Session Classification: Material Physics

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

Health risk assessment of natural occurring radionuclides in shore sediment collected from Ovambo beach, Walvis Bay, Namibia

Tuesday 3 July 2018 17:10 (15 minutes)

The activity concentration of primordial radionuclides such as 238U, 232Th and 40K were determined in shore sediment samples in the Ovambo beach of Walvis bay, Namibia. The activity concentrations were carried out by gamma spectrometry. The average activity measurements were found to range from BDL –276.39 Bq.kg - 1 with a mean of 142.79 Bq.kg –1 for 238U, BDL –40.80 Bq.kg –1 with a mean of 29.69 Bq.kg –1 for 232Th and 319.26 –516.45 Bq.kg –1 with a mean of 359.78 Bq.kg –1 40K. The concentrations were converted to assess radiological risks where the values of effective dose, radium equivalent activity, hazard index, excess life cancer risk were evaluated. The assessed values were found to be higher than the maximum allowed levels. Therefore, there is human radiological health risk envisaged along the Ovambo beach.
Keywords
Shore sediment, Radioactivity, Gamma spectrometry, Ovambo beach, Walvis Bay,

Presenter: ONJEFU, Sylvanus (NUST)

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **112** Type: **Oral Presentation**

DETERMINATION OF THE NATURAL RADIONUCLIDE CONTENT AND ASSOCIATED RADIATION HAZARDS IN SOIL SAMPLES COLLECTED FROM THE OHORONGO CEMENT PLANT NEAR OTAVI, NAMIBIA

Friday 29 June 2018 17:40 (15 minutes)

The concentrations of naturally occurring radionuclides 238U, 232Th, and 40K in the soil samples collected from the Ohorongo Cement Plant near Otavi, Namibia have been determined and used to estimate the baseline natural radiation level in the cement plant. A total of 50 soil samples were collected from inside and outside of the plant and analyzed using an HPGe detector. The concentrations vary from 7.3 ± 1.2 to 25.6 ± 1.8 Bq/kg with an average of 15.0 ± 4.7 Bq/kg for 238U, 12.7 ± 2.0 to 43.1 ± 3.5 Bq/kg with an average of 25.1 ± 9.9 Bq/kg for 232Th, and 132.2 ± 9.7 to 507.8 ± 22.5 Bq/kg with an average of 310.7 ± 97.2 Bq/kg for 40K. These concentrations were used to calculate the mean absorbed dose rate and the mean annual effective dose for the plant. The value of 0.04 mSv obtained for the mean annual effective dose is less than the maximum permissible dose of 1 mSv a year recommended for the public by the International Commission on Radiological protection. In order to evaluate the associated health hazard, the concentrations were also used to calculate the mean Radium equivalent activity (Req) and the mean external hazard index (Hex) for the plant. The values of 74.9 Bq/kg and 0.20 obtained respectively for Req and Hex are again much below their respective permissible values. These results and the low value obtained for the mean annual effective dose indicate that radiation hazard is negligible in the plant.

Presenter: Mrs NAMBINGA, Monica (University of Namibia)

Session Classification: General

Contribution ID: **113** Type: **Oral Presentation**

Degradation of poly-crystalline photovoltaic module after a few operating years outdoor exposure in hot and hymide climate of casamance in Senega

PV modules are often considered to be the most reliable component of a photovoltaic system. The alleged reliability has led to the long warranty period for modules up to 25 years. Currently, failures resulting in module degradation are generally not considered because of the difficulty of measuring the power of a single module in a PV system and the lack of feedback on the various degradation modes of PV modules. In the present study, degradation analysis of 9 poly-crystalline silicon PV modules of solar pump are study after four years exposition in outdoor in a subguineen climate. A comprehensive analysis has been carried out through visual inspection, I-V characteristic After few operation years under subguineen climate environment, the global degradation and the degradation rate of electrical. characteristics such as I-V and P-V curves, open-circuit voltage (Voc), short-circuit current (Isc), maximum ouput current (Imax), maximum output voltage (Vmax), maximum power output (Pmax) and fill factor (FF) are evaluate at standard test conditions (STC). The study has shown that Pmax, Imax, Isc and FF are the most degraded performance characteristics for all PV modules. The global degradation of power output (Pmax) presents the highest loss that cand be from 8,75%/year to 22,45%/.

Presenter: FAYE, ISSA (Université Assane Seck de Ziguinchor (Senegal))

Session Classification: Renewable energies and Energy efficiency

Contribution ID: **114** Type: **Oral Presentation**

Study of job satisfaction amongst high school teachers' holding a PhD in Cameroonian public schools

Presenter: ZAMBOU, Serges (Ecole d'Ingenierie Industrielle de Bagangte (E2i), Camerou)

Contribution ID: **115** Type: **Oral Presentation**

Preliminary results coupling SMF and BLOB with Geant4

Monday 2 July 2018 17:05 (15 minutes)

Despite their frequent use, the hadronic models implemented in Geant4 have shown severe limitations in
reproducing the measured yield of secondaries in ions interaction below 100 MeV/A, in term of production rates, angular and energy distributions [1,2,3]. We will present a benchmark of the Geant4
models with double-differential cross section and angular distributions of the secondary fragments produced in the 12C fragmentation at 62 MeV/A on thin carbon target; such a benchmark includes the
recently implemented model INCL++ [4,5]. Moreover, we will present the preliminary results, obtained
in simulating the same interaction, with SMF [6] and BLOB [7]. Both, SMF and BLOB are semi-classical
one-body approaches to solve the Boltzmann-Langevin equation. They include an identical treatment of
the mean-field propagation, on the basis of the same effective interaction, but they differ in the way
fluctuations are included.
In particular, while SMF employs a Uehling-Uhlenbeck collision term and introduces fluctuations as
projected on the density space, BLOB introduces fluctuations in full phase space through a modified
collision term where nucleon-nucleon correlations are explicitly involved. Both of them, SMF and BLOB,
have been developed to simulate the heavy ion interactions in the Fermi-energy regime. We will show
their capabilities in describing 12C fragmentation coupled with the de-excitation phase of Geant4, as their
implementation in Geant4 is foreseen.
1 B. Braunn et al. "Comparisons of hadrontherapy-relevant data to nuclear interaction codes in the
Geant4 toolkit,"J. Phys.: Conf. Ser., 2013, vol. 420, p. 012163
2 M. De Napoli et al. "Carbon fragmentation measurements and validation of the Geant4 nuclear reaction models for hadrontherapy,"Phys. Med. Biol., 2012, vol. 57, no. 22, pp. 7651–7671.
3 J. Dudouet et al. "Benchmarking geant4 nuclear models for hadron therapy with 95 MeV/nucleon carbon ions,"Phys. Rev. C, 2014, vol. 89, no. 5, p. 054616.
4 A. Boudard et al. "New potentialities of the Liège intranuclear cascade model for reactions induced by nucleons and light charged particles"Phys. Rev. C, 2013, vol. 87, p. 014606.
[5] D. Mancusi et al., "Extension of the Liège intranuclear-cascade model to reactions induced by light nuclei"Phys. Rev. C, 2014, vol. 90 p. 054602.
[6] M. Colonna et al. "Fluctuations and dynamical instabilities in heavy-ion reactions,"Nucl. Phys., 1998, vol. A642, p. 449

[7] P. Napolitani and M. Colonna "Bifurcations in Boltzmann-Langevin one body dynamics for fermionic systems", 2013, Phys. Lett. B vol. 726, pp. 382-386

Presenter: MANCINI TERRACCIANO, Carlo (Sapienza Universita e INFN, Roma I (IT))

Session Classification: Nuclear and Particle physics

Contribution ID: **116** Type: **Oral Presentation**

Optical Astronomy in South Africa

Wednesday 4 July 2018 09:00 (25 minutes)

I will present a brief overview of optical astronomy in South Africa in the context of the multi-wavelength astronomy strategy of South Africa. I will focus on the role of optical astronomy in support of radio and gamma-ray observations, and highlight the new and unique MeerLICHT optical telescope which will provide a real-time view at optical wavelengths of the MeerKAT radio sky. By exclusively linking MeerLICHT to MeerKAT, we will, for the first time ever, provide optical multi-band observations of every night-time observation conducted by a radio telescope, ensuring that every transient in the field of view will be simultaneously covered in the radio and the optical.

Presenter: Prof. WOUDT, Patrick (University of Cape Town)

Session Classification: Astrophysics & Cosmology

Contribution ID: **117** Type: **Oral Presentation**

Future of astronomy at SALT and SAAO

Friday 29 June 2018 14:00 (25 minutes)

The South African Astronomical Observatory (SAAO) turns 200 years in 2020. It is the premier optical astronomy research facility on the African continent. The Southern African Large Telescope (SALT) is a 10m class telescope, the largest one in the Southern Hemisphere, and the flagship facility at the Sutherland observing site that SAAO operates. I will summarise the current status of SALT and highlight some recent science results. I will present the new science focus strategy including transient astrophysics, exoplanets, and galaxy evolution, that both SALT and SAAO have recently adopted. I will talk about the development plans for the next years supporting those focused science goals.

Presenter: Prof. VAISANEN, Petri (South African Astronomical Observatory)

Session Classification: Astrophysics & Cosmology

Contribution ID: **118** Type: **Oral Presentation**

Antares and KM3NET

Presenter: Dr CHABAB, Mohamed (Cadi Ayyad University)

Contribution ID: **119** Type: **Oral Presentation**

Probing the Reionization epoch with the SIMONS Observatory

Friday 29 June 2018 16:00 (20 minutes)

Reionization was a very critical process in the Universe in the transition from an opaque to a transparent Universe. However, we do not fully understand how this event happened. Using the kinetic Sunyaev-Zel'dovich Effect (kSZ), we can look critically into the reionization epoch of the Universe. This work predicts how well we can constrain cosmological parameters using forecasted data from the Simons Observatory (SO), to explain the transition from dark matter to stars. We use the model developed by alvarez et. al. to test whether we can determine the shape of the kSZ spectrum from patchy reionization. Using different specifications for SO, we find the best configuration of telescope parameters that provide tight constraints on the cosmological parameters.

Presenter: Ms IKAPE, Margaret (Dunlap institute for Astronomy and AStrophysics, University of Toronto)

Session Classification: Astrophysics & Cosmology

Contribution ID: **120** Type: **Oral Presentation**

The European Spallation Source as a new tools for discovery

Tuesday 3 July 2018 14:30 (20 minutes)

The European Spallation Source (ESS) is a pan-European project composed of 15 European nations (members and observers), constructing together a neutron-scattering facility in Sweden, one of the largest science and technology infrastructure projects being built today. The ESS was designated a European Research Infrastructure Consortium, or ERIC, by the European Commission in October of 2015.The ESS was designated a European Research Infrastructure Consortium, or ERIC, by the European Commission in October of 2015. Scientists and engineers from 50 different countries are members of the workforce in Lund, who participate in the design and construction of the European Spallation Source.
After a description of the ESS collaborative project and its in-kind model, this presentation will introduce the linac accelerator, its tungsten target and the neutron instruments, which will answer the scientific challenges of tomorrow. This unique facility will enable new opportunities for researchers across the spectrum of scientific discovery, including materials and life sciences, energy, environmental technology, cultural heritage and fundamental physics.

Presenter: DARVE, Christine (European Spallation Source)

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **121** Type: **Oral Presentation**

Optimization of 6,13(bis-triisopropylsilylethynyl)-pentacene (TIPS-pentacene) organic field effect transistor: annealing temperature and solvent effect

DIALLO Abdoul Kadri (1), DIALLO Abdou Karim (2), FALL Sadiara (3), KOBOR Diouma (1), PASQUINELLI Marcel (4), HEISER Thomas (3)
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(2) University Gaston Berger, Department of Applied Physics, Saint Louis, Senegal
(3) Laboratoire ICube, DESSP, CNRS, Strasbourg, France,
(4) OPTO-PV Group/Institut Matériaux Microélectronique Nanosciences de Provence (IM2NP), Marseille, France

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Abstract: In this contribution, we report on the effect of solvents with different boiling points and annealing temperature on the performance of TIPS-pentacene transistors. Several solvent have been used for TIPS-pentacene thin film processing: toluene, chlorobenzene and tetrahydrofuran. To study the influence of solvent and temperature; the electrical parameters of TIPS-pentacene field effect transistor were measured. The highest values of mobilities were 7.1×10−3cm2.V-1s-1, 4.5×10−3 cm2.V-1s-1and 1.43×10−3 cm2.V-1s-1respectively for TIPS-pentacene field effect transistor using chlorobenzene, toluene and tetrahydrofuran and annealed respectively at 120℃, 150℃ and 120℃.We have correlated these electrical performances with AFM images in order to point out the role of morphological properties. It is found that the grain size, and roughness highly affect the electrical parameters.

Keywords: TIPS-PENTACENE, TRANSISTOR, SOLVENT, ANNEALING TEMPERATURE

Presenter: DIALLO, Abdoul Kadri (Université Assane Seck de Ziguinchor, Sénégal)

Session Classification: Material Physics

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

From Relativistic Heavy Ion Collisions to Neutron Star Mergers - the Equation of State of Dense Matter as signalled by Gravitational Waves

Friday 29 June 2018 14:30 (25 minutes)

General relativistic astrophysics and elementary particle and nuclear physics are strongly connected and their results are interdependent. Although the physical systems are quite different, the 4D-simulation of a merger of a binary system of two neutron stars and the properties of the hot and dense matter created in high energy heavy ion collisions, strongly depend on the equation of state of fundamental elementary matter. Neutron star mergers represent optimal astrophysical laboratories to investigate the QCD phase structure using a spectrogram of the post-merger phase of the emitted gravitational waves. These studies can be supplemented by observations from heavy ion collisions to possibly reach a conclusive picture on the QCD phase structure at high density and temperature. As gravitational waves (GWs) emitted from merging neutron star binaries have just been detected, it is important to understand the main characteristics of the underlying merging system in order to predict the expected GW signal. Numerical-relativity simulations of merging neutron star binaries helps in studying the emitted GWs and the interior structure of the generated hypermassive neutron stars. The spectral properties of emitted GWs are then studied with the appearance of the hadron-quark phase transition in the interior region of the hypermasive neutron star and the results are confronted with the simulation results of high energy heavy ion collisions.

Presenter: MURONGA, Azwindini (Nelson Mandela University)

Session Classification: Astrophysics & Cosmology

Contribution ID: **123** Type: **Oral Presentation**

From ANTARES to KM3NeT neutrino telescopes in the Mediterranean Sea

Wednesday 4 July 2018 09:25 (20 minutes)

ANTARES, the largest deep-underwater Cherenkov neutrino telescope operating in the Northern hemisphere, has been taking data since 2007 with the primary objective of searching for high-energy astrophysical neutrinos in the TeV-PeV range. Thanks to its excellent angular resolution, ANTARES has searched for neutrino sources and set important constraints on the origin of the neutrino cosmic flux, first observed by IceCube. The most recent results of ANTARES searches for neutrinos sources will be reported, as well as from WIMP annihilation in massive objects like the Sun or the Galactic Centre. Moreover, the ANTARES constraints on the neutrino oscillation parameters will be presented.

Building on the successful experience of ANTARES, the next generation KM3NeT neutrino telescope is currently under construction in the Mediterranean Sea to significantly boost the sensitivity. More precisely, two detectors with a combined instrumented volume hundred times larger than ANTARES will be deployed: KM3NeT/ARCA (Gton instrumented volume) focusing on high-energy cosmic neutrinos, and KM3NeT/ORCA (Mton instrumented volume) for the determination of the neutrino mass hierarchy. An overview on the physics potential of KM3NeT will be highlighted.

Presenter: CHABAB, Mohamed (Cadi Ayyad University)

Session Classification: Astrophysics & Cosmology

Contribution ID: **124** Type: **Oral Presentation**

From Relativistic Heavy Ion Collisions to Neutron Star Mergers - the Equation of State of Dense Matter as signalled by Gravitational Waves

Presenter: MURONGA, Azwindini (Nelson Mandela University)

Contribution ID: **125** Type: **Oral Presentation**

Revisiting the Dark Photon Interpretation of the Muon g-2 anomaly

Presenter: MOHLABENG, Gopolang (BNL)

Session Classification: Astrophysics & Cosmology

Contribution ID: **126** Type: **Oral Presentation**

Revisiting the Dark Photon Interpretation of the Muon g-2 anomaly.

Presenter: MOHLABENG, Gopolang (BNL)

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

ASP Forum Agenda

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

Type Ia supernova spectral features and applications to dust reddening and light-curve standardisation

Monday 2 July 2018 12:05 (25 minutes)

In this talk, we present preliminary measurements of type Ia supernova spectral features such as equivalent widths and flux ratios and how such measurements are applied to the derivation of dust reddening in galaxies in which type Ia supernovae are discovered and the way they can be used to standardise type Ia supernova light curves in a more accurate manner than the traditional photometric method of standardising the light curves. While such studies have been conducted within the local Universe (i.e. at low redshifts, $z < 0.1$) by some authors, this has not been done extensively at intermediate and high redshifts ($z > 0.1$). Our understanding of whether or not the conclusions drawn at $z < 0.1$ also hold at $z > 0.1$ is therefore limited. It is for this reason that our type Ia supernova data sample for this study - part of which was taken with the Southern African Large Telescope and the rest from the literature - is from within the redshift range $0.1 < z < 0.4$ (which we refer to herein as intermediate redshifts). Our preliminary measurements of equivalent widths of two spectral features show no change in values compared to the same measurements obtained at low redshifts, i.e. we see no redshift evolution. As a result there is currently no evidence that the dust reddening law in galaxies, as derived from type Ia supernova spectral studies, evolves significantly with redshift, at least out to $z = 0.3$, something that can be better checked with more data. Further, our goal is to demonstrate whether or not flux ratio measurements at intermediate redshifts result in improved light-curve standardisation of type Ia supernovae at intermediate redshifts, a result also obtained by some authors at $z < 0.1$.

Presenter: KASAI, Eli (University of Namibia)

Session Classification: Astrophysics & Cosmology

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

OVERVIEW OF THE LOW-ENERGY RHIC ELECTRON COOLING (LEReC) PROJECT AT BROOKHAVEN NATIONAL LABORATORY

Wednesday 4 July 2018 09:55 (15 minutes)

An electron accelerator for cooling hadron beams in the Relativistic Heavy Ion Collider (RHIC) has been constructed at Brookhaven National Laboratory in the Collider-Accelerator Department and is in the early stages of beam commissioning. Electron cooling is planned to increase the luminosity of the RHIC for heavy-ion beam energies below 10 GeV/nucleon. Such energies are necessary to map the quantum chromodynamic (QCD) phase diagram of quark-gluon plasma, a key goal of the RHIC project. The QCD critical point is a distinct feature of the phase diagram, and the LEReC project is driven by the effort to determine this critical point and characterize its properties. However, the required event statistics are much higher than previously achieved in the RHIC, requiring significant luminosity improvement at energies below $\gamma = 10.7$. Application of electron cooling can substantially increase the average integrated luminosity by countering the effect of intrabeam scattering at the lowest hadron energies. The LEReC project is a novel approach to cooling being the first to attempt bunched-electron beam cooling of a relatively high-energy hadron beam. The electron accelerator has been designed to deliver a beam with a range of energies from 1.6 MeV up to 2.6 MeV and a range of beam current up to 50 mA with an average design beam current of 30 mA. Electrons are generated by a DC gun comprising a photo-sensitive cathode contained in a cavity held at a DC potential of 400 kV. The beam then travels through a series of RF cavities, and is directed into the cooling section of the RHIC where the electron beam co-propagates with the hadron beam first into a section of one of the RHIC rings and then, after a 180-degree turn, into a section of the other RHIC ring. After these cooling sections, the electron beam is finally directed into a beam dump where it is discarded. New electron beam is generated by the accelerator and continues the cooling process. This presentation will provide an overview of the LEReC project, briefly discussing the nature of electron cooling and its application at RHIC as well as the key features of the electron accelerator including the requirements for the electron beam; the DC gun, cathode, and laser systems; the various RF cavities including a superconducting cavity; beamline instrumentation; and the mechanism for cooling. The presentation will also discuss the latest results of commissioning along with the plans for future commissioning and operation.

Presenter: HAMMONS, Lee (BNL)

Session Classification: General

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

Excess lifetime cancer risk due to natural radioactivity in soils: Case of Karibib town in Namibia

Tuesday 3 July 2018 17:30 (15 minutes)

The Erongo region of Namibia has been reported to experience high natural background radiation resulting from the presence of uranium bearing ores. In order to estimate the radiation risk to the general populace living in the Erongo region, a total of thirty surface soils samples and twenty radon gas monitors (CR 39) were collected from a Gold Mining town of Karibib. The radon gas monitors were deployed in selected households for three months. Naturally occurring radionuclides 238U, 232Th and 40K present in these soils were measured using HPGe γ-ray spectrometer to evaluate the radiation health hazard indices and excess lifetime cancer risk (ECLR). Average concentrations of 238U, 232Th and 40K in the soil were found to be 62.33±0.10, 66.65±0.06, 1122.20 Bq/kg respectively. The mean concentration of indoor radon gas in the selected households was 79.00±6.68 Bq/m3. The average radium equivalent activity 244.05 Bq /kg, the total annual effective dose 1.23 mSv/yr due to 238U, 232Th and 40K and the effective indoor dose rate due to radon was found to be 2.28x10-3 mSv/yr. The higher values for some of the health parameters in the town may present a serious public health problem because the soil is used as a constructing material for building. The excess lifetime cancer risk (ELCR) due to radionuclides in soil was found to be 4.08E-3 which slightly higher than the world value of 0.29x10-3.

Keywords
HPGe γ-ray spectrometer, health hazard indices, lifetime cancer risk, radioactivity

Presenter: ZIVUKU, Munyaradzi (NUST)

Session Classification: Accelerator, Medical and Radiation Physics

Contribution ID: **131** Type: **Oral Presentation**

Catalysts for African Development and Advancement [CADA]

Friday 29 June 2018 17:15 (20 minutes)

Keywords: Catalyst, Water Splitting, Molecular Dynamics, Semi-empirical, Fuel Cells
Theme: Computational Materials Science

The twin problems of electricity shortage and limited access to clean drinking water in Africa can be solved by the development of catalysts. Abundant catalysts that can facilitate the splitting of water into hydrogen gas (and oxygen gas) are required as well as cheaper catalysts that can be used in fuel cells to produce electricity by the oxidation of hydrogen. An important by product of the fuel cell is clean water from the combination of hydrogen and oxygen. Thus, even dirty water can be used to produce electricity and clean water. While platinum and platinum-ruthenium alloys work as catalysts in fuel cells, they are costly and cheap and abundant alternatives are needed. The goal of this work is to understand the mechanism of action of these expensive catalysts as a guide to developing alternative cheap and abundant catalysts for fuel cells. Semi-empirical molecular dynamics (SEMD) simulation will be used to study the oxidation of hydrogen by platinum and comparisons made with the same process but in the presence of a recently discovered catalyst Fe(PO3)2. Preliminary SEMD simulations of possible catalysts for photocatalytic water splitting will also be presented.

Presenter: AKIN-OJO, Omololu (ICTP East African Institute for Fundamental Research (EAIFR))

Session Classification: General

Contribution ID: **132** Type: **Oral Presentation**

The African Millimetre Telescope

Friday 29 June 2018 16:20 (20 minutes)

The Africa Millimetre Telescope (AMT) will be built on Mount Gamsberg in Namibia, to form part of a world-wide interferometric network of millimetre-wave telescopes to resolve the event horizon of the Galaxy's supermassive blackhole. At a distance of 8kpc and a mass of about 4 million solar masses, the event horizon should subtend an angle of about 10 micro arc seconds from Earth. This is too small to be currently imaged at any wavelength other than using very long baseline interferometry at mm-wavelengths. The AMT will form part of this world-wide network, providing a vital link with telescopes in Hawaii and India, allowing the very longest baseline and thus the highest angular resolution to be achieved. The AMT will use a 15-metre dish which is currently in Chile, and Mount Gamsberg's exceptionally dry weather will allow the galactic centre to be imaged at mm-wavelengths during June-September, as it passes high overhead from Namibia's latitude. In this talk, I will summarise the current status of the AMT project.

Presenter: EVANS, Rhodri (UNAM)

Session Classification: Astrophysics & Cosmology

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

Modelling the high energy gamma-ray component of the nearest radio galaxy, Centaurus A

Friday 29 June 2018 16:40 (20 minutes)

The closest known active galaxy is Centaurus A (Cen A) at a distance of 3.8 Mpc. Due to its proximity, Cen A has been observed over a wide range of energy bands. These extensive observations enabled various astrophysical phenomena associated with active galaxies to be studied in great detail. Cen A has recently been observed by H.E.S.S. and Fermi-LAT in gamma-rays. In describing the spectral energy distribution (SED) of the core of Cen A, as observed by these two instruments, it became evident that there is a need for going beyond a single-zone synchrotron self-Compton (SSC) description of the gamma-ray emission. We consider here modelling the high-energy SED in Cen A with the appearance of a second gamma-ray emission component due to gamma-gamma absorption.

Presenter: DAVIDS, Isak Delberth (UNAM)

Session Classification: Astrophysics & Cosmology

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

Building medical physics capacity in East Africa to reduce radiation toxicities and manage radiotherapy care for cancer treatment

Tuesday 3 July 2018 14:55 (20 minutes)

In September of 2013 we began working with a medical physicist at the Ocean Road Cancer Institute in Dar es Salaam, Tanzania. We developed a bi-lateral learning partnership over the course of eight qualitative Skype meetings. From these meetings we have ascertained that there is a gap between the installation of new equipment and treating patients. This gap has often been overlooked by international partners attempting to improve radiation therapy access. Relationships with academic institutions abroad can fill these gaps and lead to sustained care of patients needing radiation.

Today, many scenes in hospital wards of public sector hospitals in Tanzania and other African countries are often reminiscent of the battle to get AIDS treatment under way in the early 2000s. But now, hospital beds once filled mostly with AIDS patients are occupied by those afflicted with cancers, and other non-communicable diseases. In 2012 cancer was responsible for 8.2 million deaths globally. The World Health Organization predicts that by 2030 this number will increase to over 13.1 million deaths. In addition, currently 70% of those deaths are in low and middle income countries (LMICs), like Tanzania, which sadly are unable to deal with the growing cancer pandemic without collaborations. A 2007 Institute of Medicine report recommended collaborations between cancer centers in high-income countries with those in LMIC as the appropriate next step for cancer control in the developing world. A critical area of need in cancer control is in radiation therapy, employed in the treatment of over 50% of cancer patients.

My presentation will highlight our long-term goal to develop a USA/Africa Radiation Oncology Core (ROC), with both practical (PROC) and virtual (IROC) components, dedicated to Research Education/training in Radiation oncology in Africa and providing desperately needed quality assurance tools for patient safety and research collaborations for cancer control. The initial partner collaborating institutions in Africa include Muhimbili University of Health and Allied Sciences (MUHAS) and Ocean Road Cancer Institute (ORCI); from the USA side –University of Pennsylvania (UPENN), MD Anderson and Dana Farber/Harvard Cancer Center; from industry –Varian Medical Systems –the establishment of such an ROC will significantly increase research capacity and ensure radiation/patient safety. Our preliminary collaboration and analysis of publications, workshops in Africa and Harvard highlight a great need for such a Core to build research capacity and address an ongoing silent crises which is undoubtedly causing significant loss of life and disability in Africa. A successful launch of this Core program will provide a hub for Radiation Oncology research/education in east Africa; benefiting students/researchers from neighboring countries like Kenya, Uganda, Burundi, Malawi, Zambia DRC, Rwanda, South Sudan and Central Africa Republic.

While we are just in the beginning stage of this partnership, we believe there is great potential for success between both parties. We hope that MUHAS and/or Ocean Road Cancer Institute will benefit from potential funding and resources by partnering with a High Income Country to develop affordable solutions to clinical problems in Dar es Salaam. Successful establishment of an ROC could have a significant impact in addressing the rapidly rising burden of cancer in Africa, with publications that will shape the emerging field of global radiation oncology. The current literature shows that this global radiation oncology collaboration/partnership can serve as a platform for bi-directional learning where USA/African researchers can exchange ideas and innovations

as well as develop the skills necessary to help their countries succeed in the rapidly advancing world of cancer research. Measurable outcomes should include: 1) joint publications on needs assessment for safe radiation medicine research and practice in Tanzania; 2) a new cadre or diverse new generation of cancer researchers who can collaborate effectively in teams with partners from other nations/cultural backgrounds 3) an innovative ROC for quality assurance, treatment planning, and incident learning system in Tanzania, extendable to other LMICs. The ROC could also be adapted for multi-center clinical trial quality assurance, develop technology for African specific needs, serve as a population-based cancer patient registry and potentially connect other arrays such as genetic or pathology information to appropriate research. Based on the information from our study and the creation of a pilot research program, we can develop a strategy for long-term sustainable research and quality radiotherapy care in Tanzania extendable to other LMICs. This project will leverage the strength of an already ongoing collaboration between the partner institutions. These partner institutions are leading cancer research institutions with the institutional environment to support the establishment of the planned ROC that will benefit cancer research and education, crucial for addressing the growing global burden of cancer and related disparities affecting LMIC.

Presenter: AVERY, Stephen (UPenn)

Session Classification: Accelerator, Medical and Radiation Physics

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

Phase-2 Upgrade of the CMS Tracker

Monday 2 July 2018 16:25 (15 minutes)

The Large Hadron Collider (LHC), which is the world's largest and most powerful particle accelerator, will be upgraded from 2024 to mid 2026 to become the High Luminosity LHC (HL-LHC). This will enable instantaneous peak luminosities of 7.5 × 1034 cm−2 s−1 and allow CMS to collect integrated luminosities of the order of 300 fb−1 per year and up to 3000 fb−1 during the HL-LHC projected lifetime of ten years. The HL-LHC is expected to run at a centre-of-mass energy of 14 TeV and with a bunch spacing of 25 ns. The CMS detector needs to be substantially upgraded during LS3 in order to exploit the increase in luminosity provided by the HL-LHC. This upgrade is referred to as the CMS Phase-2 Upgrade. The increase in radiation levels requires improved radiation hardness, while the larger pileup and associated increase in particle density requires higher detector granularity to reduce occupancy, increased bandwidth to accommodate higher data rates, and improved trigger capability to keep the trigger rate at an acceptable level while not compromising physics potential. The entire silicon tracking system, presently consisting of pixel and strip detectors, will be replaced.

Presenter: BERTSCHE, David (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Nuclear and Particle physics

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

Use of Diatomaceous Earth Wastes and Plant derived Binders in Water Purification Systems

Wednesday 4 July 2018 10:15 (15 minutes)

Authors:
Mary Taabu Simiyu, Francis Nyongesa, Bernard Aduda Zephania Birech, Godwin Mwebaze

The outbreaks of water-borne diseases are a common occurrence in developing countries and have claimed millions of lives in the recent years despite the many water purification approaches in use. This is because most of these water purification systems are unaffordable to the poor of developing world and are inefficient in removal of viruses from drinking water. Furthermore, the DE wastes have not found direct application in science. Thus, the wastes pose a challenge to DE industries. In this work, the nanomaterials of diatomaceous earth (DE) wastes and charcoal are employed in the design of efficient and effective water filtration membranes capable of eliminating pathogens and viruses from water. The DE waste and charcoal raw materials were ground to the range of 86.0 nm to 200.0 nm. The DE wastes were characterized in terms of chemical analysis. They were found to contain 89% silica and a total flux content of 11.0% (4.14% of Al2O3, 3.88 of CaO, 0.85% of K2O, 0.19% of MgO and 5.10% of Na2O) making it a suitable material for water filter membranes. The samples for the filter membranes were fabricated from a mixture of DE and charcoal in various ratios and fired at 900 oC. The pore size of the finished filter was in the range of 22.0 nm –150 nm. The mechanical strength of the filter membranes was enhanced by use of plant derived binders ("Mrenda") thereby increasing the filter flow rate without compromising on its structural reliability.

Presenter: TAABU SIMIYU, Mary (University of Nairobi)

Session Classification: General

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

Search for resonant WZ production in the fully leptonic final state in proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector

Abstract:

A search for a heavy resonance decaying to WZ in the fully leptonic channel is performed. It is based on proton-proton collision data collected by the ATLAS experiment at the Large Hadron Collider at a centre-of-mass energy of 13 TeV, corresponding to an integrated luminosity of 36.1/fb. No significant excess is observed over Standard Model predictions and limits are set on the production cross section times branching ratio of a heavy vector particle produced either in quark-antiquark fusion or through vector boson fusion. Constraints are also obtained on the mass and couplings of a singly-charged Higgs, in the Georgi-Machacek model, produced through vector boson fusion.

Presenter: DAHBI, Salah-Eddine (Universite Mohammed V (MA))

Session Classification: Nuclear and Particle physics

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

Communicating science: from the experience at CERN to a worldwide aoutreach

Monday 2 July 2018 11:05 (25 minutes)

"Blue sky" research, like the one carried in large particle physics laboratories can be seen by the general public as something daunting, abstract, detached from daily experience and too difficult to understand. On the other hand, people are fascinated by the big questions, and by the complexity of the challenge the scientists are presented with. Since most of the research in fundamental physics is publicly funded, it is important that the public gets engaged beyond the simplistic attitude of "I do not understand it, but it must be great".

CERN has been engaging with public communication since the beginning, and its educational and outreach activities span very different targets, from the general public to students from school or universities. This diversified outreach program can be used as an example on how to convey the message of physics education and outreach even in very different contexts.

The speaker will also present his experience as lecturer in the ICTP-based Physics without Frontiers program.

Presenter: CAMPANELLI, Mario (University College London (UK))

Session Classification: Physics Communication

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

Status of Astronomy in Namibia

Thursday 28 June 2018 11:00 (25 minutes)

Southern Africa is becoming a beacon for astronomy throughout the electromagnetic spectrum: In all wavebands accessible from ground, the largest astronomical facilities are either operational or in the process of being set up in the region, see e.g. 1.
The Southern African Large Telescope (SALT) in Sutherland (South Africa), measuring 11m in diameter, is the largest single optical telescope in the Southern hemisphere 2. The deployment of the telescopes of the MeerKAT radio telescope, being the largest and most powerful radio telescope in the Southern hemisphere, has just completed 3. The 64-dish MeerKAT telescopes will later develop into the Square Kilometre Array (SKA), the most sensitive radio telescope on Earth, utilizing outlier station all over Southern Africa 4. The High Energy Stereoscopic System (H.E.S.S.) telescopes [5] in the Khomas highlands in Namibia are the largest and most powerful system of Cherenkov telescopes to study very high energy (E>100 GeV) gamma-rays. For its successor, the Cherenkov Telescope Array (CTA) [6,7], Namibia has been voted second of possible countries to host the Southern part [8,9].
Against this background, the current situation of astronomical research and education in Namibia will be reviewed, specifically focusing on recent developments.

Presenter: BACKES, Michael (University of Namibia)

Session Classification: Astrophysics & Cosmology

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

A Study of the Front-End Electronics of the Compact High Energy Camera prototype for the Gamma-Ray Cherenkov Telescope Project of the Cherenkov Telescope Array

Friday 29 June 2018 12:00 (25 minutes)

A Study of the Front-End Electronics of the Compact High Energy Camera prototype for the Gamma-Ray Cherenkov Telescope Project of the Cherenkov Telescope Array

M.S. Nekwaya1,*, S. Leach2, M. Backes1,3, J.Lapington2, G. Cotter4, for the CTA Consortium

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Abstract

The Compact High Energy Camera (CHEC) is a camera-development project for the dual-mirror Small-Sized Telescopes (SST-2M) of the Cherenkov Telescope Array (CTA) 1.
Some of the components of the Front-End Electronics (FEE) of the CHEC are photo-sensors, preamplifiers, TARGET modules and a backplane board 2. This study will focus on the signal generated by the preamplifier buffer boards in order to characterise the output waveform as well as to identify any faulty preamplifier channels depending on their output.
This research project will establish an automated waveform analysis procedure that will highlight any variation from the expected channel response and help ensure that each assembled CHEC has 2048 validated and uniform FEE channels.

References
1 M.K. Daniel., et.al, (2013). A Compact High Energy Camera for the Cherenkov Telescope Array. Power, 10, 4.

2 L. Tibaldo., et.al, (2017). The gamma-ray Cherenkov telescope for the Cherenkov telescope array. In AIP Conference Proceedings, Vol. 1792, No. 1, p. 080004

Presenter: NEKWAYA, Sana (UNAM)

Session Classification: Astrophysics & Cosmology

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

Precision Physics at High Energy

Tuesday 3 July 2018 11:55 (25 minutes)

This presentation will report on experiments that study rare reactions that require challenging data sets and running times to search for Physics phenomenon within the Standard Model and Physics beyond the Standard Model. A general survey of some recent results, current research and future experiments primarily at Fermilab will be featured.

Presenter: WHITE, Herman (Fermilab)

Session Classification: Nuclear and Particle physics