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Site web: www.scp-web.org, email: info@scp-web.org

INTERNATIONAL CONFERENCE

on

«HIGH LEVEL PHYSICS AND APPROPRIATE SOLUTIONS TO REAL LIFE PROBLEMS IN DEVELOPING COUNTRIES »

5th Edition (04-08, December 2017)

I. Description

The fifth edition of the International Conference on « HIGH LEVEL PHYSICS AND APPROPRIATE SOLUTIONS TO REAL LIFE PROBLEMS IN DEVELOPING COUNTRIES » will take place from 04 to 08 December 2017 in Yaoundé, Cameroon.

The main fields of the fifth edition are:

- Special session: APSA competition on Experimental Physics
- Nonlinear oscillations, Chaos, Physics and Applications of Transducers,
- Environmental Radioactivity, Radiation Protection, Dosimetry, Quantum and molecular physics,
- Materials Physics.

1-Special session: APSA competition on Experimental Physics is devoted to the presentation of the results of the African competition on experimental physics; competition organized by the Association Pour la Promotion Scientifique de l'Afrique (APSA) with its partners. The aim of this competition is the development, by Africans, of low cost innovative instruments for didactic and research purpose on experimental science, but also devices that can bring solutions to problems faced by the populations. Please visit the web site of the competition for more details: <http://sfp.univ-lille1.fr/concoursphysiqueafrique/concours.php>. This session will also be extended to other topics showing some recent contributions on experimental physics made by African scientists. Contact : contact@concoursphysiqueafrique.org

This special session is organized by the following people:

- Odette Fokapu Bouquet: General Secretary of APSA, Member of Commission Physics without borders.
- Daniel Hennequin : President North Section of the French Physical Society, member APSA.
- François Piuze : Coordinator Commission Physics without borders, member APSA.
- Annick Suzor-Weiner : Member APSA.
- Paul Wofo : Member Cameroon Physical Society, Member of APSA and President of the scientific committee of Sci-Tech-Services, Cameroon.

2- Nonlinear oscillations, Chaos, and Applications of Transducers (Coordinator: Professor Paul Wofo).

The goal of this activity is to present high quality theoretical and experimental research results on Nonlinear sciences and applications with special emphasis on transducers/sensors (optoelectronic and electromechanical transducers and actuators), telecommunication systems, electronic engineering and bio-inspiration.

Contact for participation: pwofo@lamsebp.org or pwofo1@yahoo.fr

3- Environmental Radioactivity, Radiation Protection, Dosimetry, Quantum and molecular physics (Coordinators: Professors Saidou and Nana Engo).

The goal of this session is to present theoretical research on quantum information (quantum algorithms, entanglements, squeezed states) and the structure and dynamics of atomic and molecular systems, with as far as possible, a link with applications in our environment. The second aspect here is to present research results on environmental radioactivity (radon, thoron and thoron progeny indoors, natural radiation exposure to the public) in the uranium, thorium, oil and gold bearing regions of Cameroon.

Contact for participation: nanaengo@gmail.com or saidous@yahoo.fr

4- Materials physics (Coordinator: Professor S. Zekeng)

The goal of this session is to present the connection between structure and properties of some materials dedicated to photovoltaic cells, thermal insulators and energy storage devices. A special emphasis shall be put on local materials.

Contact for participation: sergezekeng@yahoo.fr

Following the driven idea at the origin of the series of the conferences (see below), emphasis will be put on scientific achievements in physics that fulfil at least two of the following criteria:

- Research topics that can be covered entirely (theory, experiment and hints for application) in developing countries with limited resources,
- High level scientific research topics that have been published or are publishable in good international journals,
- Research topics that have impact on the technological, economic and social development in developing countries.

II. Participation and Funding

II-1- Participation:

Participation is open to any scientists from any country.

The contact for information about how to participate can be obtained using the following email addresses: info@scp-web.org and brnana2@gmail.com and omotapon@univ-douala.com or contact the coordinator of each topic of the conference as indicated above.

II-2- Funding:

Two of our major funding institutions are ICTP (Abdus Salam International Centre for Theoretical Physics: www.ictp.it) and APSA (Association Pour la Promotion Scientifique de l'Afrique: www.scienceafrique.fr). Cameroon Physical Society always contributes financially and logistically in various manners.

We are still looking for funds from other national and international institutions to support the participation of young physicists from Africa.

Participants are strongly advised to search for their own means of funding.

International advisory board

- **Annick Suzor-Weiner**, Université Paris-Sud, Paris, France.
- **Hilda Cerdeira**, University of Sao Paulo, Sao Paulo, Brazil.
- **François Piuzzi**, CEA Iramis, France.
- **Carlo Iorio**, Université Libre de Bruxelles, Belgium.
- **Yanne Chembo Kouomou**, University of Franche-Comté, Besaçon, France.
- **Jean Chabi Orou**, Université d'Abomey-Calavi, Cotonou, Bénin
- **Vincent Uchekukwu**, University of Ago-Iwoye, Nigeria.
- **Giovanni Filatrella**, Department of Science and Technologies, University of Sannio, Italy

Local organizing committee: Executive of the Cameroon Physical Society

- **O. Motapon** (President), University of Douala, Cameroon
- **B.R. Nana Nbandjo** (General Secretary), University of Yaoundé I, Cameroon
- **S. Zekeng** (Treasurer, Head of the section Physics of Materials), University of Yaoundé I, Cameroon
- **R.Tchitnga** (Head, section Physics for development), University of Dschang, Dschang, Cameroon
- **P. Wofo** (Head, section Physics and applications of Transducers and Sensors), University of Yaoundé I, Cameroon
- **A. Tiedeu** (Head, section Medical Physics), University of Yaoundé I, Yaoundé, Cameroon
- **S.G. Nana Engo** (Head, section Atomic Physics, Molecular and Quantum optics), University of Ngaoundéré, Cameroon
- **D. Njomo** (Head, section Renewable Energy and Energy Management) University of Yaoundé I, Yaoundé, Cameroon.
- **A. Kenfack** (Head, section Nonlinear Statistical Physics) University of Yaoundé I, Cameroon
- **G. Tchuen** (Head, section Computational Physics) University of Dschang, Cameroon
- **M. Kamta** (Head, section Solar Energy) University of Ngaoundéré, Cameroon Physical
- **Saidou** (Head, section Nuclear Physics, President of the Cameroon Society of Radioprotection), University of Yaounde I, Cameroon

III. History of the series

III.1- Driving idea

An important problem faced by the majority of Physicists from developing countries is that their research activities are far from developmental goals of their countries. Those of them tackling problems related to some local development objectives will not succeed in publishing their results in good scientific journals. Meanwhile they need publications in good international peer-reviewed journals for their academic promotion and international visibility. Researchers carrying out publishable works in international journals rely mainly on the theoretical aspects with sometimes experimental parts carried out in developed countries laboratories thanks to various funding institutions and individual contacts abroad. The decision-makers in developing countries, either do not have sufficient fund, or do not find the necessity to fund expensive equipment for research topics that have no direct and immediate links to problems suffered by their population.

This constitutes a big threat to the development of physics activities and is certainly the most important cause of lack of public and decision-makers awareness on the benefits that come from research in physics. As a consequence, a large number of physicists who want to maintain their scientific standard generally move abroad to work in stimulating environment, so the brain-drain.

Aware of this fact, the Cameroon Physical Society launched in 2009 a series of biannual conferences on the general topic: “Low Cost High Physics and Appropriate Solutions to Real life Problems in Developing countries”.

III.2- Success of the first edition (2009)

The first conference of the series took place from 8 to 10 December 2009 and two days training on specialized topics (6 and 11 December) with 64 participants coming from Europe, Latin America and Africa and covered many physics disciplines. It was supported by the International Centre for Theoretical Physics, the International Group of Physics for Development at the European Physical Society, Institute for Theoretical Physics of Sao Paulo (Brazil), The Faculty of Science (University of Yaoundé I, Cameroon) and the Cameroon Physical Society. The topics of the conference were:

- Nonlinear Physics and Complex Systems,
- Renewable energies,
- Medical Physics and Water potabilisation,
- Methods for research and innovation for scientific instruments.

The direct funding of the conference came from The International Centre for Theoretical Physics (Trieste, Italy), Physics for Development at the European Physical Society, Faculty of Science (University of Yaoundé I) and Cameroon Physical Society.

III.3- Success of the second edition (2011)

The Second Edition of the CPS International Conference on “*Low Cost High Physics and Appropriate Solutions to Real Life Problems in Developing Countries*” took place from 5 to 9 December 2011, Yaoundé (Cameroon). 65 scientists including famous physicists from Belgium, Brazil, Canada, Cameroon, Congo, France, Germany, Ivory Coast, Nigeria and Spain met to discuss on high level scientific ideas on the following topics:

- -Semiconductor lasers and photonic materials,
- -Medical and Biological Physics,
- -Modeling of ecological and social phenomena,
- -Appropriate and low cost instrumentation,
- -Appropriate solutions to real-life problems.

The funding of the second edition was supported by the institutions indicated above as well as various universities abroad with the support of their scientists (University of Palma de Mallorca, Instituto de Fisica Interdisciplinar y sistemas complejos (IFISC) UIB-CSIC, Mallorca (Spain) ; Institute for Theoretical Physics, University of Sao Paulo (Brazil); Université de Franche-Comté, Besançon (France); Ecole de Technologie Supérieure, Montréal (Québec, Canada); Université Libre de Bruxelles (Belgium); Free University, Berlin (Germany); CEA Iramis (France).

III.4-Success of the third edition (2013)

The Third Edition of the CPS International Conference on “*High Level Physics and Solutions to Real Life Problems in Developing Countries*” took place from 25-29 November 2013, Yaoundé (Cameroon). More than 100 people came from Belgium, Benin, Central African Republic, Chad, Congo, France, Ivory Coast, Kenya, Uganda, South Africa and Cameroon. One sees the appearance of people from Eastern and Southern Africa, who were not present during the two first editions. The main topics of the 2013 conference were:

- high level research topics in Electromechanics (MaEMS, MEMS and NEMS): fundamental studies and applications based on different types of or on the types of actions.
- high level research topics in Optoelectronics: fundamental studies and applications based on different types of effects.
- State of Physics in Africa (Sub-Saharan Africa, excluding the Republic of South Africa).

However due to the success of the two first editions and following the wish of many members of the Cameroon Physical Society, the 2013 edition was strongly expanded to include the following parallel or satellite conferences and managed by dedicated funding members of the Cameroon Physical Society:

- Chaos in Cameroon and Africa,
- Atomic and Molecular Physics and Quantum Optics,
- Quantum Toolbox in Python-software for Quantum Optics,
- Physics for Medecine,
- Nuclear Physics,
- Computational Physics,
- Solar Energy,
- Miscellaneous contributions for development.

The funding of the third edition was supported by the following institutions; International Union of Pure and Applied Physics (IUPAP), International Centre for Theoretical Physics (ICTP), and Cameroon Physical Society as well as various universities abroad with the support of their scientists; Université de Franche-Comté, Besançon (France), Université Libre de Bruxelles (Belgium).

III.4- Success of the fourth edition (2015)

From 24-28 November 2015, the Cameroon Physical Society organized the fourth edition of his conference series on “*High Level Physics and Solutions to Real Life Problems in Developing Countries*”. The goal of the fourth edition of the conference was to share the up-to-date high level information in the fields of Transducers/sensors and electromechanical applications, Transducers/sensors and electromechanical applications, optoelectronics, physics for telecommunications, radiation protection, environmental radioactivity, physics of solar energy, quantum information and molecular physics from the fundamental physics perspectives (classical, quantum, statistical physics and complex systems concepts) to applications (with special emphasis on applications bringing solutions to real-life-problems encountered in developing countries). The conference that took place in three (3) locations (Hotel Franco, Centre for Scientific Cooperation between Africa and Germany and Hotel Merina) was attended by more than 100 people. Foreign participants (14) came from Belgium (1), New Zeland (1), Benin (2), Spain (1) Central African

Republic (1), Congo (1), France (2), Burkina Faso (1), Nigeria (1), Kenya (1), Japan (2). One sees that the number of people from Africa, are increasing.

The direct funding of the conference came from Association pour la Promotion Scientifique en Afrique (APSA), International Centre for Theoretical Physics (ICTP), Trieste, Italy and Cameroon Physical Society (CPS). The fund received from APSA and ICTP was in its large part used to support foreign African participants for flight tickets and board and lodging.

More than 75 oral presentations (41 from the session IYL, 13 for Atomic Molecular Physics and quantum optics, 17 for computational Physics, and 4 from radiation protection) were given, a large number of which was given by young physicists and PhD students. Special emphasis was also put on the poster sessions since young participants had many ideas to share. That is why 19 posters were presented and the best posters were awarded prizes.