



**A REPORT ON**  
**THIRD INTERNATIONAL CONFERENCE ON PHYSICS AND**  
**TECHNOLOGY OF REACTORS AND APPLICATIONS**  
**& INMM SECURITY WORKSHOP**

**PHYTRA 3 - TETOUAN, 12-14 May 2014**

**The Moroccan Association for Nuclear Engineering & Reactor Technology**



**GMTR**  
Organizes  
In collaboration with



**The National Center For Energy & Nuclear Techniques**  
**The University of Abdelmalek Essadi of Tetouan, Morocco**



Under the auspices of



**MINISTRY OF ENERGY, MINES, WATER & ENVIRONMENT**



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## **Introduction**

The 3rd edition of the conference PHYTRA is being organized by the Moroccan Association for Nuclear Engineering and Reactor Technology (GMTR) with the collaboration of the National Centre for Energy, Sciences and Nuclear Techniques (CNESTEN) after the resounding success which the first and second editions PHYTRA1 and PHYTRA2 had met. The conference was held at Hotel Chams, Tetouan, Morocco from 12-14 May, 2014. In addition to this, INMM (International Nuclear Material Management) has organized a workshop on Nuclear Security. As for the previous editions, PHYTRA3 was expected to be an outstanding international event in the MENA region which provides an opportunity for researchers, academicians and practitioners in the field of physics and technology of reactors to gather, exchange ideas, and present original research contributions and best practices.

Since the last edition, the interest for nuclear energy does not cease increasing and a great number of developing countries including Morocco, expressed their intention to include the nuclear option in their national energy plans. A special session was being devoted to research reactors physics and utilization since Morocco is now operating a TRIGA Mark II research reactor. In addition, new topics on Education and training in reactor physics and Nuclear security which are of great importance for Morocco and other countries who decide to embark on a nuclear power program, have been included in the conference topics.

The efforts for going to PHYTRA3 initiated days back in the month of February-March 2014; when we came to know about this international conference through our respected seniors & hence the consequence was, the abstracts which were sent by us selected for Paper/Poster presentation. To present the poster at the conference, we applied for financial assistance to PNS (Partnership for nuclear security), Department of State, USA, which was passed by them and luckily we got a chance to present it. All the participants have represented their selves enthusiastically and the representatives of PNS & INMM were impressed with our work. Moreover, all of us got a chance to have a fruitful discussion as well as suggestion from scientist, technocrats and students from entire world regarding our published work and latest development.

## **Purpose of Participation**

The purpose of participation was to represent our research work as well as PDPU at International Level and have an exposure to ongoing research in the field of Nuclear. By attending presentations, we can learn new things, which is unfamiliar for us as well as for our department.

## **The Journey & Incredible Experience**

The journey from Ahmedabad to Morocco, was planned by the PNS. For most of us, it was a first international trip, so everyone was very excited about it. Our to-&-fro journey was safe and comfortable by all means & and we were all pleased with the arrangements done by PNS & all of us lucky enough to stay at DUBAI and CASABLANCA airport for few hours. After reaching there, we stayed in Hotel CHAMS in Morocco-Tetouan. It was again arranged by PNS & was quite comfortable. Though, many of us need to compromise regarding the food but organizing committee did their best with enough efforts for vegetarian food and it was



divine for us to experience their traditions and care. In Morocco the climate is too unique with cool breeze and long day till 8:30 pm apart from this natural beauties and helping culture of the local public were much remarkable. Phytra-3, got a great response from around the world and there were participants from different countries like Austria, Argentina, Brazil, India, USA , Jordan, Italy, France, Canada, Egypt ,Czech republic, Indonesia, South Korea & Morocco. We had a bit of problem with the language but all people were nice to interact with. We met the scientists who were part of their national energy department and representing their country. and they too appreciated our work. We met Dr. Larry (Director, Nonproliferation, Safeguards,& Security Programs Oak Ridge National Laboratory, UT-Battelle, LLC, Oak Ridge, Tennessee ), Dr. Mo Bissani ( International Nuclear Materials Protection Program Manager ,Global Security, Directorate Lawrence Livermore National Laboratory), Dr. Rian Bahran (Los Alamos National Laboratory), Mr. B.D. Thomas (CRDF Global) also the Moroccan students and faculties. The people over there are too kind and helpful and we heartily respect their culture. Apart from this we are now lucky to have very good friends in Morocco and all around. There were great French and American scientists present at the conference, with interaction with such great minds; we enhance our knowledge and confidence within ourselves which lift us and highly motivated for research. Furthermore, we marked several areas in which we need to improve our self to walk together with competitive world. It is require to increase our level in terms of submitting abstract as well as communication skill, through which a sound impact can be made & we can establish an incredible image at such kind of international conference. We have to work together by including our faculty members and have to make aware our selves of latest innovations and research.

We were lucky enough to express our views and ideas with paper and poster presentations. Overall, we received very good comments and suggestions from all great minds present over there but still, it is very essential to prepare well as we are representing PDPU as well as India on international platform. The vital issue is to convince and explain them about your research and its implication in Nuclear sector. However, we all will learn progressively as it was our first participation at international platform. Simultaneously, we will increase the level of research as well as technical knowledge in upcoming days and it will definitely help us for the future events. This visit has left an extraordinary impact in our life as it was our 1<sup>st</sup> International Conference and we have surely learned enough from this visit and now we can represent our self with full gusto and self confidence. It is a great advantage for us, that now we can propel ourselves in an appropriate direction regarding research and its implementation by using various contacts which we have developed there.

Here we would be proud to let you all know that as the answer of our “Letter of Appreciation to them ”. The entire organizing committee of PHYTRA3 is impressed by the behavior of PDPU students as we were 100% attentive all throughout the conference. It is required to build fierce communication skills among us in everyone. Moreover, what we felt is, universities curriculum and research work was more focused on MCNP (Monte Carlo N-Particle code) so it would be great if such kind of course is introduce in our University. Students from the universities in morocco are more familiar with simulation codes for neutron flux distribution calculation, geometry calculation, reactor design tools which we think; it’s a necessity for a Nuclear Engineer.



**List of participants from PDPU**

Name	Responsibility	Title of Paper/Poster represented
Dipesh Mistry	Author	Case Study of Travelling Wave Reactor (TWR) & It's future Impact
Bhumi Chaudhari	Co-Author	
Jay Joshi	Author	The need and current human reliability analysis in Indian nuclear power sector
Parth Patel	Co-Author	
Montu Bhuva	Author	Effective and Efficient Thorium Utilization
Darpan Shukla	Co-Author	
Dhrumil Modhiya	Co-Author	
Swapnil Patil	Author	Implementation of Nuclear-Desalination in Coastal Region in India For Industrial Development
	Co-Author	Automatic Detection of Abnormal Event Using Smart Video Surveillance System in a Nuclear Power Plant
Arunsinh Zala	Author	Application of Austempered Ductile Iron (ADI) in Containers for Nuclear Waste

**Program details**

On the 12<sup>th</sup> May, at 9.00 am in the morning, this auspicious event declared open by GMTR president, Prof. L Erradi in the presence of Minister of Scientific Research, CNESTEN Director General, UAE President, PNS representative, IAEA representative and CEA representative at Hall of the University Abdelmalek Essadi of Tetouan, Morocco. The various plenary session and the topics are mentioned below.

**PLENARY SESSION 1**

**Prospects of Nuclear Energy**

**Chairs: L.Erradi + F.Rahnema**

Date	Title of the Topic	Speaker
May 12, 2014	French contribution to the development of GEN-IV Nuclear Reactors	P. Anzieu (CEA-FRANCE)
	Moroccan National Strategy for Electricity Production for the next deceny	M. Hajroun(MEMEE-Morocco)
	Potential Role of the National Center of Nuclear Energy, Scinces & Techniques(CNESTEN), as a technical support organization, for nuclear power option	HTET (CNESTEN-Morocco)
	The French Nuclear Energy Society SFEN : a scientific & educational organization	A.Santamarina (SFEN-France)



**PLENARY SESSION 2**

**Nuclear Security: New Challenges for Nuclear Community**

**Chairs: J. Tajmouati + R. M. Bahrn**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 12, 2014	IAEA assistance to improve Global Nuclear Security	T. ANDREWS (IAEA)
	Nuclear security education in morocco, achievements & prospects	A. KHARCHAF (UIT - Morocco)
	Introduction to the Institute of Nuclear Materials Management	L. SATKOWIACK (INMM - USA)

**PLENARY SESSION 3**

**Advances in Reactor Physics**

**Chairs: T. El Bardouni + A. Santamarina**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 12, 2014	Advanced Particle Transport Methodologies for Real-Time Simulations	A. R. HAGHIGHAT (VI-Tech - USA)
	DRAGON5 and DONJON5, the contribution of École Polytechnique de Montréal to the SALOME platform	A. HEBERT (EPM-Canada)
	COMET Theory for Whole-Core Neutronics, Radiation Detection and Radiotherapy Calculations	F. RAHNEMA (GIT - USA)
	Models and Methods for the dynamic simulation of advanced nuclear systems	P. RAVETTO (PM - Italy)
<b>POSTER SESSION 1</b>		

On the following day, all the technical session was held at Conference Hall, Hotel Chams, Tetouan, Morocco.



**TECHINCAL SESSION 1**

**Deterministic & Monte Carlo Transport Method**

**Chair : A. R. Haghight**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 13, 2014	Calculation of the equilibrium core for the PBR concept	R. Sanchez (CEA - France)
	Subgroup decomposition method via quasi transport theory	S. Yasseri (GIT - USA)
	Angular quadrature formula for a step-MOC solver in 3D axial geometries	D. Sciannandrone (CEA France)
	Spatial correlations in Monte Carlo criticality simulations	E. Dumonteil (CEA – France)

**TECHINCAL SESSION 2**

**Reactor Core Calculations and Lattice Physics Methods**

**Chair : R. Sanchez**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 13, 2014	Sampling based method for propagation of uncertainty in fissionable material system parameters for burnup analysis	D. Campolina (CDTN/CNEN - Brazil)
	From VVER-1000 to VVER-1200: investigation of the effect of the change in core.	M. Dwidar (DNRE/AU - Egypt)
	TICTOC Solutions for the Two-Dimensional C5G7 MOX Benchmark Problem	C. Kong (UNIST - Korea)
	General simple method for coupling neutron transport, depletion and thermal-hydraulic codes for nuclear reactor calculations	F. Leszczynski (CAB - Argentina)
	Accurate neutronic calculations for GEN-III LWR reactors	A. Santamarina (CEA - France)



**TECHINCAL SESSION 3**

**Nuclear Data & Benchmarks Analysis, New  
Concepts and Measurements**

**Chair : A. Hébert**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 13, 2014	Qualification of PWR Lumped Burnable Gadolinium Poisoning through the interpretation of MELUSINE / GEDEON-II spent fuel analysis	<b>D. Bernard (CEA - France)</b>
	Assessment of a new method for reactivity measurement	<b>S. Dulla (PM - Italy)</b>
	Case study of travelling wave reactor (TWR) and its impacts on future needs	<b>D. Mistry (PDP - India)</b>
	Calculated models and nuclear data libraries for study of fast reactor experiments	<b>E. F. Mitenkova (NSI/AS - Russia)</b>

**TECHINCAL SESSION 4**

**Thermal Hydraulics and Research Reactor  
utilization & Calculation**

**Chair: F. Leszczynski**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 13, 2014	The Role of Nigeria Research Reactor-1 in Nigeria's Nuclear Power Programme	M. A. Akpanowo (NRR - Nigeria)
	Experimental measurements and CFD evaluation of wall heat flux partitioning during sub cooled flow boiling of R-11 within vertical annulus	Y. Bouaichaoui (CRNB - Algeria)
	Safety analysis under reactivity insertion in the Moroccan Triga Mark II reactor using the PARET/ANL code	Y. Boulaich (CNESTEN - Morocco)
	Synergy of Education & Training and Research & Development at VR-1 Training Reactor	O. Huml (CTU - Czech Republic)
	Power decay analysis of the Moroccan TRIGA MARK II reactor using PARET code	B. Nacir (CNESTEN - Morocco)

**POSTER SESSION 2**





At the end of the conference, we had an additional advantage to attend the Nuclear Security workshop organised by INMM (International nuclear Material Management).



**CNESTEN**



Institute of Nuclear Materials Management (INMM)

**REDUCING THE RISK FROM NUCLEAR AND RADIOACTIVE MATERIALS WORKSHOP**

Supported by CNESTEN and the Morocco INMM Chapter

*May 14, 2014  
Chams Hotel  
Tetouan, Morocco*

PANEL ONE

**Nuclear Security Culture**

<b>Date</b>	<b>Title of the Topic</b>	<b>Speaker</b>
May 14, 2014	Overview of Nuclear Security Culture	Dr. Mo Bissani, Lawrence Livermore National Laboratory
	Relationship Between Security and Safety Cultures	<i>Mr. A. Jraut, CNESTEN</i>
	INMM Student Perspectives	Moroccan representative Indian Representative

**PANEL ONE: Question & Answers**



PANEL TWO

Nuclear Security Knowledge

Date	Title of the Topic	Speaker
May 14, 2014	International Perspective on Nuclear Security Curriculum Development	Mr. Benjamin DeThomas, CRDF Global
	Nuclear Security Education : Highlighting the International Security Education Network (INSEN)	Dr. Rian Behran (Los Alamos National Laboratory)
<b>PANEL TWO : Question &amp; Answers</b>		

PANEL THREE

Insider Threat

Date	Title of the Topic	Speaker
May 14, 2014	Overview of Insider Threat	Dr. Rian Bahran
	Mitigating Insider Threat	Dr. Larry Satkowiak, INMM President Elect
	Nigeria's Nuclear Security Efforts: Achievements and Prospects	<i>Mr. Mbet Amos Akpanowo, Nigeria Nuclear Regulatory Authority</i>
<b>PANEL THREE : Question &amp; Answers</b>		
<b>Concluding remarks</b>		
<b>Workshop Adjourns</b>		

**Recommendations:-**

The Students especially from Department of Nuclear Energy, PDU recommended to submit the ideas with an appropriate guidance of faculty. International Published work will enhance your profile as well as you will get a chance to introduce yourself at International level and the experience will boost you in your area of interest for further research.