# Nuclear 2022

18-20 May

Pitesti, ROMANIA

## The 14th Annual International Conference on Sustainable Development through Nuclear Research and Education

**organized by RATEN ICN Pitesti**
**under the auspices of the Romanian Academy**
**in cooperation with University from Pitesti,**
**the Academy of Romanian Scientists**
**and the Technical Scientist Academy of Romania**

conference program

# CONFERENCE TOPICS

## I. Nuclear Energy

- Advanced Nuclear Systems and SMRs
- Nuclear Technologies and Materials
- Nuclear Safety
- Nuclear Reactors and nuclear fuels

## II. Environmental Protection

- Radioprotection
- Air, Water and Soil Protection
- Radioactive Waste Management

## III. Sustainable Development

- Education, Training and Knowledge Transfer

# CONFERENCE PROGRAMME Nuclear 2022

18-20 May, 2022
Pitesti, ROMANIA

| Eastern European Time | Day 1 Wednesday, May 18 | |
|---|---|---|
| 10:00 - 11:00 | Welcome | |
| 11:00 - 14:00 | Opening Session - Day 1 | |
| 14:00 - 17:40 | Advanced Nuclear Systems and SMRs | |
| | **Day 2 Thursday, May 19** | |
| 10:00 - 10:30 | Opening Session - Day 2 | |
| 10:30 - 14:00 | Nuclear Technologies & Materials | |
| | *PARALLEL SESSIONS* | |
| 14:00 - 17:00 | Nuclear Safety, Nuclear Reactors and Nuclear Fuels | Radioprotection & Air, Water and Soil Protection |
| | **Day 3 Friday, May 20** | |
| 09:00 - 13:00 | Radioactive waste management | |
| 13:00 - 13:40 | Education, Training and Knowledge Transfer | |
| 13:40 - 14:00 | *Nuclear 2022 Student Awards Ceremony* | |
| 14:00 - 14:20 | *Nuclear 2022 Awards Ceremony* | |
| 14:20 - 14:30 | Closing Remarks | |

- ***Please, REGISTER ONLINE to get the access link to the conference!***
- ***All times in the Programme are reported to the Eastern European Summer Time (Bucharest time)***
- ***Poster contributions will be available online throughout the Conference for all registered participants***

# Day 1 - May 18

| | |
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| **Transfer from Pitesti to ICN Mioveni** | **9:15 - from Muntenia Hotel/ Arges Hotel parking**<br>**9:20 - from Ramada Hotel** |

**Wednesday, May 18**

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|---|---|
| **10:00 - 10:10** | **Welcome by:**<br>**Prof. Dr. Ing. Şerban Valeca – *President of Scientific Council, RATEN ICN***<br>**Constantin Păunoiu – *Director, RATEN ICN***<br>**Marian-Cătălin Ducu – *General Director, RATEN*** |
| **10:10 – 11:00** | **Key Notes by representatives of:**<br>**- Ministry of Energy**<br>**- Ministry of Research, Innovation and Digitalisation**<br>**- Ministry of European Investments and Projects**<br>**- Local Authorities**<br>**- CNCAN**<br>**- ANDR**<br>**- SNN** |

## Opening Session

***Chairman: Şerban Constantin Valeca*** — ***Co-chairman: Marian-Cătălin Ducu***

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|---|---|---|
| **11:00 - 11:25** | *Latest views and perspectives of EU Energy/ Climate/ Euratom Nuclear Research and Innovation programmes* | ***Roger GARBIL***<br>European Commission, Belgium |
| **11:25 - 11:50** | *New perspectives for cooperation on SMR/AMR in Europe: opportunities for FALCON Consortium to accelerate the ALFRED program* | ***Roberto ADINOLFI***<br>ANSALDO NUCLEARE Italy |
| **11:50- 12:10** | *Coffee break* | |
| **12:10 – 12:35** | *Safety Operation of Cernavoda NPP* | ***Sorin Valerian GHELBEREU***<br>SNN, Romania |
| **12:35– 13:00** | RATEN perspectives on Gen IV and SMRs in Romania. R&D priorities on medium and long term | ***Marian-Cătălin DUCU***<br>RATEN, Romania |
| **13:00 – 14:00** | ***Lunch*** | |

Wednesday, May 18

## Advanced Nuclear Systems and SMRs — Room 1

***Chair: Michele Frignani*** — ***Co-chair: Ilie Turcu***

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|---|---|---|
| **14:00 - 14:20** | *Alessandro ALEMBERTI*<br>ANSALDO NUCLEARE<br>**Italy** | Status of Generation-IV Lead Fast Reactor Activities |
| **14:20 – 14:40** | *Maria OPRISESCU, Madalina Coca*<br>CNCAN<br>**Romania** | Romanian Regulatory Framework for Small and Modular Reactors |
| **14:40 - 15:00** | *Andrei Radulescu*<br>*SNN*<br>**Romania** | The role & contribution of SMRs in shaping the nuclear future and sustainable development |
| **15:00 - 15:20** | *Michele FRIGNANI*<br>ANSALDO NUCLEARE<br>**Italy** | ALFRED: opportunities as Advanced Modular Reactor in future hybrid energy systems |
| **15:20 – 15:40** | *John SAROUDIS*<br>Laurentis Energy Partners<br>and Canadian Nuclear Partners SA,<br>**Romania** | The future of Nuclear in Canada: the SMR revolution |
| **15:40 – 15:50** | *Discussions* | |
| **15:50 – 16:10** | *Coffee break* | |

***Chair: Marco Caramello*** — ***Co-chair: Marin Constantin***

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|---|---|---|
| **16:10 - 16:30** | *Janne WALLENIUS* LeadCold,<br>Stockholm,<br>KTH Royal Institute of Technology,<br>**Sweden** | The SEALER Programme to Commercialize LFRs in Sweden |
| **16:30 - 16:50** | *Marco CARAMELLO*<br>ANSALDO NUCLEARE<br>**Italy** | Advances in validation of ALFRED innovative self-regulated decay heat removal system |
| **16:50 - 17:10** | *Manuela PROFIR, V. Moreau*<br>CRS4,<br>**Italy** | CIRCE-THETIS Facility CFD simulation: Steady State and Transient Compliance |
| **17:10 – 17:30** | *Ana Maria IVAN, D.E. Gugiu*<br>RATEN ICN<br>**Romania** | Review of the Experimental Studies on the Behavior of Volatile Elements from Lead and LBE |
| **17:30 – 17:40** | *Discussions* | |

**17:45 - Departure to Pitesti**

***19:00 - Conference dinner at RAMADA Hotel, Pitesti***

***End of the 1st day***

# Day 2 – Thursday, May 19

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| **Transfer from Pitesti to ICN Mioveni** | **9:15 - from Muntenia Hotel/ Arges Hotel parking**<br>**9:20 - from Ramada Hotel** |

## Opening Session – Day 2 — Room 1

***Chairman: Şerban Constantin Valeca*** — ***Co-chairman: Daniela Diaconu***

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| **10:00 - 10:20** | *The role of international collaborations in the development of economical reliable and sustainable reactors* | ***Alessandro DODARO***<br>ENEA, Italy |
| **10:20 – 10:40** | *IAEA NPTDS Activities on Non-Electric Applications of Nuclear Energy* | ***Alina CONSTANTIN***<br>IAEA, Vienna |

**Thursday , May 19**

## Nuclear Technology and Materials — Room 1

***Chair: Alexandru Toma*** — ***Co-chair: Vasile Radu***

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|---|---|---|
| **10:40 - 11:00** | *Mariano TARANTINO*<br>ENEA<br>**Italy** | Structural Materials and Coating for LFR |
| **11:00 - 11:20** | *Livia STOICA, V. Radu, V. Ionescu, A. Niţu, A. Jinga, D. Toma, M. Matei, V. Olaru*<br>RATEN ICN<br>**Romania** | The Microstructural Investigations of the Liquid Metal Embrittlement Phenomenon on 316L Specimens Tested in the Liquid Lead Environment |
| **11:20 - 11:40** | *P. PERES, S. Choi, C. Defouilloy, L. Renaud, N. Touzalin, A. Vuillaume*<br>CAMECA Gennevilliers,<br>**France** | ACTINIS: Shielded SIMS for Analysis of Highly Radioactive Samples |
| **11:40 – 11:50** | *Discussions* | |
| **11:50 - 12:10** | *Coffee break* | |
| **12:10 – 12:30** | *Vasile RADU, L. Stoica, A. Jinga, A. Niţu, V. Ionescu, D.Toma, V. Olaru*<br>RATEN ICN<br>**Romania** | Multilayer Feedforward Neural Network Modeling of the Fracture Mechanics Parameters for the Zr-2.5%Nb Pressure Tube |
| **12:30 – 12:50** | *Elena MATEI, A.C. Răduţ, D.F. Oproiu, D.V. Ionescu, I. Neacşu*<br>RATEN ICN<br>Romania | Fatigue Behaviour of Zy-4 Cladding under Cyclic Loads Using Finite Element Modelling |
| **12:50 – 13:10** | *Mariea DEACONU, I. Sturzeanu, I. Dumitrescu, M. Florea, E. Badulescu*<br>RATEN ICN<br>**Romania** | Experimental Investigation on Hydrogen Absorption Properties of as-cast Zirconium rich U-Zr Alloy, for Use in Hydrogen Storage Applications |
| **13:10 – 13:20** | *Discussions* | |
| **13:20 – 14:00** | ***Lunch*** | |

# PARALLEL SESSIONS

Thursday, May 19

## Nuclear Safety, Nuclear Reactors and Nuclear Fuels — Room 1

**Chair: Dumitru Barbos** — **Co-chair : Mirea Mladin**

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|---|---|---|
| **14:00 - 14:20** | *Viorel VASILACHE*<br>CNE Cernavoda<br>**Romania** | Cernavoda NPP Unit 1 refurbishment project |
| **14:20 - 14:40** | *Nicolae TRANTEA*<br>CNE Cernavoda<br>**Romania** | Cernavoda Tritium Removal Facility Project Status and Objectives |
| **14:40 - 15:00** | *Gheorghe IONITA, Ciprian Bucur, Amalia Soare and Ionut Spiridon*<br>ICSI Rm.Valcea<br>**Romania** | New Solutions for Improving of Mixed Catalytic Packing for Heavy Water Detritiation |
| **15:00 - 15:10** | *Discussions* | |
| **15:10 - 15:20** | *Coffee break* | |
| **15:20 - 15:40** | *Cristina.A. MĂRGEANU*<br>RATEN ICN<br>**Romania** | Evaluation of Spent Fuel Inventory and Radioactivity for CANDU type Fuel Bundles with Increased Number of Elements and U-based Fuels |
| **15:40 - 16:00** | *Iosif PRODEA*<br>RATEN ICN<br>**Romania** | Reactor Physics Study for Advanced Fuel Cycle Options to be used in CANDU Reactors |
| **16:00 – 16:20** | *Laurenţiu DINU, M. Constantin, C.A. Mărgeanu*<br>RATEN ICN<br>**Romania** | Study of a Loss-of- Cooling Accident at the Spent Fuel Pool of a CANDU NPP containing Natural Uranium or SEU Spent Fuel |
| **16:20 – 16:40** | *Teodora RETEGAN*<br>Chalmers University<br>**Sweden** | Studies of FPs-coolant-cladding interactions in LBE/Pb systems at Chalmers University, Sweden |
| **16:40 - 17:00** | *Discussions* | |

Thursday , May 19

## Radioprotection & Air, Water and Soil Protection Room 2

*Chair: Alexandru Toma* **Co-chair:** ***Cristian Dulama***

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|---|---|---|
| **14:00 - 14:20** | *Dorel Florin ALBU*<br>Cernavoda NPP<br>**Romania** | Individual Dosimetry Program at Cernavoda NPP – Good Practices in the Dosimetry Lab |
| **14:20 - 14:40** | *M. MITWALLI, C. Dulama, G. Saleh,*<br>*A. H. El-Farrash, M. Sallah*<br>Faculty of Science, Mansoura University,<br>**Egypt** | Exposure Evaluation within Um-Safi Mine (Egypt) due to Radionuclides determined by High-Resolution Gamma-ray Spectrometry |
| **14:40 - 15:00** | *M. KADHEM, M. Mitwalli,*<br>*H. M. Yousef, A. H. El-Farrash, M. Sallah*<br>Faculty of Science, Mansoura University,<br>**Egypt** | Assessment of Radiation Dosimetry and Excess Cancer Risk due to Terrestrial Radionuclides for Al-Zubair Petroleum Station (Iraq) |
| **15:00 - 15:10** | *Discussions* | |
| **15:10 - 15:30** | *Coffee break* | |
| **15:30 - 15:50** | *Ioan ZAHARIE, M.Golosie*<br>POLITEHNICA Univ. Timisoara,<br>**Romania** | On Radioactivity in Timis |
| **15:50 - 16:10** | *Radu VASILACHE*<br>Canberra<br>**Romania** | Radiation Protection and Climate Change: How Do the Dose Response Models Influence the Choices of Solutions to Mitigate Climate Problems |
| **16:10 - 16:30** | *Valentina NECULAE, C. Dulama,*<br>*I. Prisecaru*<br>RATEN ICN<br>**Romania** | Improving analytical performance through proficiency testing activities |
| **16:10 - 16:20** | *Discussions* | |

**16:30 - Departure to Pitesti**

***End of the 2nd day***

# Day 3 – Friday, May 20

**Transfer from Pitesti to ICN Mioveni**

**8:15 - from Muntenia Hotel/ Arges Hotel parking**
**8:20 - from Ramada Hotel**

Friday, May 20

## Radioactive Waste Management — Room 1

***Chair: Louise Theodon*** — **Co-chair: *Crina Bucur***

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|---|---|---|
| **9:00 - 9:20** | *Louise THEODON*<br>ANDRA<br>**FRANCE** | EURAD: A step change in European joint collaboration towards safe radioactive waste management |
| **9:20 - 9:40** | *Alice DIMA*<br>ANDR<br>**Romania** | Near surface disposal in Romania: Status of DFDSMA project |
| **9:40 -10:00** | *Ion POPESCU, Dorin Dumitrescu*<br>Cernavoda NPP<br>**Romania** | The Management of Intermediate Level Radioactive Waste Generated During Cernavoda Unit 1 Retubing Project |
| **10:00 - 10:20** | *Daniela DIACONU*<br>RATEN ICN<br>**Romania** | Impact of loess consolidation solutions on the radionuclide transport |
| **10:20 - 10:40** | *Min Ji KIM, Hee Reyoung Kim*<br>Ulsan Nat. Inst. of Science and Techn., Ulsan, **South Korea** | Radiological Safety Evaluation of Recycling Facility for the Dismantled Concrete Waste |
| **10:40 - 11:00** | *Coffee break* | |
| **11:00 – 11:20** | *Daniela GURĂU*<br>IFIN HH<br>**Romania** | Uncertainty quantification applied to the radiological characterization of radioactive waste |
| **11:20 - 11:40** | *Ionuţ FLOREA*<br>RATEN ICN<br>**Romania** | Modelling of cement hydration by PREEQC code modelling |
| **11:40 – 12:00** | *Camelia ICHIM, Crina BUCUR, Mirela OLTEANU*<br>RATEN ICN<br>**Romania** | Effect of organics and cement degradation on Ni solubility in cement pore water |
| **12:00 – 12:20** | *Crina BUCUR, C. Manolescu, I. Florea, C. Ichim*<br>RATEN ICN<br>**Romania** | Optimization of geopolymer based on blast furnace slag for liquid organic waste incorporation |
| **12:20 – 12:40** | *Discussions* | |
| **12:40 – 13:00** | *Coffee break* | |

Friday, May 20

## Education, Training and Knowledge Transfer — Room 1

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|---|---|---|
| ***Chair:*** **Serban Constantin Valeca** | | ***Co-chair:*** **Dumitru Chirlesan** |
| **13:00 - 13:20** | ENEN ++ European opportunities for E&T | *Gabriel PAVEL*<br>ENEN,<br>**Belgium** |
| **13:20 - 13:40** | Nuclear Education and Training – a challenge of the 21th century | *Dumitru CHIRLEŞAN*<br>UPIT,<br>**Romania** |

Friday, May 20

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| **13:40 - 14:00** | **Nuclear Student Award Ceremony (Serban Valeca)**<br>**Student 1**<br>**Student 2**<br>**Student 3** |
| **14:00 - 14:20** | **NUCLEAR 2021 Awards Ceremony (Daniela Diaconu)**<br>**Young scientist 1**<br>**Young scientist 2**<br>**Young scientist 3** |
| **14:20 - 14:30** | **Closing Remarks** |

**14:30 - Departure to Pitesti**

## End of the Conference

# Poster Session

## Advanced Nuclear Systems and SMRs

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| **S1-P1** | *Mirela Matei, L. Stoica, A. Niţu, V. Olaru, V. Radu* ***RATEN ICN, Romania*** | Development of a Conceptual System for the Chemical Cleaning of Residual Lead from the Structural Materials Used in LFR Reactors |
| **S1-P2** | *Nita Iulian Pavel, Pancef Rodica* ***RATEN CITON, Romania*** | Conceptual Design and Layout of Air-Cooling Condensers (ACC) Required as Heat Sink for ALFRED LFR Demonstrator Reactor |

## Nuclear Technology and Materials

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| **S2-P1** | *Dumitra Lucan, M. Fulger, V. Roşu, Gh. Jinescu* ***RATEN ICN, Romania*** | The Usefulness of International Collaboration Focused on the Systematic Ageing Management for Nuclear Power Plants |
| **S2-P2** | *Viorel Ionescu, V. Radu, A. Niţu, D. Toma, L. Stoica, A. Jinga, V. Olaru, L. Popescu, M. Matei* ***RATEN ICN, Romania*** | Study of Mechanical Fatigue on the Zr-2.5%Nb Pressure Tube Specimens |
| **S2-P3** | *Dobrin Ionuţ, Dima Denis-Gabriel, Popescu Mircea Dafin* ***RATEN ICN, Romania*** | Fuelling Machine Head Testing Loop – ADAM Control and Data Acquisition System |
| **S2-P4** | *Popescu Mircea Dafin, Dima Denis-Gabriel, Dobrin Ionuţ* ***RATEN ICN, Romania*** | Fuelling Machine Head Testing Loop – Control Room Safety Increase Through Equipment Upgrading |
| **S2-P5** | *N. Anghel, R. Năstase* ***RATEN ICN, Romania*** | Spectral Analysis of Acoustic Signals Occurring at a Cracked Pipe Crossed by a Pressure Fluid |
| **S2-P6** | *M. Media, T. Tudorache, A. Amzoi* ***RATEN ICN, Romania*** | Induction Heating Process Modeling of Nuclear Fuel Rod |
| **S2-P7** | *Cristian Costea, Mihai Arva* ***RATEN ICN, Romania*** | Embedded Web Server for Industrial Automation Using Programmable Logic Controller |
| **S2-P8** | *Mihai Arva, Cristian Costea, Cosmin Ivan* ***RATEN ICN, Romania*** | Design of a Manufacturing Execution System (MES) Used for LEU Type Nuclear Fuel Manufacturing Process |
| **S2-P9** | *N. Anghel, R. Năstase, A.N. Avram* ***RATEN ICN, Romania*** | Location of an Acoustic Signal Source in the Two-Dimensional Plane by the Estimated Delay Time Method |
| **S2-P10** | *C. Ivan, A. Florea, I. Pirvu, M. Arva* ***RATEN ICN, Romania*** | Embedded System using Microcontroller for Gamma Radiation Detection |
| **S2-P11** | *Bogdan Corbescu, Dumitru Puiu* ***RATEN ICN, Romania*** | CFD Model for the Double Ice Plugging Process of a Dn 200 Pipe |
| **S2-P12** | *Aurelia Elena Tudose, Alexandru Anghel, Alexandru Cristian Matei, Valentina Cristina Rosu* ***RATEN ICN, Romania*** | Corrosion Susceptibility Assessment of Chromium Nitride Thin Layers Applied on Stainless Steels |
| **S2-P13** | *A.F.Florea, C.Ivan, I.Pirvu* ***RATEN ICN, Romania*** | Oxygen control system using gas phase in molten lead corrosion test facility |
| **S2-P14** | *Oana Rusu, V. Ion* ***RATEN ICN, Romania*** | Plasma Electrolytic Oxidation of Titanium and its Surface Chemistry Investigation |
| **S2-P15** | *M. Patrascu, Oana Rusu* ***RATEN ICN, Romania*** | The Influence of Electrolyte Composition and Current Regime on the Micro-Discharges of Plasma Electrolytic Oxidation on Zr-2.5Nb and Titanium Alloys |
| **S2-P16** | *Oana Rusu, M. Pătraşcu* ***RATEN ICN, Romania*** | The Pulse Current Mode and Current Density Influences on Plasma Electrolytic Oxidation of Zr-2.5Nb and Ti Alloys |

## Nuclear Reactors, Nuclear Fuels

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| **S3-P1** | *Roxana G. Bezdedeanu, C.A. Mărgeanu* ***RATEN ICN, Romania*** | Nuclear safety aspects associated with increasing U235 enrichment of CANDU standard bundles with SEU and RU fuel |

## Nuclear Safety & Severe Accidents

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| **S4-P1** | *Elena D. Morlova, D. Mladin* ***RATEN ICN, Romania*** | Evaluation of the Unavailability of the Primary Circuit of TRIGA SSR Reactor, Importance Factors, Risk Criteria |
| **S4-P2** | *Iulia Jianu, Maria Oprisescu, Madalina Coca* ***CNCAN, Romania*** | Enhancement of Nuclear Safety and Security in Romania – Improvement of Disaster Resilience and Preparedness for Radiological and Nuclear Events |
| **S4-P3** | *Madalina Ionita* ***CNCAN, Romania*** | Romanian Regulatory Development Relevant to Nuclear Safety |

## Radioactive Waste Management

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| **S5-P1** | *Cristina Diaconescu, I. Florea, I. Prisecaru* ***RATEN ICN, Romania*** | Assessment of Gamma Dose Rate for Waste Packages with Radioactive Concentrate using MicroShield Software |
| **S5-P2** | *Simona Laliu, Crina Bucur, Camelia Ichim, Daniela Rotaru* ***RATEN ICN, Romania*** | Site selection criteria for the deep geological repository in Romania |

## Radioprotection & Air, Water and Soil Protection

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| **S6-P1** | *Cornelia Guţă, M. Arva* ***RATEN ICN, Romania*** | Management System Regarding the Release of Gaseous Effluents in Nuclear Installations |

## Education, Training and Knowledge Transfer

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| **E-P1** | *European Nuclear Education Network* ***(ENEN), Belgium*** | Augmented cooperation in education and training in nuclear and radiochemistry |
| **E-P2** | *European Nuclear Education Network* ***(ENEN), Belgium*** | Towards Optimized Use of Research Reactors in Europe |
| **E-P3** | *Raluca A. Nedelcu,* **CNE Cernavoda, Romania** | Training in COVID -19 Pandemic Context– Challenges and Opportunities |
| **E-P4** | *Elena Olaru, Şerban Constantin Valeca, Gabriela Gheorghe, Ion Man* ***UPIT, Romania*** | Nondestructive Examination Techniques on CANDU Fuel Elements |
| **E-P5** | *Mădălin Domnişanu, Constantin Robea, Şerban Constantin Valeca* ***UPIT, Romania*** | Determination of the Functional Parameters of the Hot Thermomechanical Loop during the Injection of Water into the Fuel Channel |
| **E-P6** | *Natalia Arsene, Şerban Constantin Valeca, Dumitru Puiu* ***UPIT, Romania*** | Evaluation Technique for Power Cable Ageing |
| **E-P7** | *Denisa Manea, Monica Valeca, Livia Stoica* ***UPIT, Romania*** | Characterization of the Ramberg-Osgood Constitutive Equation for 316L Stainless Steel in Liquid Lead at 400℃ |
| **E-P8** | *Andreea F. Alexandru, Elena Stoica, Şerban Constantin Valeca* ***UPIT, Romania*** | Study of Pressure Tube Behavior in Case of Flow Blockage in a CANDU Fuel Channel |

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| **E-P9** | *Teodora Furtună, Monica Valeca, Daniela Stanciu* ***UPIT, Romania*** | Fluorimetric Method Applied to Determination of Uranium Content in Aqueous Samples |
| **E-P10** | *Simona-Andreea Stoica, Şerban Constantin Valeca, Iosif Prodea* ***UPIT, Romania*** | Evaluation of Uranium Utilization for Some Advanced Nuclear Fuels Suitable to be Used in a CANDU Reactor |
| **E-P11** | *Andrei Cana, Şerban Constantin Valeca, Viorel Ionescu* ***UPIT, Romania*** | Study of the Elastic Anisotropy of CANDU Pressure Tube by Ultrasonic Methods |
| **E-P12** | *Gabriel Despa, Monica Valeca, Emil Mugurel Ana* ***UPIT, Romania*** | Factors Influencing the TRIGA Steady State Reactor Core Reactivity |
| **E-P13** | *Sergiu-Mihail Voiculescu, Adrian Arjoca, Şerban Constantin Valeca* ***UPIT, Romania*** | Calibration and Regulation of Pressure Drops on Water Distribution Routes to Comply with MID Test Conditions |
| **E-P14** | *Lazăr Bogdan-Alexandru, Şerban Constantin Valeca, Adrian Amzoi* ***UPIT, Romania*** | Vacuum Induction Melting - VIM |
| **E-P15** | *Lavinia Eremia, Monica Valeca, Şerban Miloiu* ***UPIT, Romania*** | Recovery of Uranium from Secondary Products Obtained in the Manufacture of LEU Experimental Nuclear Fuel |
| **E-P16** | *Valentin Timonea, Dumitru Chirleşan, Andrei Vîlcu* ***UPIT, Romania*** | Study on the Measurement of Oxygen Concentration in Molten Lead |
| **E-P17** | *Ionela Sotan, Alexandru F.Florea, Dumitru Chirleşan* ***UPIT, Romania*** | Methods of Acquiring Oxygen from the Molten Lead Medium |
| **E-P18** | *Moga Liviu, Monica Valeca, Adrian Florinel Bucşă* ***UPIT, Romania*** | Using NAA Method to Determine the Concentration of Retained Elements in the Air Filters of the Ventilation Installation from the TRIGA Reactor |
| **E-P19** | *Georgiana Nicolae, Florina Cristina Constantinescu, Monica Valeca* ***UPIT, Romania*** | Probabilistic Safety Assessment - an Important Tool for the Maintenance Activity Optimization |
| **E-P20** | *Alexandra Georgiana Vasilescu, Monica Valeca, Camelia Ichim* ***UPIT, Romania*** | Short Term Irradiated Graphite Leaching Test |
| **E-P21** | *Tiberiu N. Ciobanu, Şerban Constantin Valeca, Mariana Postelnicu* ***UPIT, Romania*** | Obtaining U-Zr-Er Alloys by Applying the Powder Metallurgy Method |
| **E-P22** | *Nicolae Georgescu, Dumitru Chirleşan, Valentina Neculae* ***UPIT, Romania*** | Determination of Peak Efficiency for an HPGe Detector Used in Gamma Spectrometry of Environmental Samples |
| **E-P23** | *Cătălin Bănuţă, Valentina Neculae, Dumitru Chirleşan* ***UPIT, Romania*** | Calibration in Energy and Efficiency of the Gaseous Effluent Monitoring System |
| **E-P24** | *Diana Ureche, Carmen Manolescu, Şerban Constantin Valeca* ***UPIT, Romania*** | Geopolymers Matrices for Radioactive Waste Conditioning |
| **E-P25** | *Dana Maria Creţulescu, Monica Valeca, Olteanu Mirela* ***UPIT, Romania*** | Analysis of Natural Uranium in Liquid Radioactive Waste |
| **E-P26** | *Mihai Pavel, Monica Valeca, Cristina Diaconescu* ***UPIT, Romania*** | Determination of HPGe Detector Efficiency Calibration Curve for Liquid Radioactive Waste Measurements |

# Background

**1970** A mission of IAEA experts in Romania favorably advises the necessity to establish the Institute.

**1971** **Institute for Nuclear Technologies** (ITN) is founded, with the main purpose to provide scientific and technological support for the Romanian Nuclear Program.

**1977** Research laboratories are commissioned on the new premises in Mioveni-Colibasi, at 130 km NW from Bucharest. The Institute assignments are enlarged by involvement in design activities of nuclear system components. Its name is now changed into the **Institute for Nuclear Power Reactors** (IRNE).

**1978** Quality Assurance Requirements were settled for the reactor operation. The first QA manual was accepted by the Nuclear Authority. Today the Quality Management System is extended to all activities which take place in the Institute: research, design, manufacturing and exploitation in the nuclear field;

**1979** November 18: first criticality is attained at the TRIGA Materials Testing Reactor, built within the Institute.

**1980** Commissioning of the Pilot-scale plant for the fabrication of CANDU-type fuel elements;

**1983** Commissioning of the Post-Irradiation Examination Laboratory (LEPI).

**1984** Commissioning of the Endurance Test Rig for fuel bundles at the Out-of-Pile Testing Department.

**1984** Commissioning of the Radioactive Waste Treatment Plant.

**1985** Starting of CANDU fuel bundles fabrication in SPEC (Unit for Fuel Elements Production).

**1989** With the arrival of the Fuelling Machine (F/M) Heads #4 and #5 intended for Cernavoda NPP-Unit 2, the F/M head test stand is commissioned.

**1990** Incorporated in the National Authority for Electric Power (RENEL), IRNE becomes the **Institute for Nuclear Research (ICN)**.

**1992** The Department for Fuel Elements Production separates from the Institute and becomes a distinct unit within RENEL, under the name of Nuclear Fuel Factory (FCN).

**1992** Beginning of the fuel conversion process at the TRIGA Reactor.

**1994** ICN specialists significantly contribute to the commissioning of Cernavoda NPP - Unit 1.

**1995** Commissioning at Cernavoda NPP-Unit 1 of the Failed Fuel Location System (SLCD), equipment entirely designed and manufactured by the Institute.

**1996** April 16: first criticality is attained at Cernavoda NPP-Unit 1, directly involving ICN specialists.

**1998** ICN becomes **SCN**, a subsidiary of the Romanian Authority for Nuclear Activities (RAAN), as an affiliate branch.

**1999** Return of spent fuel to the country of origin (USA).

**2003 - 2005** Testing and delivery of two Fuelling Machine Heads at Cernavoda NPP – Unit 2.

**2004** 25$^{th}$ anniversary of the TRIGA Reactor commissioning.

**2006** Completion of the TRIGA-SSR conversion from HEU (High Enriched Uranium) to LEU (Low Enriched Uranium) fuel.

**2007, May** First criticality of Cernavoda NPP-Unit 2 reactor; October, commercial operation; ICN main contribution: F/M heads testing, Failed Fuel Location System.

**2009** HEU fuel returns to Russia under a US DOE contract.

**2010** Completion of the main refurbishing of TRIGA Reactor.

**2011** ICN nomination as national leader for GIV development

**2012** Launch of the extended research programme to GIV: LFR-ALFRED in ICN.

**2013** ICN becomes subsidiary of the new created State Owned Company Technologies for Nuclear Energy (RATEN).

ICN, ANSALDO NUCLEARE and ENEA signed the FALCON International Consortium aiming to bring the LFR technology to industrial maturity

**2016** Inauguration Ceremony of the Cooperation Center IAEA Vienna - ICN Romania, Pitesti, in the presence of Yukiya Amano, the IAEA Director General".

**2020** IAEA designated RATEN ICN as International Centre based on Research Reactors (ICERR) in the fields of Education and Training and Joint Research and Development (R&D) Projects nomination

## CONFERENCE SPONSORS:


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