



# **NATIONAL RESEARCH-DEVELOPMENT INSTITUTE FOR CRYOGENIC AND ISOTOPIC TECHNOLOGIES - ICSI Rm. Valcea**

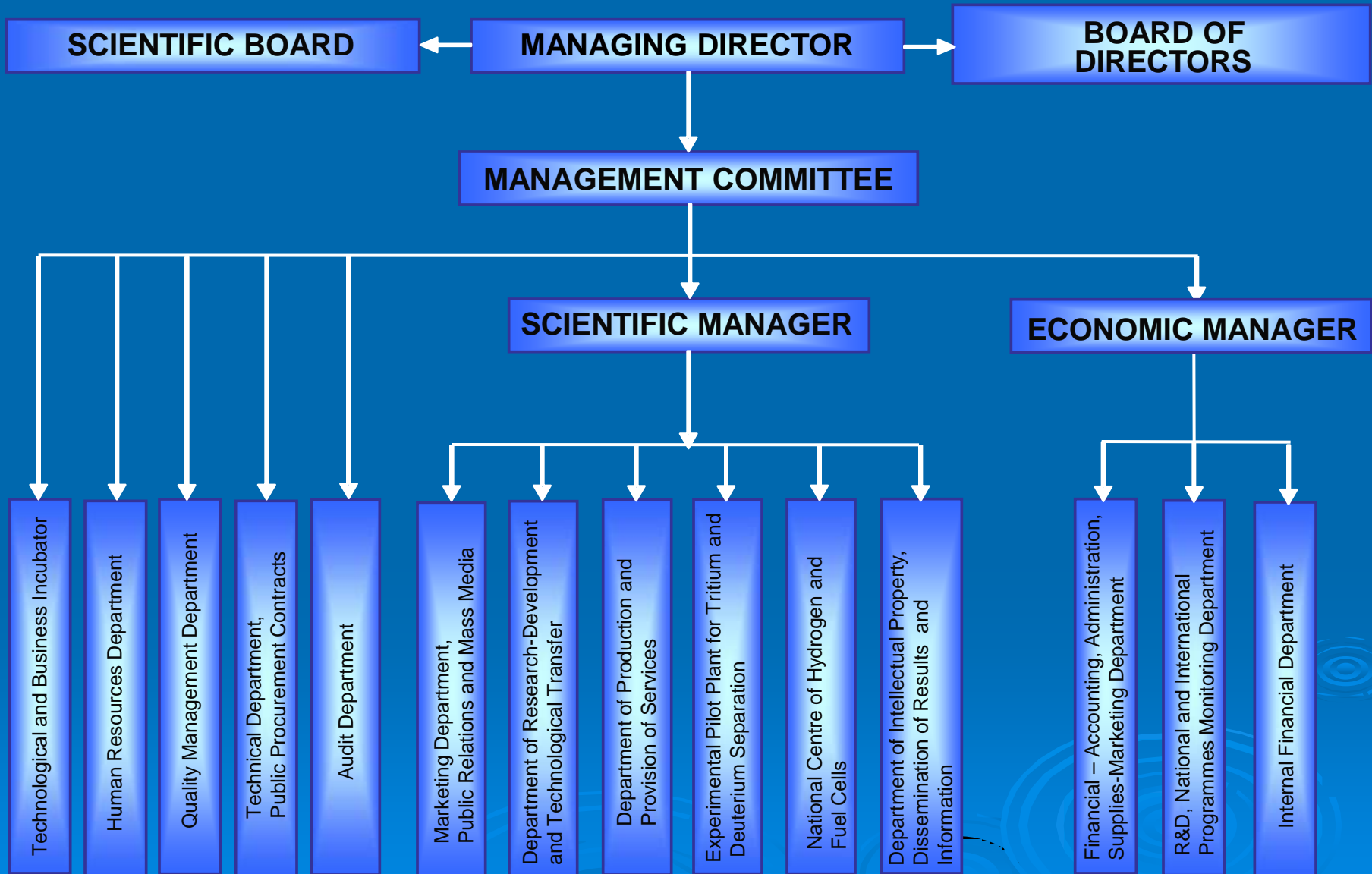


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# ORGANIZATIONAL CHART



**Research and development** of ICSI Ramnicu Valcea are focused on the following general objectives:

- ❖ To sustain the national nuclear program – fission and fusion
- ❖ To develop studies and researches in the field of cryogenics
- ❖ Hydrogen and Fuel Cell
- ❖ Environment and quality of life
- ❖ Production and Services
- ❖ Infrastructure development, technology transfer and innovation services
- ❖ Increase of competitiveness and bring ICSI Rm. Valcea at specific EU policies by developing capacity to assimilate the techniques and technologies
- ❖ Development of management of public and private financial resources allocated to scientific research, technological development and innovation of ICSI Rm. Valcea.
- ❖ Human resource development in the sphere of research activities by encouraging the formation and development of young researchers and research teams for high performance.

# ICSI RM. VALCEA UNDERSTRUCTURES

- ❖ Experimental Pilot Plant for Deuterium and Tritium Separation
- ❖ Laboratories of Research, Development, Innovation and Technology transfer
- ❖ National Center for Hydrogen and Fuel Cells
- ❖ Technological and Business INCUBATOR – ITA–ICSI Rm. Valcea

# EXPERIMENTAL PILOT PLANT FOR DEUTERIUM AND TRITIUM SEPARATION

## OBJECTIVES:

- ☆ Develop of the technology for heavy water detritiation, used as moderator in CANDU reactors.
- ☆ Verification of specific equipment and materials in cryogenic environments and tritium.

## TECHNOLOGY:

- ☆ Pilot plant has a continuous process training and authorization, in accordance with CNCAN rules.
- ☆ Review of the technical design of reference, procedures for operating the pilot plant system.



- ☆ Personnel training and operator verification / testing it in relation to nuclear safety requirements.
- ☆ Pair installation program EURATOM / EFDA-JET and EFDA-ITER on fusion and water detritiation system that will function within the ITER reactor.

## **SECURITY SYSTEM:**

- ☆ Protection of premises by implementing technological protection systems in accordance with EU legislation and requirements of the IAEA.
- ☆ Improving the system of radiological protection of personnel and operating environment.
- ☆ Accreditation of the dosimetry laboratory of installation.
- ☆ Development environmental laboratory.
- ☆ Implementation of the safeguard rules and physical protection by providing technological spaces and annexes with a controlled access and intrusion protection.

# TECHNOLOGY TRANSFER

- The beneficiary of the heavy water detritiation technology is NUCLEARELECTRICA for Cernavoda NPP Unit 1 and Unit 2.



# INTERNATIONAL PROJECTS

## Programme EURATOM

Project title	Coordinator (Institution/ Country)	Partners (Country / Institution)	International program that enrolls project	International Project Value	ICIT share Rm.Vilcea	International Project duration
Upgrade of Gamma-Ray Cameras JET-EP2- GRC-NA	Romania/ ICIT (INFLPR)	MHST Slovenia UKAEA United Kingdom ENEA Italy JOC (JET OPERATING CONTRACT)	EURATOM/ EFDA JET	1.116.000 Euro  Of which: MER Notification 683.000 Euro Orders 148.000 Euro	Notification 521.000 Euro Art. 6.3 ORDERS 101.000 Euro	2005-2010
KM6T (JET-EP2- KM6T)	Romania/ ICIT	JOC (JET OPERATING CONTRACT)	EURATOM/ EFDA JET	29.000 Euro	29.000 Euro	6 months
"Fuel Cycle" Fusion Training Scheme	FZK Karlsruhe/ Germany;	CEA Cdarache; ENEA; MTAATOMKI; ICIT Rm.Valcea	EURATOM EFDA-ITER	750.000 Euro	144.469 Euro	48 months
"TRI-TOFFY" Training Programme	FZK Karlsruhe/ Germany;	CEA Cadarache; ENEA; MTAATOMKI; UKAEA; ICIT Rm.Valcea	EURATOM EFDA-ITER	2.721.000 Euro	342.000 Euro	48 months



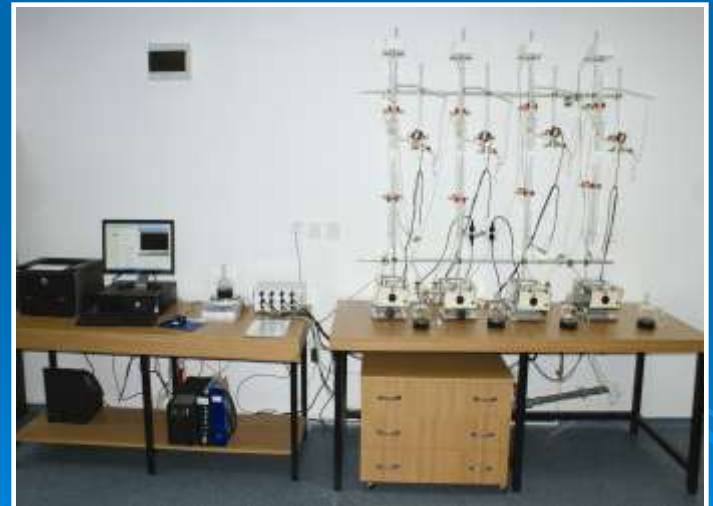
# LABORATORIES OF RESEARCH, DEVELOPMENT, INNOVATION AND TECHNOLOGY TRANSFER

## OBJECTIVES:

- ❖ Advanced gas separation and purification by physical adsorption, selective adsorption and chemical processes.
- ❖ Study of electrochemical and physical processes for PEM-FC and demonstration
- ❖ Obtaining and characterization of advanced materials with applications in industrial waste gas purification
- ❖ Analysis Techniques: mass spectrometry, gas-chromatography, physico-chemical, IR-spectrometry
- ❖ Procedural system according to the European and national norms for establishment of analytic data bank and annual wine identification record

- Intercommunication analysis – Eurofins Scientific – NMR Laboratory, Nantes, France
- ❖ High vacuum system pumps
- ❖ Design and production of cryogenic installations, experimental research and implementation of data acquisition system
- ❖ Investigation and characterization of materials studied in the field of cryogenic temperatures ( $\text{LN}_2$ ,  $\text{LH}_2$ ,  $\text{LHe}$ )





# NATIONAL CENTER FOR HYDROGEN AND FUEL CELL

## OBJECTIVES:

- ❖ Implementation of hydrogen energy technologies.
- ❖ Achieving an environment conducive to research activity for production of energy from unconventional sources.
- ❖ Implementation of educational programs for training on the use of hydrogen as energy vector, the training of young researchers in the field.



- ❖ Connecting of researchers from Romania in scheduled activities at European / international level for energy production from renewable sources.
- ❖ Dissemination of activities and their results in order to promote renewable energy, design, implementation and demonstration of technologies at laboratory and prototype.
- ❖ ICSI Rm. Valcea – National Center for Hydrogen and Fuel Cell
  - Full member of JTI- N ERGHY Group
  - Partner of the University of Lorens/France in the project KIC-EIT: Energy, Education, Entrepreneur ship and Eco-Engineering Management of the project: ARTTIC, France



# TECHNOLOGICAL AND BUSINESS INCUBATOR ITA - ICSI RM VALCEA

**ITA-ICSI Ramnicu Valcea** - innovation and technology transfer entity, established in the INC-DTCI - ICSI Ramnicu Valcea, without personality legal.  
- part of the National Network of Innovation and entities ReNITT Technology Transfer.

**MISSION:** To facilitate the start-up and development of new enterprises (SMEs) innovative based on advanced technology.

## **GENERAL OBJECTIVES:**

- \* Sustaining innovation effort in the economy and society.
- \* Stimulation of innovation and technology transfer to introduce in economic cycle of research results.
- \* Increase quality and competitiveness of products, processes and services.
- \* Support sustainable regional development strategies .

**Area:** 650 m<sup>2</sup>, furnished in areas modulated.

# SME COMPANIES INCUBATED

- 💧 *SC MECRO SYSTEM SRL*
- 💧 *SC ECOSYSTEM EXPERT SRL*
- 💧 *SC ECOPROTMED SRL*
- 💧 *SC ECOTESTGAS SRL*
- 💧 *SC. CARPE SRL*
- 💧 *SC METINSTAL SRL*
- 💧 *SC MONTINDUS SRL*
- 💧 *MESSER MAGNICOM GAS*
- 💧 *MESSER ENERGO GAS*
- 💧 *MESSER ROMANIA GAS*

## Facilities:

- ❖ *Access to infrastructure - offices, furniture, telephones, computers, servers, multifunctional printers, and Internet communications networks.*
- ❖ *Professional services - technological information, technological audit, technological forecasting, exploiting intellectual property rights.*
- ❖ *Assistance services: raising funds, identifying partners, access to specialized databases, national priorities, regional and local.*
- ❖ *Security services and protocol .*

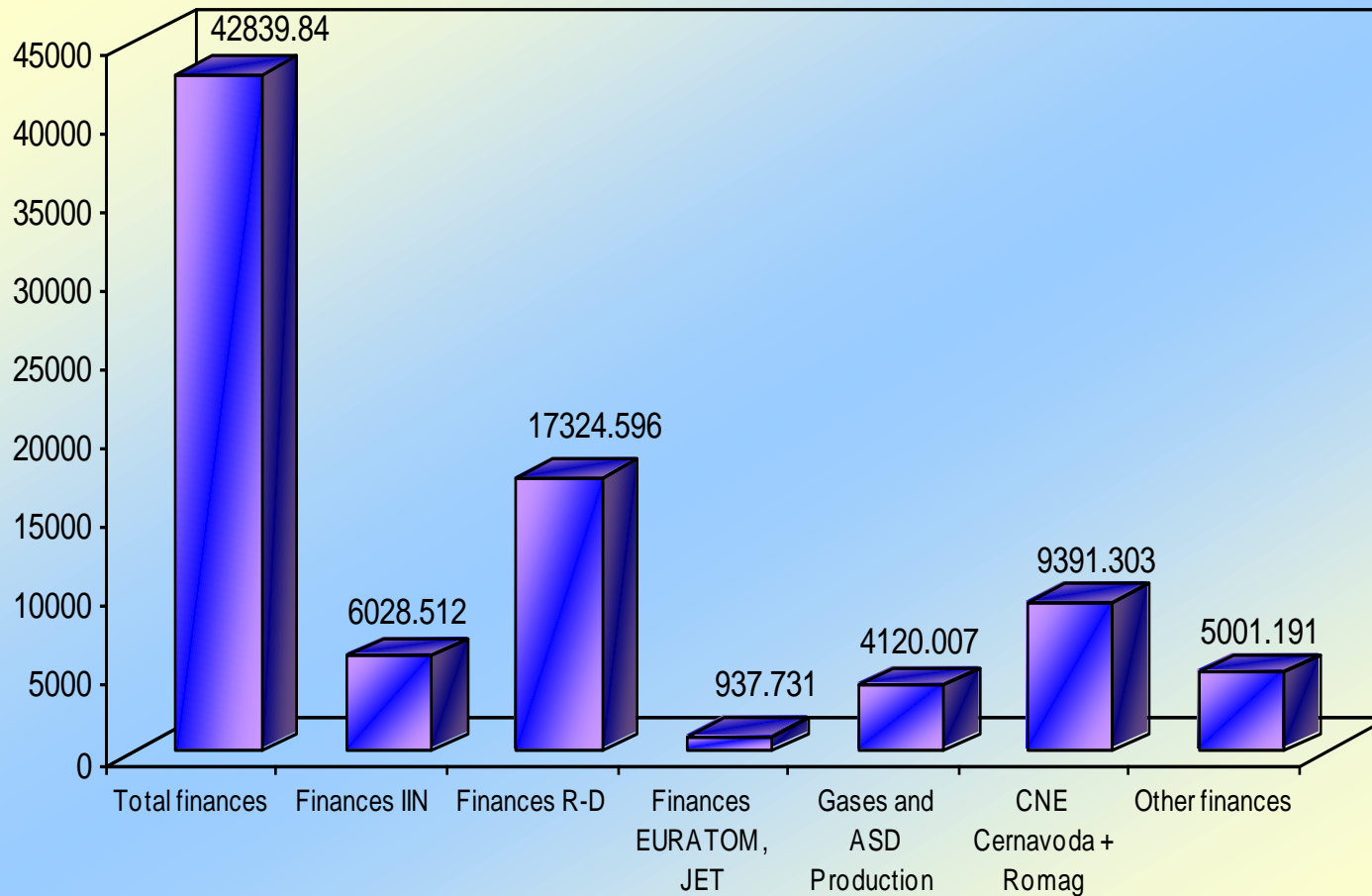




# DISSEMINATION / APPLYING THE RESULTS 2008

- ❖ Scientific papers published in professional journals ISI: 30
- ❖ Scientific papers published in specialized journals without ISI: 118
- ❖ Participation at scientific (symposiums, conferences, congresses):
  - ☆ National: 89 papers
  - ☆ International: 60 papers

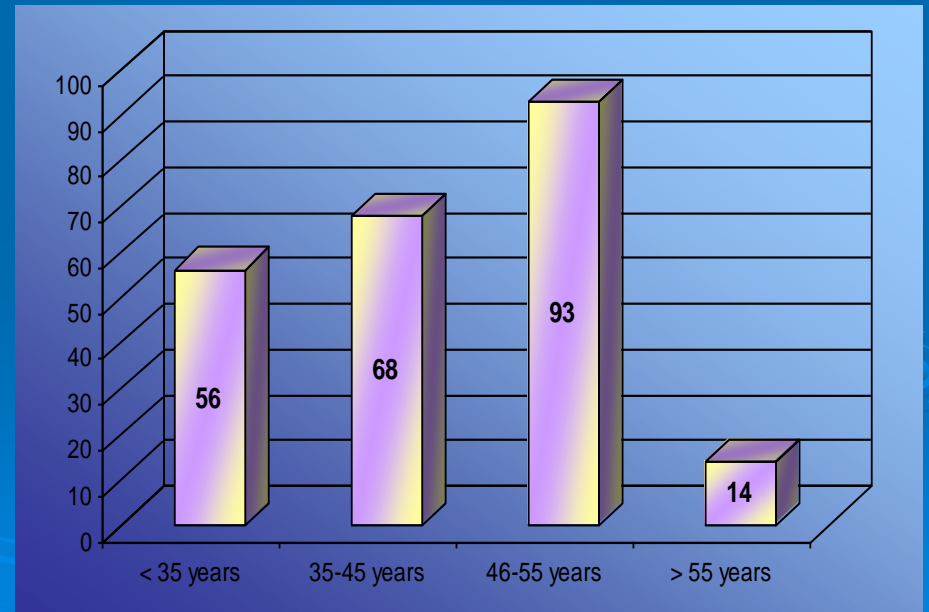
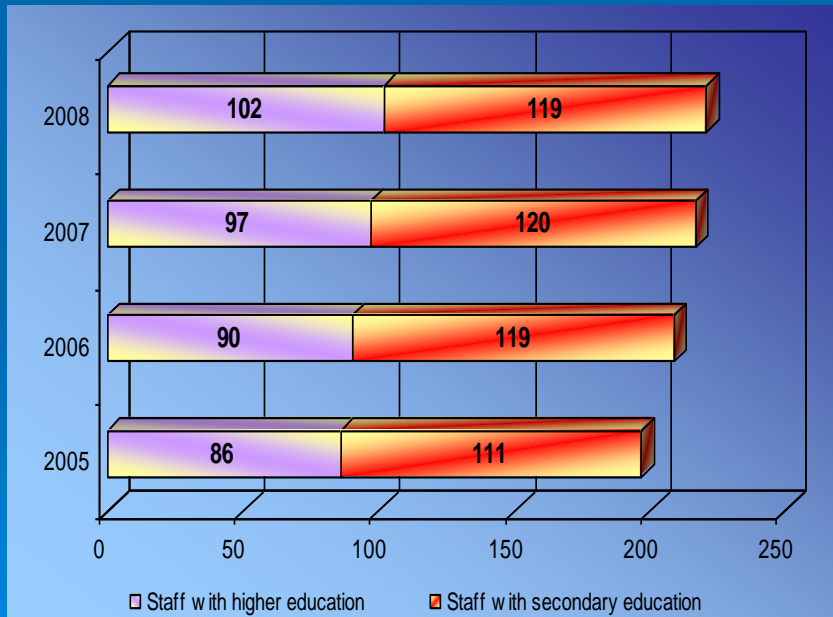


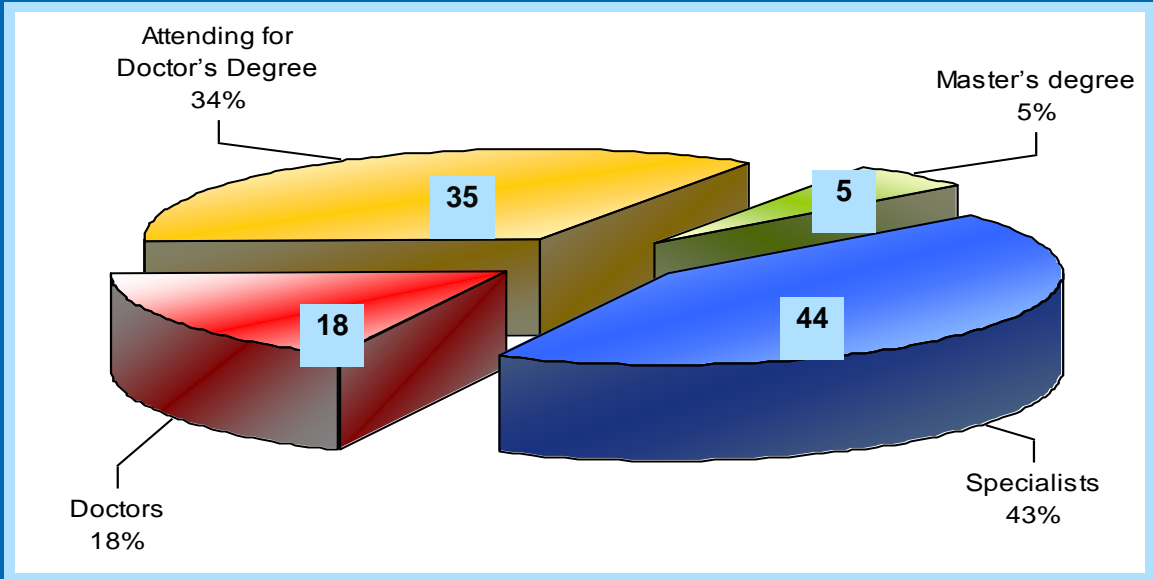


**REVENUES ACHIEVED IN 2008 (thousand LEI)**

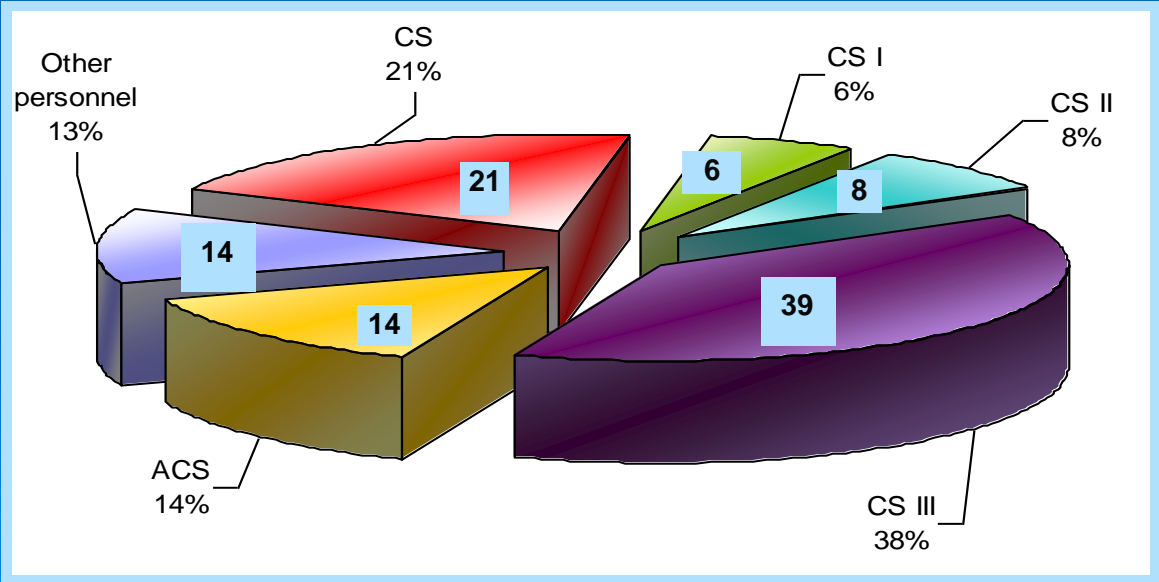
# HUMAN RESOURCES

<b>Total no of staff</b>	<b>221</b>	<b>100%</b>
❖ Staff with higher education	102	43%
❖ Staff developing R&D activities	165	75%
❖ Staff developing marketing and production activities	23	10%
❖ Administrative staff	33	15%





❖ **STAFF IN HIGHER EDUCATION**



❖ **STAFF OF HIGHER EDUCATION ON OFFICERS AND PROFESSIONAL GRADE**

# INTERNAL PARTNERS

## RESEARCH AND DEVELOPMENT INSTITUTE

- ❖ **Institute of Atomic Physics, Bucharest-Magurele**
- ❖ **National Institute of Research and Development for Physics and Nuclear Engineering "Horia Hulubei", Bucharest-Magurele:** *behavior of materials and equipment in environmental tritium.*
- ❖ **National Institute for Research and Development for Isotopic and Molecular Technologies, Cluj Napoca:** *instrumentation and equipment for isotopic analysis.*
- ❖ **National Institute for Research and Development for Electrotechnical products ICPE - CA Bucharest:** *vacuum equipment, materials and zeolites new carbon structures, hydrogen energy.*
- ❖ **Autonomous nuclear activities - Branch SCN - Pitesti:** *study behavior of materials in corrosive media.*
- ❖ **National Institute for Research and Development for Technical Physics, Iasi:** *study of advanced materials and their applications to isotope separation and hydrogen storage.*
- ❖ **Institute of Physical Chemistry, Bucharest:** *Physical and structural characterization of materials.*
- ❖ **Romanian Marine Research Institute, Constanta:** *environmental radiation protection.*
- ❖ **National Institute of Laser Physics, Plasma and Radiation, Bucharest-Magurele**
- ❖ **National Institute of Materials, Physics, Bucharest-Magurele**

# HIGHER EDUCATION INSTITUTIONS

- ❖ **University of Bucharest - Faculty of Chemistry:** *Techniques for investigating organic substances.*
- ❖ **Polytechnic University of Bucharest - Faculty of Power:** *processes and equipment in nuclear energy, hydrogen energy and its associated.*
- ❖ **University of Craiova - Faculty of Electrical Engineering:** *Materials Science and Engineering; cryogenic applications in electrical.*
- ❖ **University of Pitesti - Faculty of Science:** *study material - thermodynamics and corrosion of materials, physical and structural characterization of materials.*
- ❖ **Ovidius University:** *study materials and environmental protection.*
- ❖ **University of Civil Engineering Bucharest - Faculty of Plants:** *thermodynamics, heat transfer and thermal engineering, environment protection.*
- ❖ **Transylvania University of Brasov:** *hydrogen and its associated energy.*

# UNITS IN INDUSTRY

- ❖ Autonomous nuclear activities – ROMAG Drobeta-Turnu Severin;
- ❖ RAAN-SITON Bucharest-Magurele
- ❖ Nuclear Fuel Factory Pitesti
- ❖ National Mineral Water Company
- ❖ National Society Nuclearelectrica SA
- ❖ CNE - PROD - Unit 1 and Unit 2 Cernavoda
- ❖ SC PROIMSAT SA Rm. Valcea
- ❖ SC MECROSYSTEM Bucharest
- ❖ SC ROMIB Bucharest
- ❖ SC OLTCHIM SA Rm. Valcea
- ❖ SC IMUC SA Pitesti - Bucharest Branch
- ❖ SC Govora S.A.
- ❖ SC METINSTAL Rm. Valcea
- ❖ SC ELECTRONICS Rm. Valcea

# INTERNATIONAL PARTNERS

- ❖ **FZK Karlsruhe - Tritium Laboratory, Germany** - *compare performance catalysts for hydrogen-water isotopic exchange; detritiere water systems.*
- ❖ **NUCLEAR ENERGY CENTER in MOL, Belgium** - *isotopic exchange catalyzed H<sub>2</sub> - water, testing the endurance of the catalyst Pt / C / PTFE, decontamination of liquid waste and solid modeling.*
- ❖ **ATOMIC ENERGY COMMISSION - CEA, France** - *ITER fuel cycle.*
- ❖ **CENTER FOR RESEARCH AND ENGINEERING MATERIALS in Toulouse, France** - *study materials and their processing.*
- ❖ **MESSER GRIESHEIM GmbH, Austria** - *the production of pure gases and gas mixtures.*
- ❖ **Kanagawa University, Japan** - *water with low in deuterium and its associated processes.*
- ❖ **University "CHALMERS" of Gothenburg, Sweden** - *removal of radionuclides from liquid radioactive wastes, development of new materials and techniques with applications in environmental protection.*



- ❖ **INSTITUTE FOR ITEMS TRANSURANIENE** in Karlsruhe, Germany - *JRC project - techniques and methods for measuring radioactivity in the environment.*
- ❖ **INTERNATIONAL INSTITUTE OF COOLING**, France – *Cryogenic processes and equipment.*
- ❖ **Nuclear Research Institute in St. Petersburg, Russia** – *computer programs and computer simulation of hydrogen isotope separation processes, fillings and catalysts for separating isotopes of hydrogen, tritium storage equipment.*
- ❖ **UNIVERSITY OF ANTWERPEN (U.I.A.)**, Belgium – *production and investigation of new materials for environmental separation and purification techniques of gas.*
- ❖ **KRYOTECHNIK LINDE AG**, Switzerland - *Cryogenic equipment.*
- ❖ **UNIFIED INSTITUTE NUCLEAR RESEARCH**, Dubna, Russia - *measurements at very low temperatures, high vacuum equipment.*
- ❖ **NUCLEAR RESEARCH INSTITUTE of the Hungarian Academy of Sciences** - *ITER fuel cycle.*

- ❖ **EDWARDS, England** – *vacuum production equipment, measurement systems and purchase of controlled high vacuum cryogenic.*
- ❖ **OXFORD SCIENTIFIC INSTRUMENTS, England** – *system structural analysis of metal surfaces.*
- ❖ **NUCLEAR RESEARCH INSTITUTE Belgrade, Serbia** – *cooperation in the analysis of stable isotopes, environmental monitoring.*
- ❖ **Analytic JENA GmbH, Germany** – *equipment and instrumentation for analysis of gas and aqueous solutions.*
- ❖ **INSTITUTE FOR REFERENCE MATERIALS AND MEASURES, EC-JRC Geel, Belgium** - *instrumental methods of analysis of isotopes.*
- ❖ **VARIAN INSTRUMENTS, Germany** - *instrumentation and analysis equipment accessories for vacuum equipment.*
- ❖ **KRAFTANLAGEN HEIDELBERG GmbH, Germania** – *Design and manufacture of nuclear energy production equipment.*

# CONFERENCE

## “Progress in Cryogenics and Isotope Separation”

*28-30 October 2009*

*15<sup>th</sup> edition, the resort hotel complex “COZIA” of  
Calimanesti-Caciulata*

### CONFERENCE TOPICS:

- ☆ Physics, technology and applications of stable isotopes;
- ☆ Cryogenic Technology and Equipment;
- ☆ Materials Science and Engineering;
- ☆ Nuclear Power – fission and fusion;
- ☆ Hydrogen and its applications in power. Fuel Cells;
- ☆ Environmental Protection and Industrial Risk;
- ☆ Laboratory Analysis Methods;
- ☆ Agriculture and food security.



**Participants: 188**

- country: 180

- abroad: 8

**Conference plenary / invited lectures: 12**

**Oral papers: 20**

**Posters papers: 66**



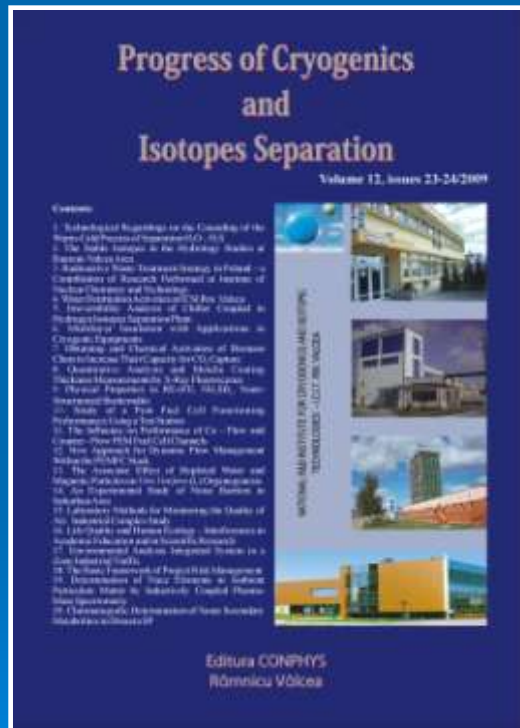




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THANK YOU  
FOR ATTENTION!



Ramnicu  
Valcea