



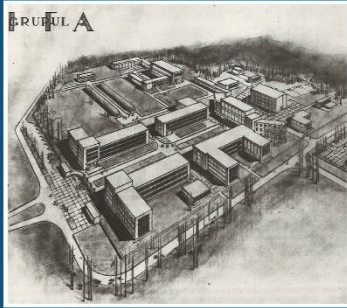
# National Institute for Physics and Nuclear Engineering – “Horia Hulubei” (IFIN-HH)

(Short presentation)

**Dan Enache** PhD  
Head of CTTM  
IFIN-HH







371A

**SURT ISTORIC**  
**ASUPRA DEZVOLTARII INSTITUTULUI DE FIZICA ATOMICA**

Institutul de fizică atomică este în întregime o creație a regiunii noastre de democrație populară. El a luat ființă în 1956, printr-o hotărâre a Consiliului de Miniștri ( H.C.M. nr. 890 din 18 mai 1956) prin organizarea și scindarea Institutului de fizică în două institute: Institutul de fizică atomică al Academiei R.P.R., cu sediul la Măgurele și Institutul de fizică al Academiei R.P.R., cu sediul în București.

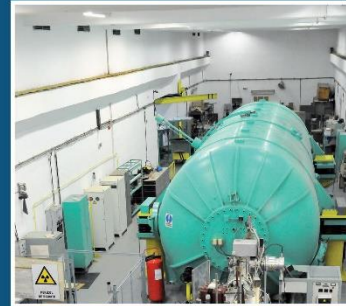
Institutul de fizică scindat fusese înființat în cadrul Academiei R.P.R., prin decizia plenului Academiei din 27 februarie 1949, în sesiuni generale de vară.

**PERIOADA DE ACTIVITATE A INSTITUTULUI DE FIZICA (1949- 1956)**

Sub conducerea profesorului Horia Hulubei ca director, Institutul de fizică și-a început activitatea în sept. 1949, cu mijloace restrinse și cadre puține. Sediul său inițial a fost în localul Academiei R.P.R. din Calea Victoriei 125 și se compunea dintr-o cameră. Din punct de vedere financiar el a funcționat - în perioada sept.-dec. 1949 - cu o situație provizorie, schema organizatorică intrând în funcție în ianuarie 1950. În acest răstimp de 4 luni a avut o alocație bugetară de 8.000.000 lei, iar la investiții pentru procurări de aparate din țară și din străinătate lei 42.000.000- ( respectiv în lei actuali 400.000 și 2.100.000)

La sfârșitul anului 1949 personalul se compunea din: 41 de colaboratori și bursieri și 18 laboranți, tehnicieni și personal administrativ, angajatarea având locul de muncă la Universitate. În numărul acestui personal intrau și colaboratorii dela Universitatea Cluj, Iași și dela Politehnica din Timișoara, care lucrau pentru problemele Institutului.

# 70 Years of Physics at Magurele



# 1949



# 2019



[www.ifin.ro](http://www.ifin.ro)

[www.eli-np.ro](http://www.eli-np.ro)

- 1949: Institute of Physics of the Romanian Academy
- 1956 Institute of Atomic Physics (IFA)
- 1976 Institute of Physics and Nuclear Engineering (IFIN)
- 1996 "Horia Hulubei" National Institute of Physics and Nuclear Engineering (IFIN-HH)
- 2013 Extreme Light Infrastructure – Nuclear Physics





# Magurele Campus: National Physics Lab

**NUCLEAR**  
Tandem Accelerators  
Cyclotrons  
 $\gamma$  Irradiator  
Radiation Detectors  
Biophysics  
Radioisotopes

Theoretical Physics  
Elementary Particles  
Lasers, Plasma  
Optoelectronics  
Material Physics  
Earth Physics  
Space Sciences  
Faculty of Physics







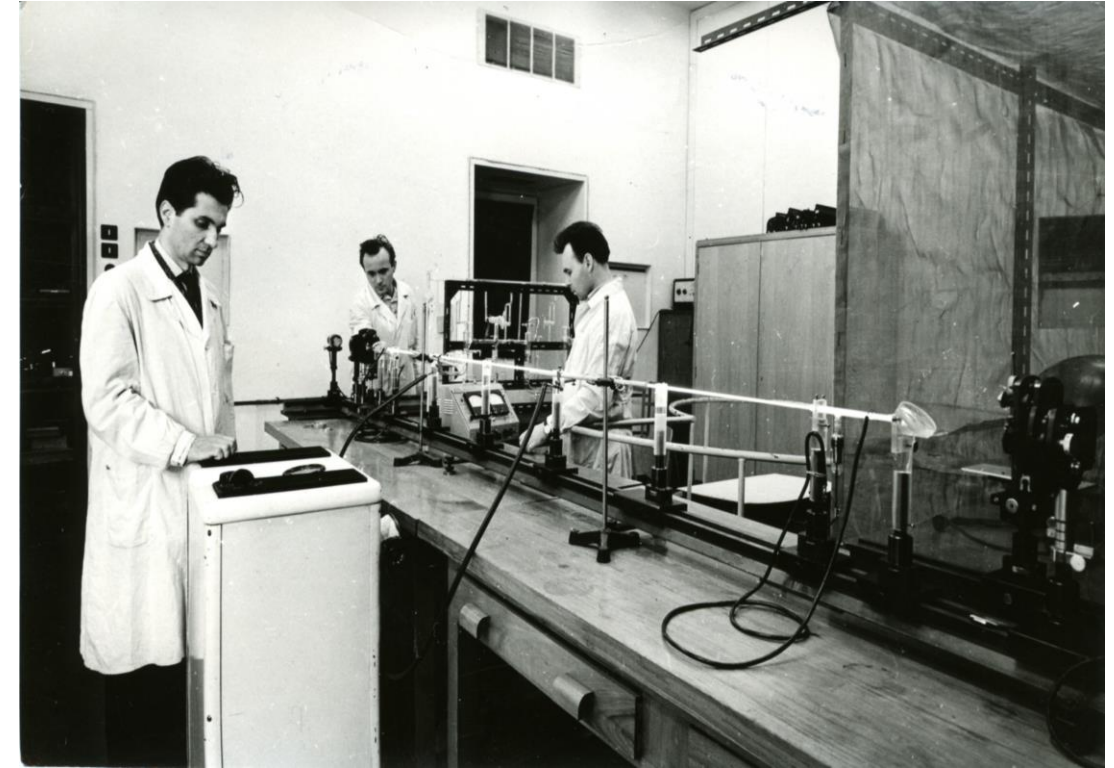
VVR-S Research Reactor and U-120 Cyclotron (1957)



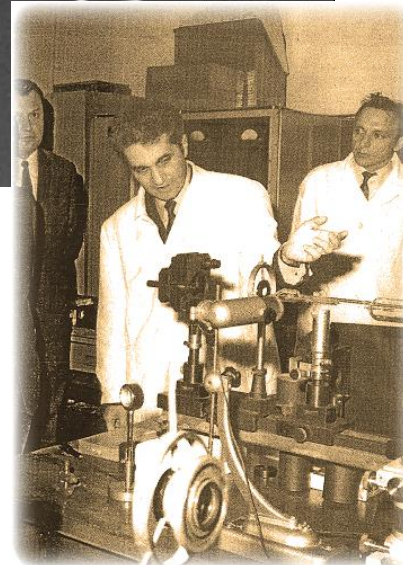




October 20, 1962 – the first Romanian (He-Ne) Laser was obtained by a team headed by Prof. Ion Agârbiceanu at the Institute of Atomic Physics, Bucharest



Laurențiu Blănaru, Virgil Vasiliu and Anton Agafiței (from left to right)

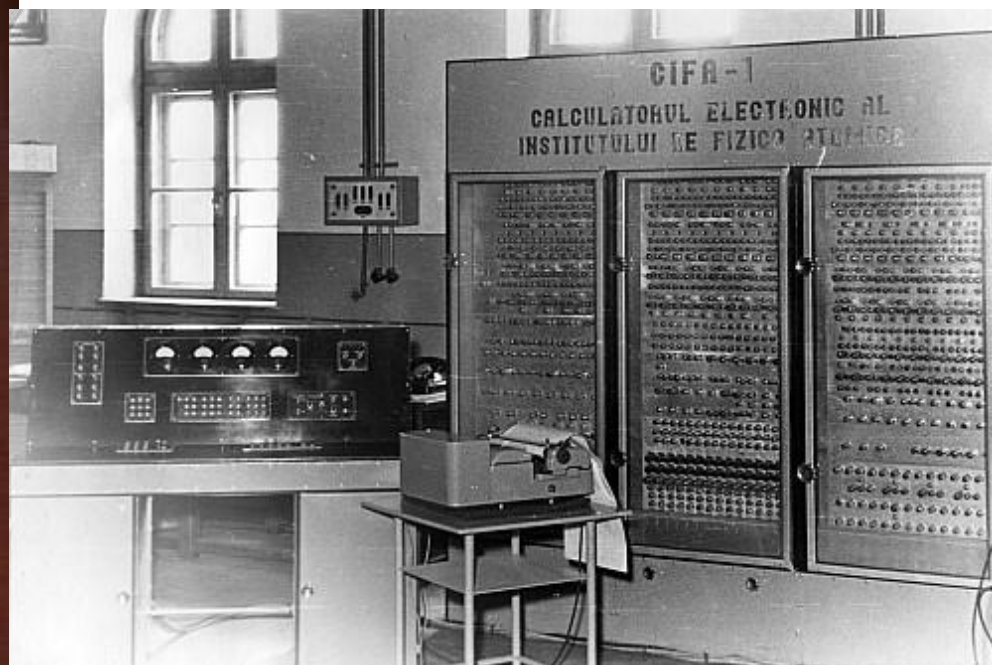


The achievement of this He-Ne laser, **less than two years** after that of Javan, Bennett and Herriott was a direct consequence of the scientific background (advanced gas spectroscopy - theory and experiments, vacuum deposition, Fabry-Pérot etalons and radiation detection) of the earlier Laboratory

ION AGÂRBICEANU (1907 – 1971) *"Optical Methods in Nuclear Physics"* at the Institute of Atomic Physics.

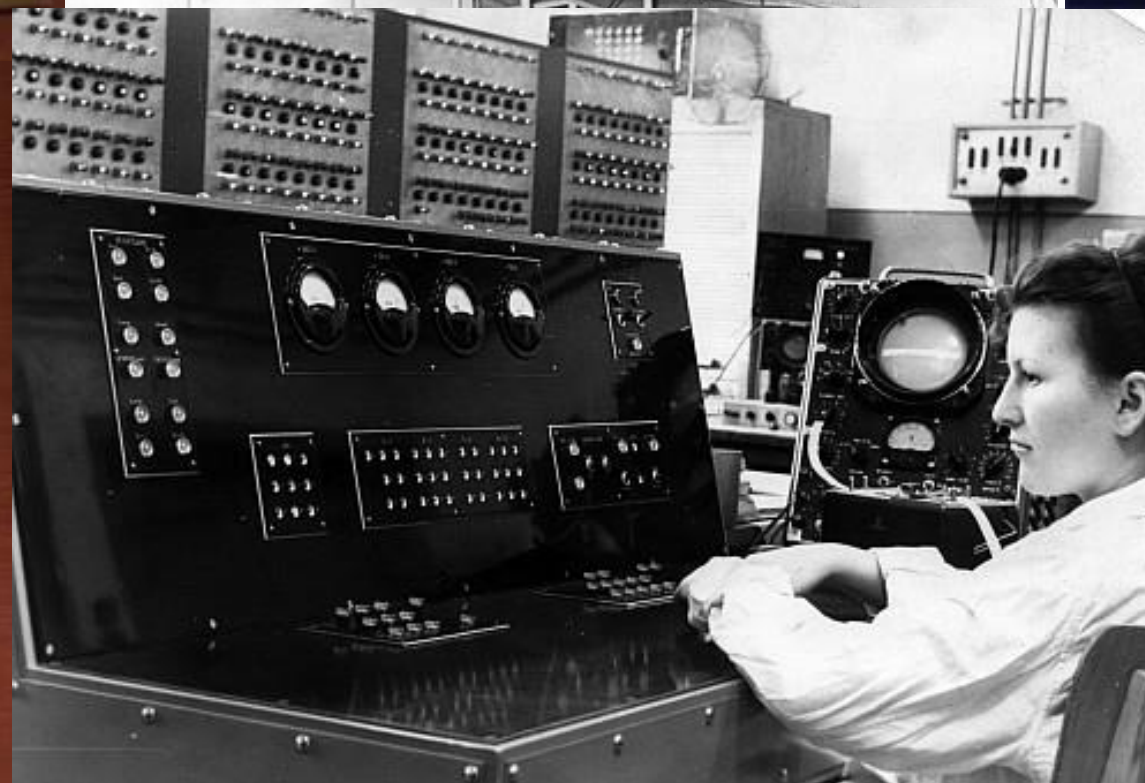
Courtesy of Acad. Valentin.I. Vlad





Victor Toma  
1922 - 2008

Under his guidance a series of electronic calculators with vacuum tubes were constructed, starting with CIFA-1 (April 1957), CIFA-2 (1959), CIFA-3 (1960), CIFA-4 (1962) and then on transistors: CET- 500 (1964) and CET-501 (1966).





*9MV for Basic Research*

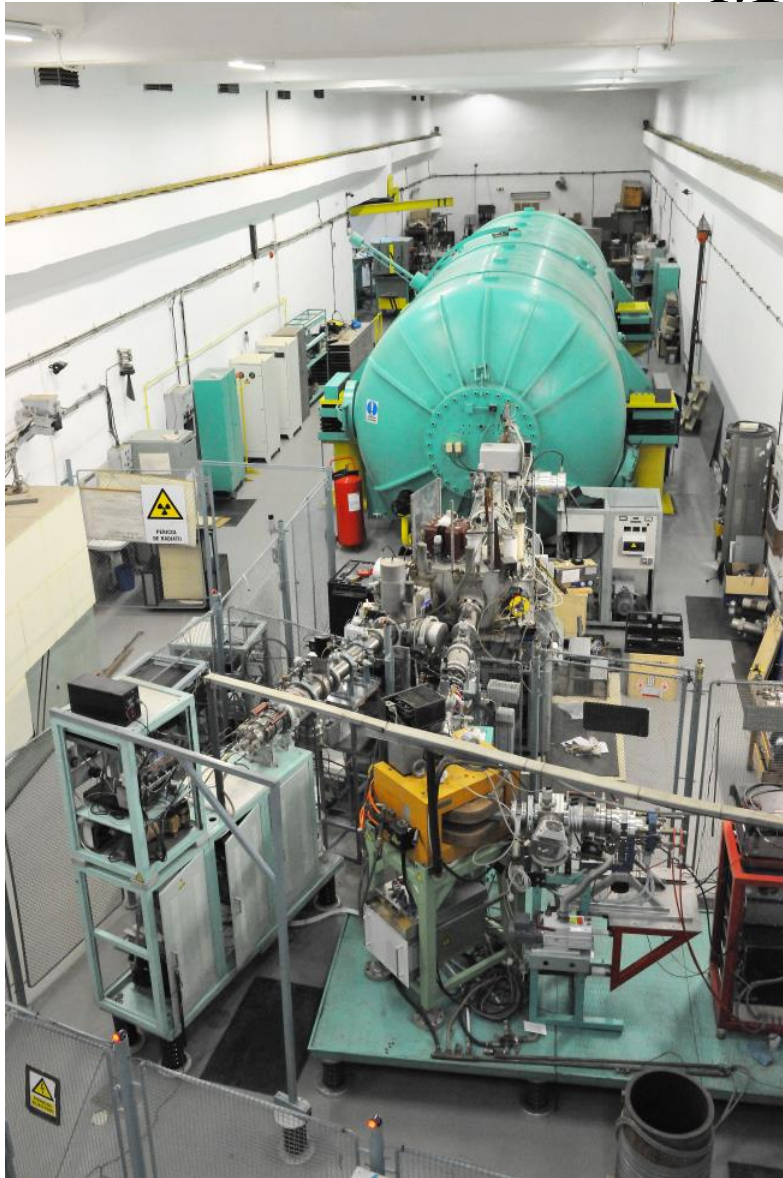
# *Major Research Infrastructures*



*3MV for Ion Beam Analysis*

**Linear (Tandem) Accelerators**

*1MV for Mass Spectroscopy*





The ever-growing possibilities of using nuclear energy have led to an increased amount of dangerous fissile and radioactive materials, nuclear installations, nuclear equipment, as well as the number of countries possessing them. As a result, the risk of unauthorized possession and illicit use of nuclear materials or radioactive sources for criminal or terrorist acts has increased. In this context the **Nuclear Forensics is a key tool in response to nuclear security events** which plays an essential role in advancing the investigation for two main reasons: criminal prosecution and prevention of further events by fixing the identified gaps which allowed materials to escape regulatory control.

**Requires a high level of scientific expertise**

# Nuclear Forensics and Scientific Research

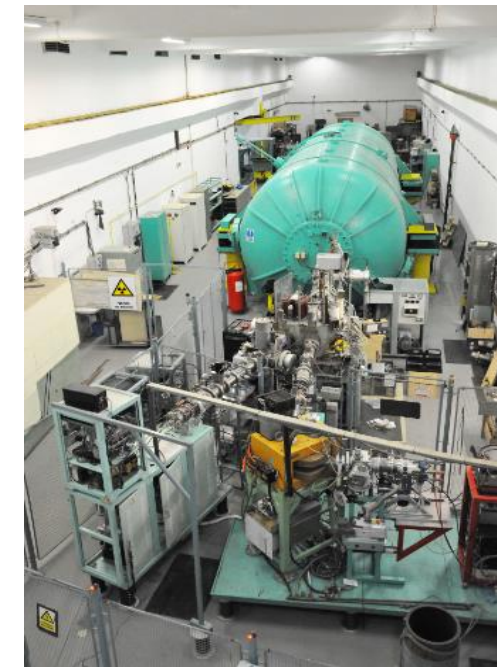
## 3MV Tandetron



## ROSPHERE gamma detectors array



## 9 MV Tandem



## 1MV Accelerator Mass Spectrometry

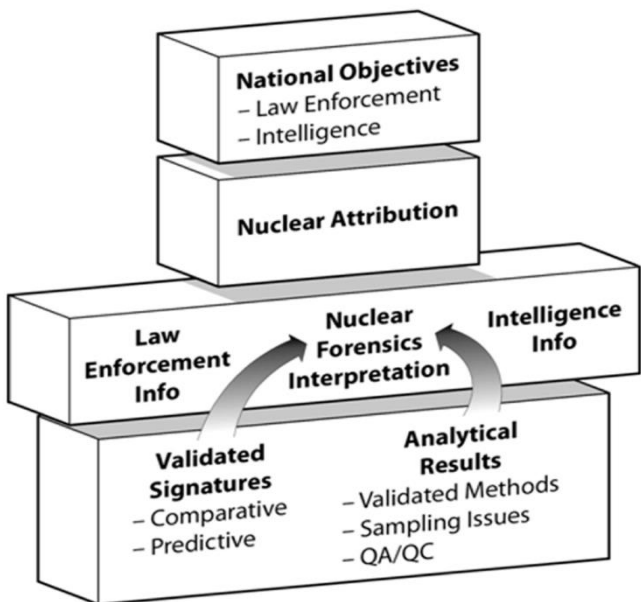


## Experimental Infrastructure in IFIN-HH

## Gamma-ray Irradiator

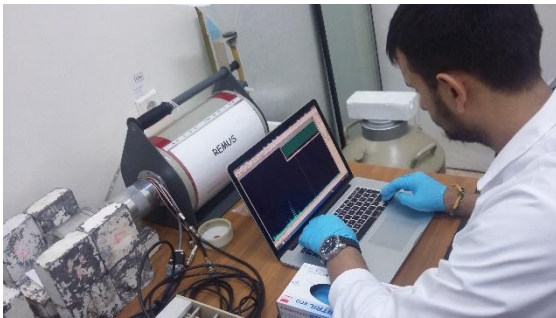
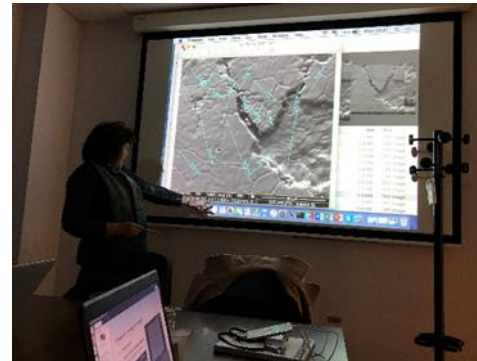
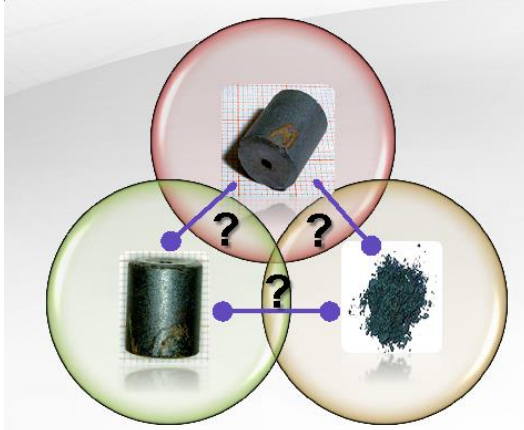


## 19 MeV Proton Cyclotron for production of radioisotopes





# Nuclear Forensics Exercises



**CHEMICAL CHARACTERISTICS**

- the exact chemical composition of the material - 1 week

**PHYSICAL CHARACTERISTICS**

- weight, sizes and geometry - 24 h  
 - microstructure, morphology (aprox. 0.5 μm) - 24 h  
 - microstructure, morphology (≤ 1 nm) - 1 week

**NUCLEAR MATERIAL IDENTIFICATION**  
 (U, Pu, MOX and their daughter products)

**ELEMENTAL COMPOSITION**

- metallic impurities, other elements  
 - 1 week

**ISOTOPIC COMPOSITION**

- type of material and isotopic composition - 24h  
 - age dating - 2 months

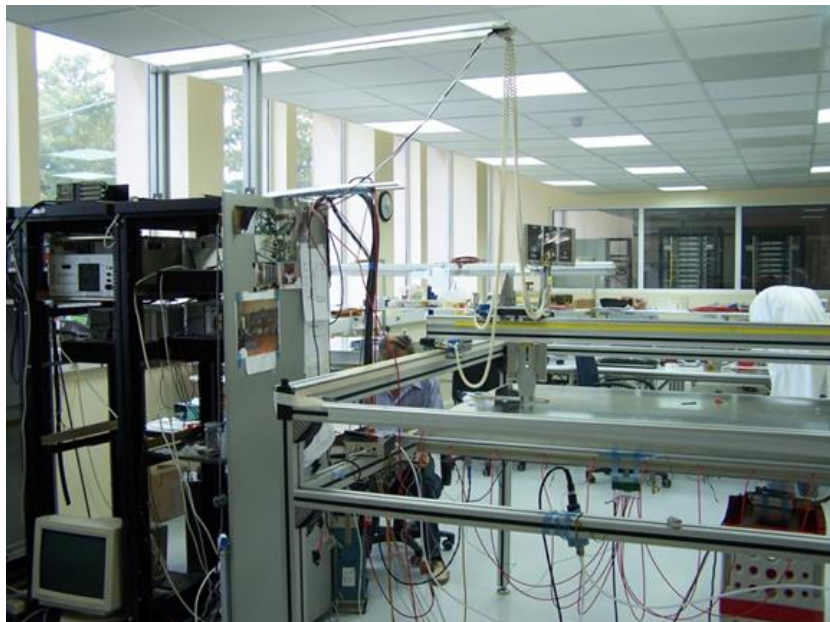
The IFIN-HH team of nuclear forensics experts is actively involved in the activities of the International Technical Working Group on Nuclear Forensics (ITWG) by participating in the Collaborative Materials Exercise and Galaxy Serpent international exercise series, as well as ITWG annual meetings.





# Major Research Infrastructures (cont.)

*Detector Laboratory  
for CERN and FAIR*



*GRID Computing (CERN)*



*Cyclotron for  
radiopharmaceuticals studies*





# Major Research Infrastructures (cont.)

## National Physics Library

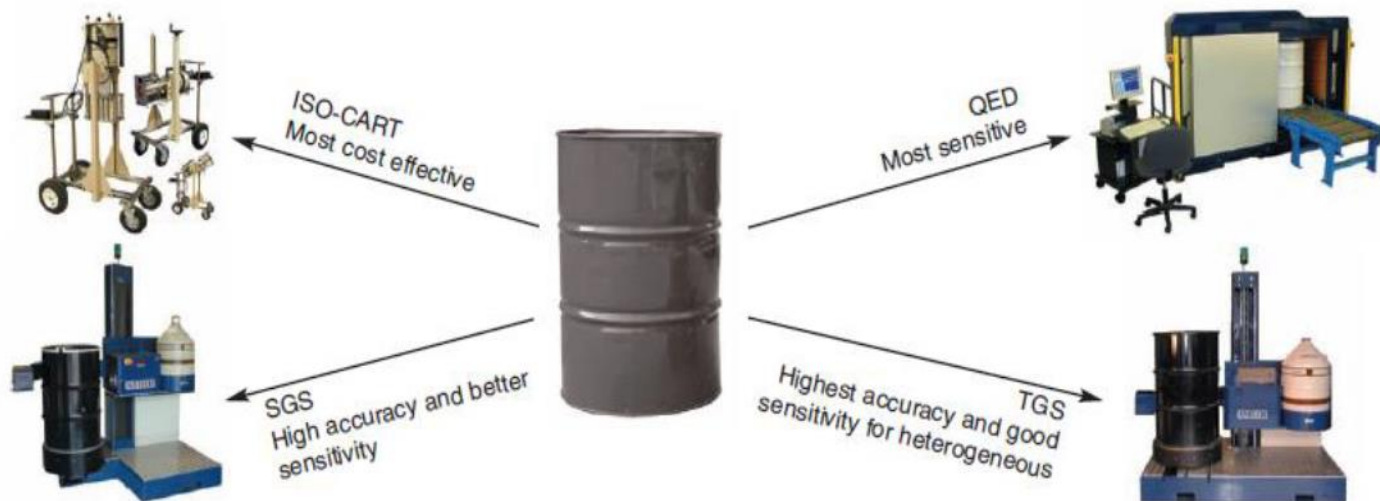
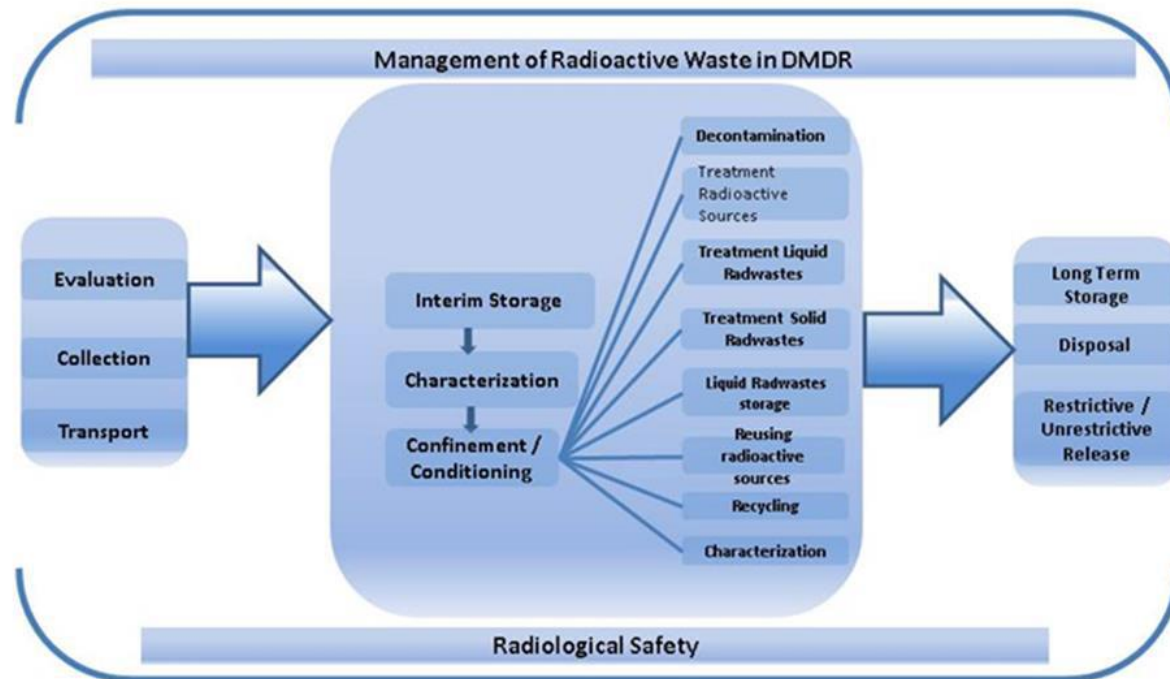




# Nuclear Decommissioning



End state of the decommissioning project of the VVR-S Reactor. **Reutilization of the building for extension of ELI-NP experimental area.** Decommissioning activities for VVR-S reactor were performed with own equipment and workers.







# *Decommissioning of the Research Reactor (2010-2019)*





# Waste management



## ***Radioactive Waste Treatment Plant (STDR)***

The management of the non-fuel cycle radioactive wastes from all over Romania is centralized at IFIN-HH in Radioactive Waste Treatment Plant. Radioactive wastes, containing short lived radionuclides, including spent sealed sources are collected, treated and conditioned at IFIN-HH before final disposal, provided they are satisfying the maximum concentration of activity allowed for disposal at Baita Bihor national repository. The long-lived radioactive wastes including spent sources are stored on site, STDR







# *The Radioactive Waste Processing Facility*



*Repository for Low and Medium Activity Radioactive Waste (Baita-Bihor)*



## Highlights

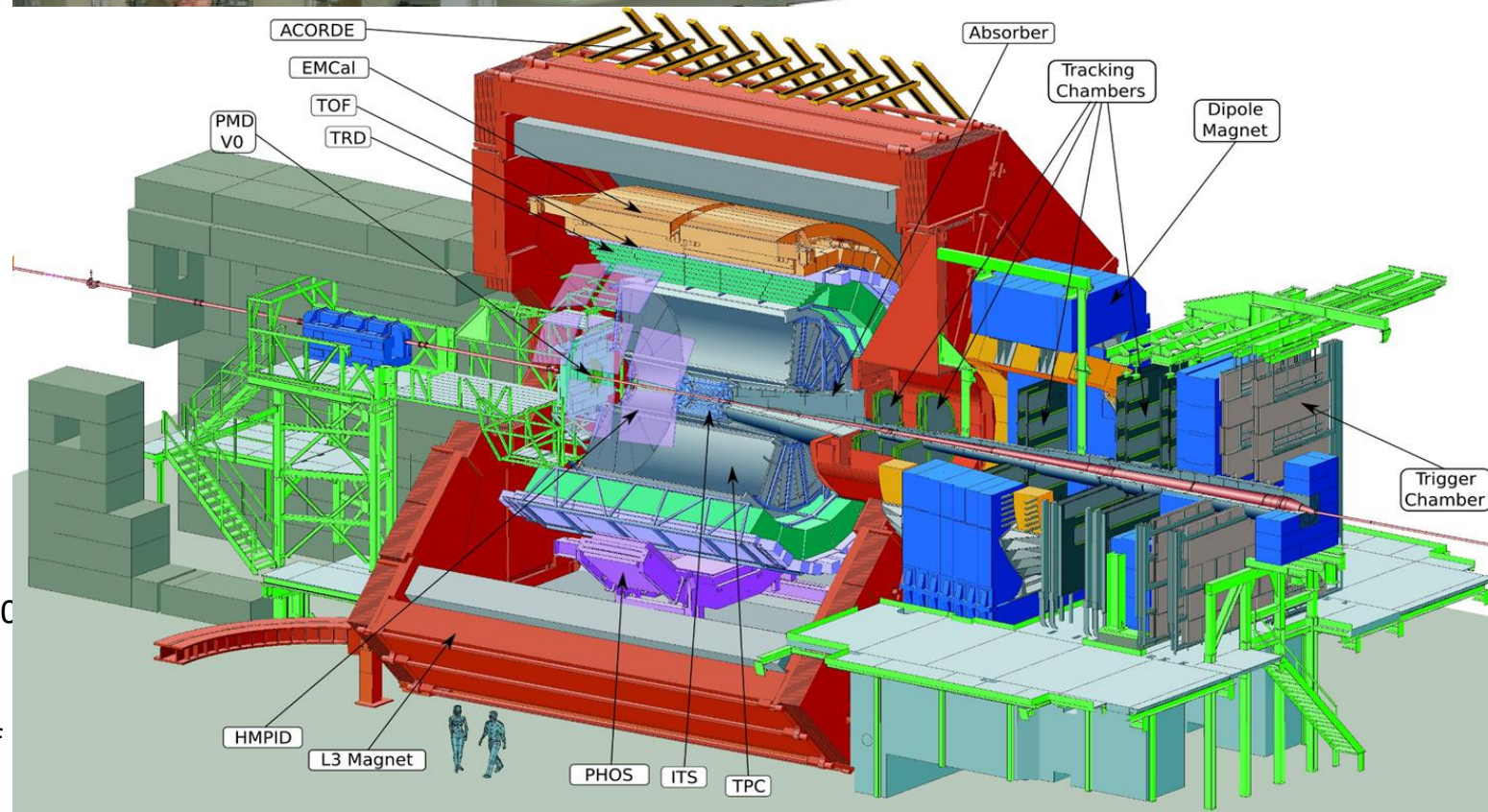


## Hadron Physics Department -IFIN-HH Contribution to ALICE Experiment @ LHC

### Building the ALICE-TRD Subdetector

together with GSI-Darmstadt, JINR-Dubna, IK-Frankfurt and PI-Heidelberg.

According to the TRD Technical Design Report, initially 108 modules, covering an area of 147 sqm and having 232,000 read-out channels, have been constructed and tested at NIHAM Centre of Excellence (**Prof. Mihai Petrovici et al.**) - followed by an overtask of 22 modules, representing 24% of the total 540 modules.



The most substantial contribution of a Romanian research institute to a large international collaboration



**Horia Hulubei National Institute for Physics and Nuclear Engineering (IFIN-HH), Bucharest, Romania**



# IRASM

- FOOD SAFETY
- PHARMACEUTICALS
- COSMETICS

- GENETICS
- GENETIC MODIFIED ORGANISMS
- MICORHISA

MICROBIOLOGY

BIOCOMPATIBILITY  
EVALUATION

DOSIMETRY

IRRADIATOR

IRRADIATED  
FOOD DETECTION

PHYSICAL & CHEMICAL TESTS

- SMALL MOLECULE DETECTION
  - RESIDUAL ETO IN STERILE PRODUCTS
- CULTURAL HERITAGE CONSERVATION
  - ARCHIVES
  - CHURCHES

- ACCIDENT DOZIMETRY
- ARCHEOMETRY





# Technological irradiation and more

With the diverse R&D projects and large irradiations for cultural heritage, IFIN-HH got an international recognition as leader (main counterpart) of the IAEA regional cooperation project: "Using Nuclear Techniques for the Characterisation and Preservation of Cultural Heritage Artefacts in the European Region" (2007-2014). Following this project **IRASM is hosting fellowships, is organizing trainings and provides lecturers and experts for the member states.**

IAEA RADIATION TECHNOLOGY SERIES No. 6



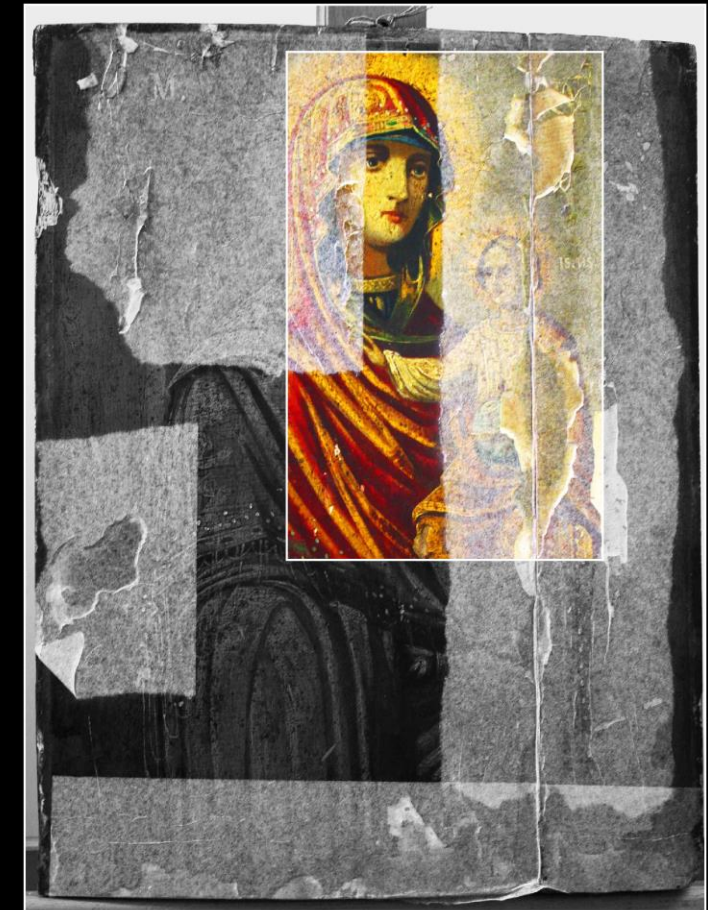
## Uses of Ionizing Radiation for Tangible Cultural Heritage Conservation



Another application is Radiation processing, a technique for modifying the properties of materials by irradiation



**Horia Hulubei National Institute for Physics and Nuclear Engineering (IFIN-HH), Bucharest, Romania**



## Demonstration of Techniques for Cultural Heritage Protection

IAEA Regional Training Course • Dissemination Workshop



IAEA Technical Cooperation Project RER/8/015

PN2 92083 - ARCON • PN2 92086 - DELCROM

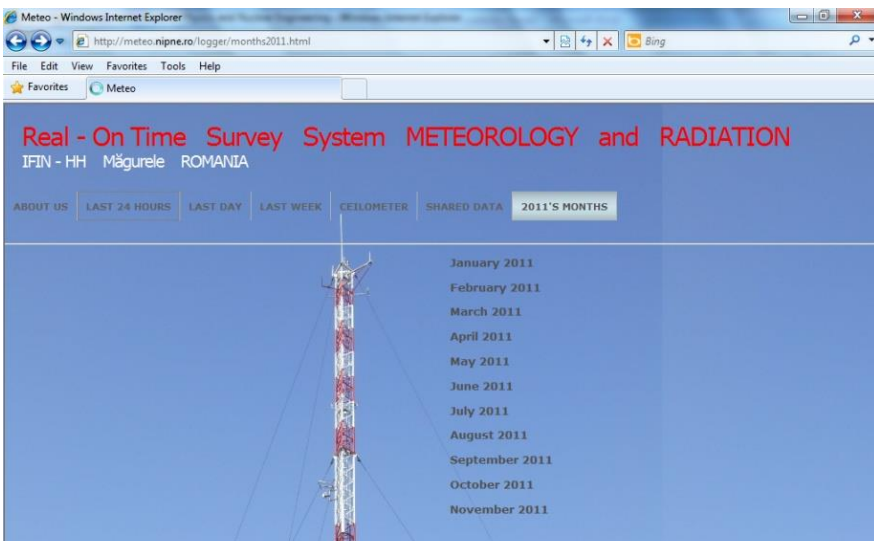


May9-13,2011 • IRASM-IFIN-HH • Bucharest-Magurele • ROMANIA



# Life and Environmental Sciences

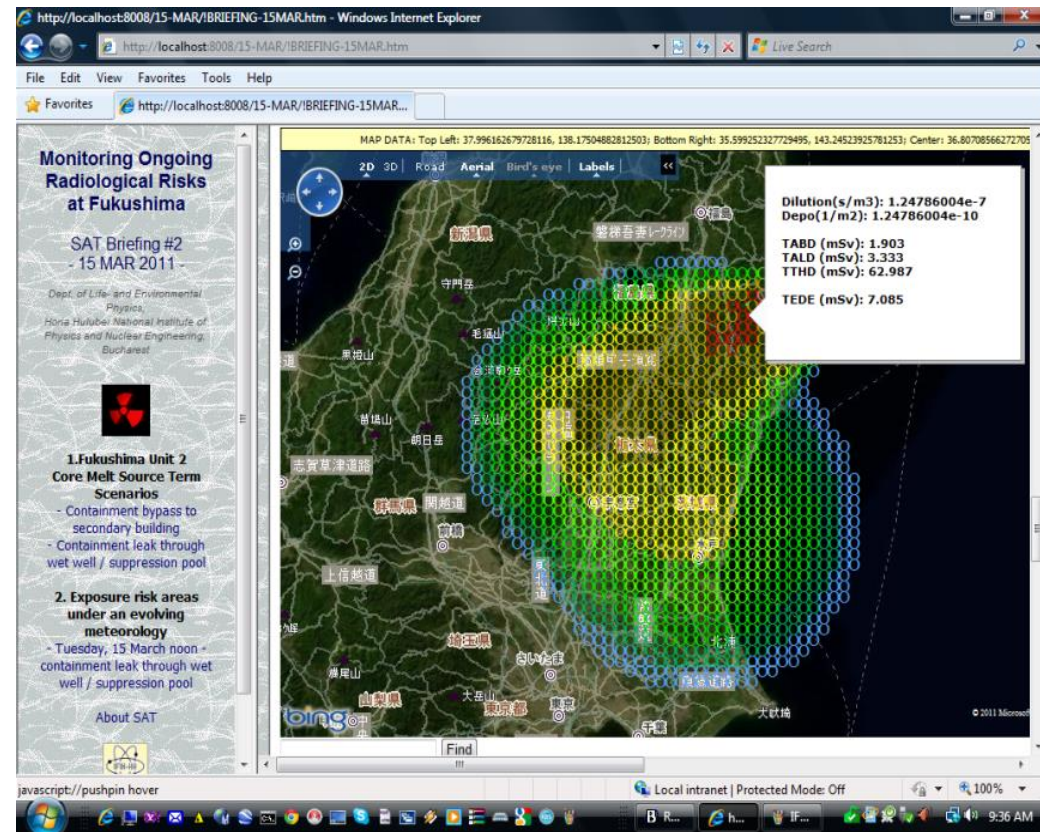
## Monitoring; modeling; predictions/forecasts



- Biological effects of radiation
- Radiolabeled biomarkers for medical applications
- Biophysics of nanosized materials
- Diseases of large impact

- Health and environmental impact of nuclear activities
- Nuclear emergency assessment
- Tritium and Carbon-14 Radioecology
- Meteorological and radiological onsite survey

- Radioactivity measurements in environmental samples
- Ultra low level radioactivity measurements ( $\mu\text{Bq}$  Lab)
- Radiation background of Black Sea coastal env.i
- Personal dosimetry





# PROJECT N-WATCHDOG

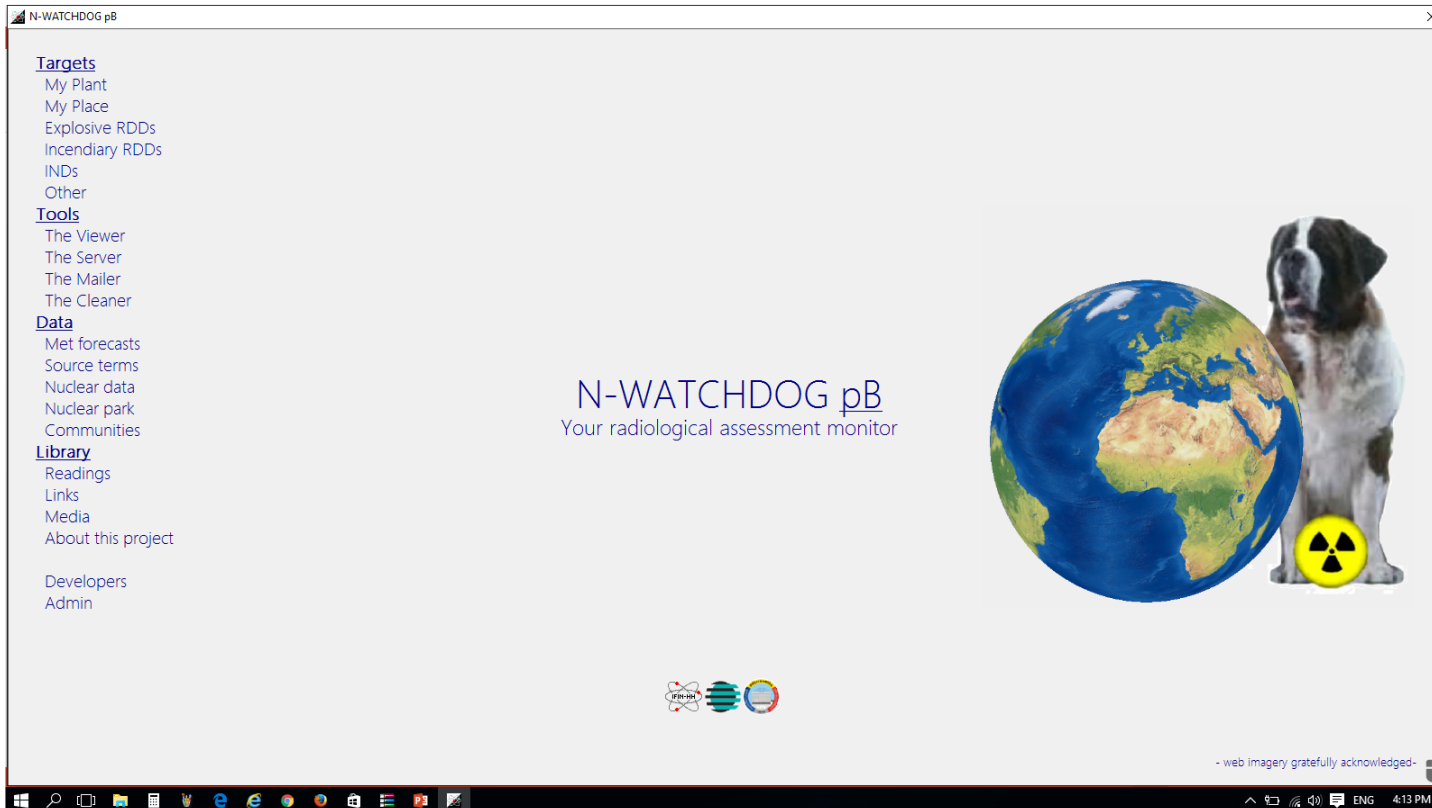
SERVING AN EMERGING PARADIGM  
IN NUCLEAR SAFETY PERCEPTION AND PRACTICE



**SISTEM DE ALERTARE TIMPURIE SI ASISTARE COMPUTERIZATA A DECIZIILOR, BAZAT PE EVALUAREA ANTICIPATIVA A DINAMICII RAPIDE A VULNERABILITATILOR INDUSE IN TERITORIU DE OBIECTIVELE NUCLEARE**

**Motto: Though never perfect, always ready to be of service**

**A coherent, multidisciplinary, stakeholder-oriented and practical software platform for monitoring vulnerabilities induced in people, natural environment, infrastructure and assets by nuclear facilities and events, with a pronounced preoccupation for precautionary, anticipatory assessment and early warning.**



## *The Dog's Catechism*

- 1 - Locate release source
- 2 - Acquire met forecast
- 3 - Infer source term from plant status
- 4 - Run the assessment engine
- 5 - Display results
  - The Base Map (GUI, standalone)
  - Web Maps (Leaflet, Google Maps, Google Earth; online)
  - Vulnerability map of exposed communities (GUI, standalone)
  - Situation Reports (on/off-line)

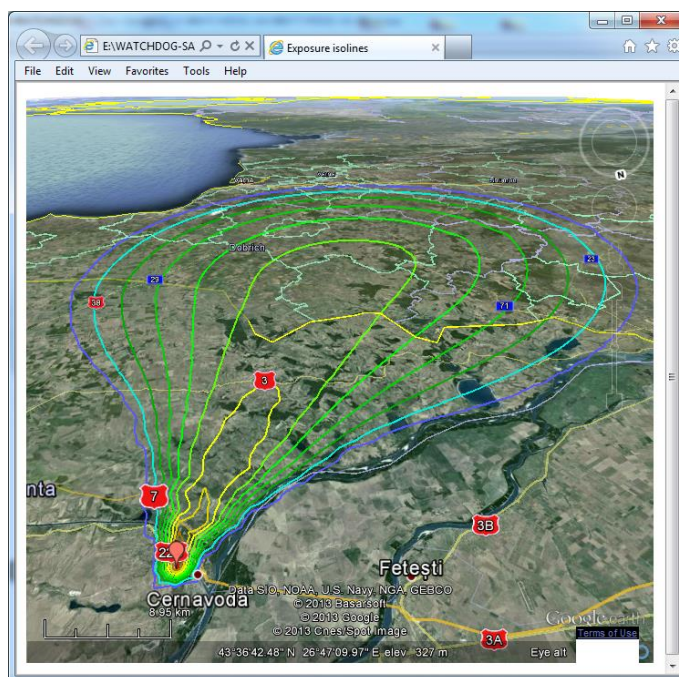
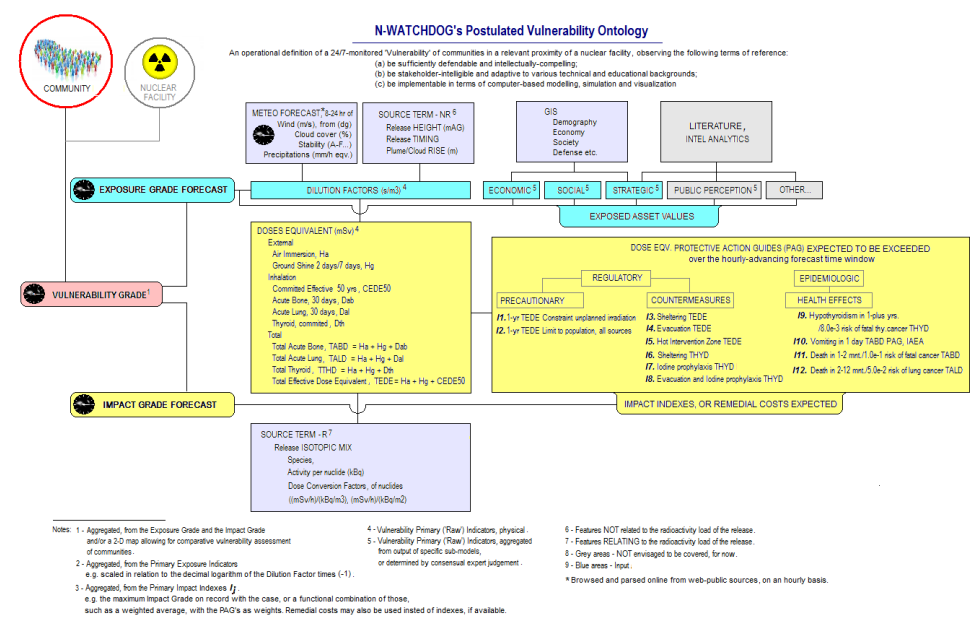
**•Risk assessment in real time in ordinary or emergency situations: Nuclear, chemical, health ... threats**

**•Provides data to decision factors: local, national, regional**

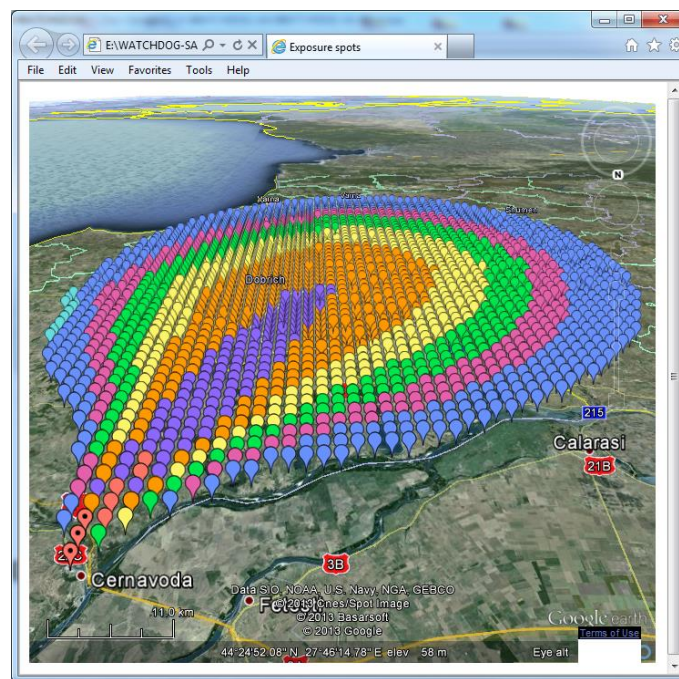
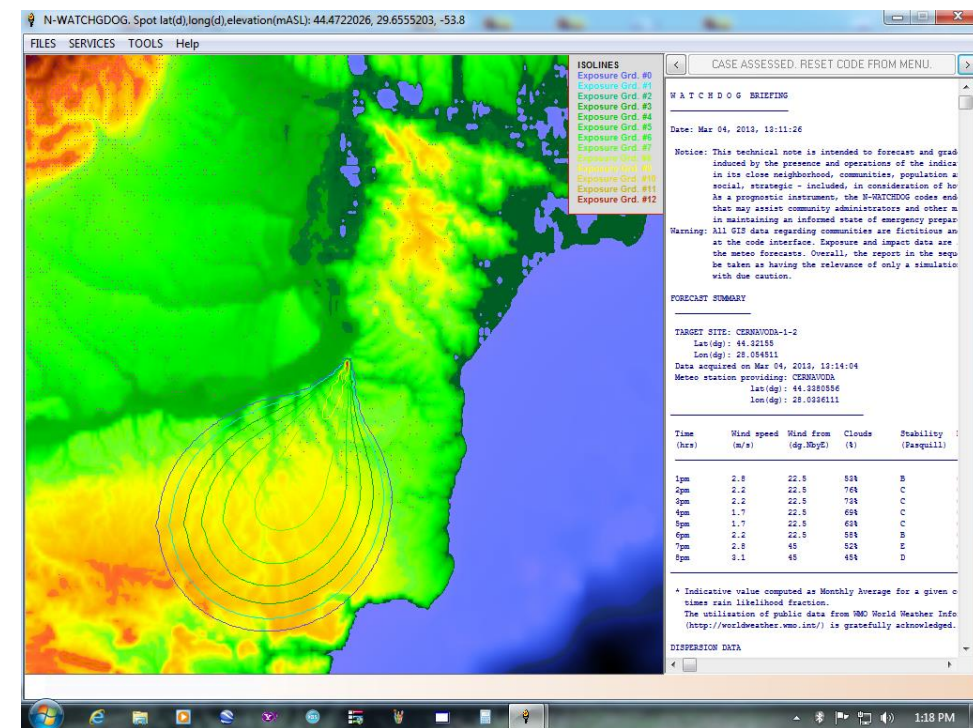
**•Public awareness**







- **Work as a toolkit of a minimalist design** capable, however, of a comprehensive coverage of stakeholder demands.
- **Implement an anticipatory attitude**, offering RadSit forecasts in a 24/7 manner, refreshed on user-selected time-windows.
- **Constitute an effective Situation Table** networking in a logical, coherent and convenient structure source terms; release scenarios; physical and geographic data; environmental dispersion and dose models – within an intelligible simulation and visualization platform.
- **Cover virtually any incidental source of radioactive release to atmosphere on the Globe**, generating on-the-fly 'intelligent' interactive maps from resident digital (DEM) and GIS resources.
- **Extract from public web sites the meteo forecasts** required by the atmospheric dispersion models.
- Determine areas of influence of a release event based on postulated source-terms; infer source terms from scarce, casual information on plant status; or integrate source terms directly specified by the nuclear facility management; on this basis, compute radiation doses; countermeasures in order; and possible health effects in in respect of regulatory provisions.
- **Generate and assess 'what if...' scenarios** for the same source and meteorological circumstances;
- **Run models and generate output standalone-fashion**, while having ready an embedded web server to publish Situation Reports complete with I/O radiological and vulnerability briefings; desktop and web-based interactive maps; and info on the emitter facility.
- **Timely store batches of meteo forecasts** while online, so that assessment sessions be possible also offline, in case of web failure.
- **Offer an user-friendly interface**, with all ops sequentially concatenated and synoptically visible.
- **Secure a consistent resident data resource** providing at all times sufficient independence from 3<sup>rd</sup> parties, including DEMs; GIS libraries; physical data libraries; regulatory documentation; and specific knowledge.
- **Assist users via a 'Virtual Reading Room'**, designed as an updatable selection of writings and documents of special relevance in nuclear safety and emergency management.
- **Feature and evident and effective educational vocation** addressing, along with stakeholders in the realm of Nuclear Safety, various socio-professional segments and the interested public.





## Certified Laboratories within the IFIN-HH Departments

**Ionizing Radiation Calibration Laboratory** (LERI/DRMR, bercea@nipne.ro)  
[calibration, dosimeter/radiometric instruments; RENAR accreditation, CNCAN designation]

**Ionizing Radiation Testing Laboratory** (LIRI/DRMR, bercea@nipne.ro)  
[tests, instrument, radioactive sources (equipment), materials; RENAR, CNCAN]

**Laboratory for Testing and Certification of Compliance for Radiopharmaceuticals, Radiochemicals and Radioactive Sources** (CPRLAB/DRMR, catalinac@nipne.ro)  
[analysis radionuclidic/radiochemical, radioisotopes, sealed sources of radiation, radiopharmaceuticals]

**Radionuclide Metrology Laboratory** (LMRE-LMRI/DRMR, msahagia@nipne.ro)  
[radionuclide standards, calibration, testing-calibration, radionuclide measurements]

**Laboratory for Elemental and Structural Analysis of Nanostructured Materials using Rutherford Backscattering Spectrometry (RBS)** (RBSL/DFNA, ddudu@nipne.ro)  
[Rutherford Back Scattering, thin layers, depth profiling, interface mixing]

**'ACTIVA-N' Materials Testing Laboratory** (ACTIVA-N/DFNA, cincue@nipne.ro)  
[activity evaluation, elemental analysis, gamma-ray spectrometry, neutron activation, OES, XRF]

**Laboratory for Biocompatibility Evaluation of Medical Materials and Devices** (BIOEVAL/DFVM, mradu@nipne.ro)  
[biocompatibility, medical devices, cytotoxicity tests, allergenicity test]

**Environmental and Personnel Dosimetry Laboratory** (LDPM/DFVM, stoc@nipne.ro)  
[radioactivity, monitoring, dosimetry, environment, personnel]

**Laboratory for  $\alpha$ ,  $\beta$ ,  $\gamma$  Spectrometry and Radon Measurements** (SALMROM/DFVM, rcalin@nipne.ro)  
[alpha, beta, gamma, radon, spectrometry, global measurements]

**Whole Body Monitoring Laboratory** (USCIR/DFVM, saizu@nipne.ro)  
[whole body counter, internal radioactive contamination monitoring, internal dosimetry]

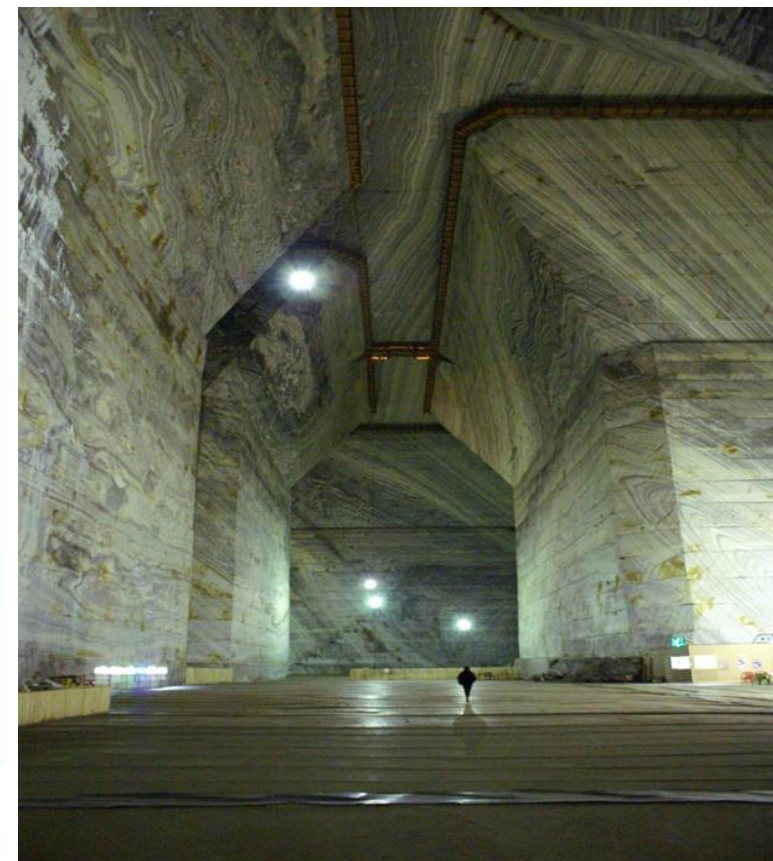
**Low Background Gamma-Ray Spectrometry Laboratory** (GAMASPEC/DFN, apantel@nipne.ro)  
[gamma-ray spectrometry, radionuclide analysis, environmental radioactivity, NAA]

**Spectroscopy Analysis Laboratory** (LAS/DMDR, fdrag@nipne.ro)  
[spectrometry analysis, radioactive source examination, gamma-ray spectrometry]

**Microbiology Laboratory** (LM/IRASM, cponta@nipne.ro)  
[microbiological tests, validation of irradiation sterilization; RENAR, ANM authorization]

**Detection of Irradiated Foods Laboratory** (LDAI/IRASM, cponta@nipne.ro)  
[detection, irradiated foodstuff, 10 ISO standards]

**Physical and Chemical Testing Laboratory** (LFC/IRASM, cponta@nipne.ro)  
[color, mechanical tests, GC-MS, TG, DSC, DTA, FT-IR, FT-Raman, EPR, TL, OSL]





# Services and small scale manufacturing

## *Specialized services*

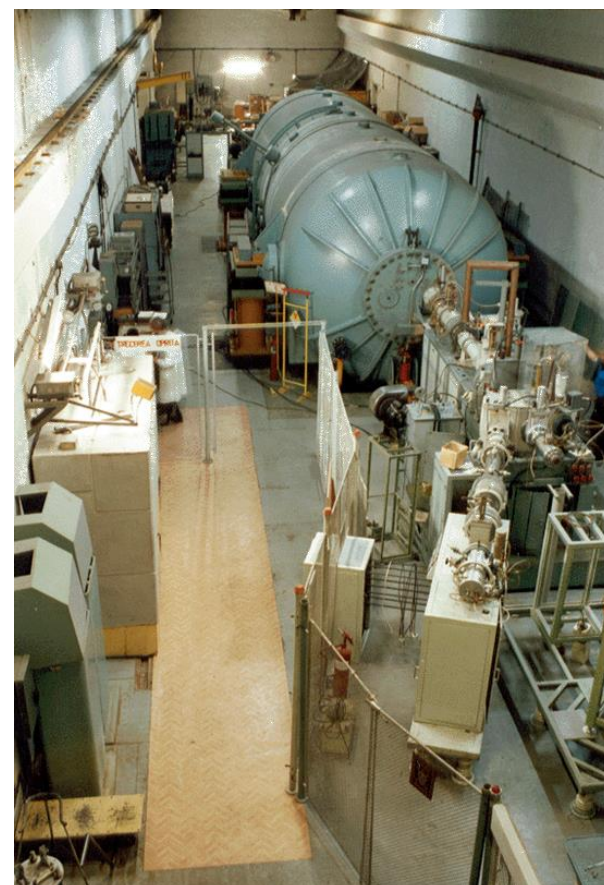
1. Accelerated particle beams
2. Radwaste collection, confinement and storage
3. Irradiation treatment of products and materials
4. Legal metrology in ionizing radiations
5. Ionizing radiation methods, technologies and device testing
6. Personnel monitoring for radiation workers
7. Microbiological testing and certification
8. Decommissioning of nuclear facilities, research reactors included
9. Radioactive sample analysis
10. Basic and advanced nuclear training

## *Small scale manufacturing*

1. Radiopharmaceuticals and radiotracers
2. Radioactive sources

## *Other services*

1. Computerization and communications
2. Documentation, editing, printing and publishing
3. Preparation of R&D programs, strategies and studies



IFIN-HH is a public research organization dedicated to research and development in physical and natural sciences, mainly Nuclear Physics and Nuclear Engineering, and in related areas including: Astrophysics and Particle Physics, Field Theory, Mathematical and Computational Physics, Atomic Physics and Physics of Condensed Matter, Life and Environmental Physics.







# Technology Transfer Direction



**TOWARDS**  
Investments, Research  
Infrastructure Acquisitions,  
Equipment, Processes, Know How

**LSRI/RO/Academia**

**FROM**  
Licensing, Assigning, Products and  
Services, Cooperation Contracts, In  
Kind Contribution, Consultancy  
(TTO?)





# Main activities



- **Projects based financed (around 80% in 2019)**
- **Workshops, conventions and specialized seminars participation and setup**
- **Entrepreneurial knowledge development**  
(Instruments, Intellectual Property Management Best Practices)
- **Promotion of innovation and creativity;**
- **Direct cooperation with IFIN-HH researchers**  
(patent valuation and submitting support, new projects and management of innovation, support in contract negotiating, licensing, NDAs)
- **Funding support**  
(Business angels, Crowdfunding, Microcredits, Venture Capital, Investment banks, Governmental programs)
- **Mentorship, Advice, Promoting ethics in business**







# Examples of promotion



## Web page

Information about patent application

List of IFIN-HH patents

List of services rendered by IFIN-HH departments

Patent library

Printed materials (leaflets, brochures, posters)

Articles in Newsletter

Exhibitions and conference participation

Data base with main partners

### Patents and Licenses

- Multilayer coating material having tribological properties and process for making the same [Patent no. 128094]
- Lubricating and wearproof compound based on tungsten disulphide, carbon and metal [Patent no. 127963]
- Lubricating and wearproofing compound based on tungsten disulphide and carbon [Patent no. 127962]
- Lubricating and wearproof compound based on tungsten disulphide for coating a metal substrate [Patent no. 127961]
- Process for obtaining substances and devices used for safe handling of hazardous materials and other polluting substances. [Patent no. 126118]
- Process for preparing the nanoimmunosorbent silicon dioxide-aminopropyltriethoxysilane-glutaraldehyde-bovine serum albumin-3,6-dichloro-2-methoxybenzoic acid used in ELISA technique for dosing the 3,6-dichloro-2 [Patent no. 127570]

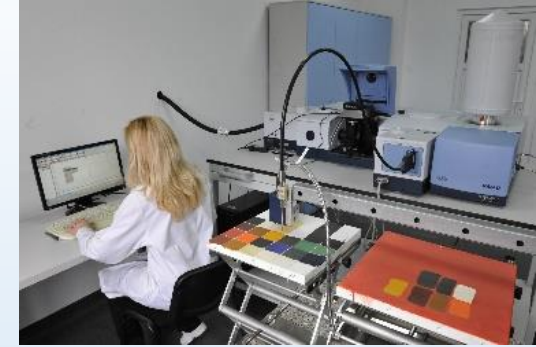






# Diaspora Start-Up?

- A line of funding intended for the Romanians living abroad and for those recently returned to the country, who want to develop a business in a urban areas in Romania
- A program exclusively dedicated to the development of entrepreneurship and the setting up of new businesses
- The financial allocation of the call for proposals is EUR 30 million
- The maximum value of a project is EUR 5 million
- The maximum amount of subsidies granted to a beneficiary is 50,000 euros
- More than 3,000 people followed entrepreneurial education in 2017
- Over 300 SMEs funded in 2017
- Over 600 new jobs created in 2018





# Patents, prototypes and technology services at IFIN-HH

- Last 10 years 35>
- Filing under evaluation 12>
- Prototypes in 2017/2018 8
- Technology services 2017/2018 14
- Not the number of patents but their value count (www, touch screen – CERN, cherry tomatoes – Nahum Kedar, Weizman/Monsanto)







## Services – Key role in Knowledge Transfer and important source of revenue for Academia

- **Large Scale Research Infrastructure (IFIN-HH, ELI-NP) crucial role in offering R&D services**
- **IFIN-HH has seven “Research Infrastructures of National Importance”**
- **Pay back the investment through**
  - **Patents filing**
  - **Services provided – Key instrument for self financing, TTO’s priority**
  - **Good practice sharing**
  - **Training**
  - **Open access - Open Hardware License and Open Source Software (ex NVIDIA)**





The Center for Technology Transfer and Marketing

CTTM

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### Services

#### IFIN-HH Services for Industry and Academia offered through our Technology Transfer Office (CTTM - Center for Technology Transfer and Marketing)

Please use our [Contact](#) page for further details

- [ACCELERATED MASS SPECTROMETRY](#)
- [ION BEAM IMPLANTATION](#)
- [ION BEAM ANALYSIS](#)
- [RADIOACTIVE WASTE MANAGEMENT](#)
- [RADIOACTIVE MATERIALS TRANSPORTATION \(CLASS 7\)](#)
- [MATERIALS AND RADIOACTIVE WASTE CHARACTERIZATION](#)
- [RADIONUCLIDE METROLOGY LABORATORY \(RML\)](#)
- [HADRON PHYSICS DEPARTMENT General Description](#)
- [VACUUM TECHNOLOGIES](#)
- [GAMMA IRRADIATION FOR STERILIZATION OF MEDICAL AND PHARMACEUTICAL SUPPLIES](#)
- [GAMMA IRRADIATION FOR BIOBURDEN REDUCTION](#)
- [GAMMA IRRADIATION FOR RADIATION RESISTANCE TESTS](#)
- [MICROBIOLOGICAL TESTING FOR PHARMACEUTICAL PRODUCTS](#)
- [MICROBIOLOGICAL TESTING FOR PHARMACEUTICAL AND OTHER PRODUCTS](#)
- [RADIATION STERILIZATION VALIDATION](#)
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# CTTM

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## Patents and Licenses

- [Process for preparing the nanoimmunosorbent silicon dioxide-aminopropyltriethoxysilane-glutaraldehyde-bovine serum albumin-3,6-dichloro-2- methoxybenzoic acid used in ELISA technique for dosing the 3,6- dichloro-2 \[Patent no. 127570\]](#)
- [PThe nanoimmunosorbent silicon dioxide-aminopropyltriethoxysilane-glutaraldehyde anti 3,6-dichloro-2- methoxybenzoic acid antibody to be employed in the ELISA technique for dosing the 3,6-dichloro-2- methoxybenzoic acid pesticide \[Patent no. 127441\]](#)
- [Process for preparing the acid enzymatic marker 3,6-dichloro-2- methoxy-benzoyl- glycyl-alkaline phosphatase \(dicamba-glycylalkaline phosphatase\) \[Patent no. 126442\]](#)
- [Process for obtaining Nandrolone-3-carboxymethyloxime- bovine serum albumin-alkaline phosphatase \(nand- 3CMO-BSA-ALK-P\) enzymatic marker \[Patent no. 122695\]](#)
- [Process for obtaining spherical immunosorbents of silicon dioxide-3- carboxymethyloxime-nandrolone \[Patent no. 122696\]](#)
- [Process for obtaining immunosorbent trenbolone-3-carboxymethyloxim-ovalbumincarboxymethyl-cellulose \(Tren-3-CMO-OVA-CMcellulose\) \[Patent no. 123130\]](#)
- [Process for obtaining immunosorbent trenbolone-3-carboxymethyloxim-ovalbumincarboxymethyl-cellulose \(Tren-3-CMO-OVA-CMcellulose\) \[Patent no. 125452\]](#)
- [Process for preparing the enzimatic marker 3,6- dichloro-2-methoxy benzoylhexamethylendiamin-glutharaldehyde-alkaline phosphatase \[Patent no. 125536\]](#)
- [Package for storage of alpha active radioactive waste \[Patent no. 126351\]](#)
- [Method for reducing the background specific to a spectrometric system \[Patent no. 127062\]](#)
- [Ionizing radiation detector cavity \[Patent no. 126797\]](#)
- [Ionization chamber type detector \[Patent no. 125188\]](#)

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# MAGURELE HIGH TECH CLUSTER



## MAGURELE HIGH TECH CLUSTER Innovation Eco-system - From 45 entities to 90

The innovative MHTC cluster represents an association of more than 90 organizations: companies, research institutes, foundations, associations, local public institutions, hospitals.

It represents a significant potential in terms of financial, material, human, technological and scientific capabilities that are necessary to carry out comprehensive projects.

### Advanced Science and Innovative Business

- Magurele High Tech Cluster
- Incubator
- Science Park
- Laser Valley – Land of Lights (Bucharest – Magurele – Giurgiu – Ruse)

### National & Local Administration

- Ilfov County
- City of Magurele
- Municipality of Bucharest
- Giurgiu County
- The National Authority for Scientific Research and Innovation

- 18 RD&I entities
- 5 universities
- 55 SME's
- 4 local authorities
- 7 NGO's
- 1 hospital

## MHTC - Areas of activity

1. Advanced Research:
  - Nuclear physics
  - Lasers and plasma
  - Materials physics
  - Earth physics
2. Optoelectronics
3. Methods and nuclear technologies for health and environment
4. Preserving cultural heritage through nuclear technologies and lasers
5. Information and Communication Technologies, Energy, Security
6. Technologies for agriculture
7. Training & educational products & science promotion

## Services offered to the MHTC members

- ✓ Consultancy in preparing projects for funding from governmental, European and international, public and private funds.
- ✓ Consultancy in development of skills in the field of knowledge and technology transfer.
- ✓ Consultancy for protecting intellectual property at national and European level.
- ✓ Consultancy for correct positioning of SMEs in the market areas in where they evolve.
- ✓ Consultancy for the marketing activities.
- ✓ Consultancy for the development of new ideas for projects.
- ✓ Creating brands for each member and organizing public campaigns for promoting the members and their results
- ✓ Promoting cluster innovative services in domestic and international markets.
- ✓ Developments of national and international networks that will help better integrating the cluster and its members in the EU.
- ✓ Assess the innovation capacity of SMEs and proposing plans to increase performance in this area in accordance with the development strategies of companies.
- ✓ Increase SMEs management competence in the field of public communication and in the management of the crisis situations.
- ✓ Training for the staff and dissemination of best practices developed by clusters in Romania and the EU.





# Magurele High Tech Cluster

- It is set up around ELI – NP Project – the largest EU investment in large research infrastructure in Central and Eastern Europe
- IT is bottom up initiative
- It is a Science driven Cluster
- Around 30% of the Romanian research is done on Magurele Campus
- Contribution to the development of the region by implementing the Danube Strategy with the support of the Ministry of Foreign Affairs (Romania and Austria are co-sponsors)
- Develop a multiannual research plan related to lasers and connected fields working with the European networks (like EU-Life)
- Enhance the Council of Innovation for the Down Danube created by the Romania – Bulgaria Cross-Border Projects (INNO GATE 21 and RINNO) in strong connection with the local administrations and the national research ministries from both countries
- Education: The researchers – partners for students



- **90 members:**

- 55 SMEs
- 18 RD&I
- 5 Universities
- 4 Local authorities
- 7 NGOs
- 1 Hospital



# MASTER PLAN MAGURELE SCIENCE PARK

MAGURELE SCIENCE PARK  
4



- Centrul de Inovare
- Incubatorul de Afaceri
- Centrul de Conferințe și Birouri
- Muzeul Viitorului
- Centrul de Excelență în Sănătate
- Centrul Tehnologiei Informațiilor și Comunicațiilor
- Centrul de Transfer Tehnologic
- Centrul de Cercetare Materiale Avansate

MAGURELE SCIENCE PARK  
5





# Investment values

Faza 1	Cost €
1. Lucrări de infrastructură (amenajare teren, utilități, căi de acces, parcări, spații verzi etc.)	6.348.716
2. Centrul de transfer tehnologic	5.597.167,38
3. Centrul de inovare	4.423.556,06
4. Muzeul Viitorului	9.296.942,83
5. Centrul de recreere	357.000
<b>A. Total Costuri construcție și echipamente</b>	<b>26.023.382,27</b>
B. Proiectare, management de proiect, dirigenție de șantier	4.610.991,77
<b>Total A+B:</b>	<b>30.634.374.04</b>
<b>Faza 1 – Total:</b>	<b>30.634.374.04</b>



# HEPTech new website

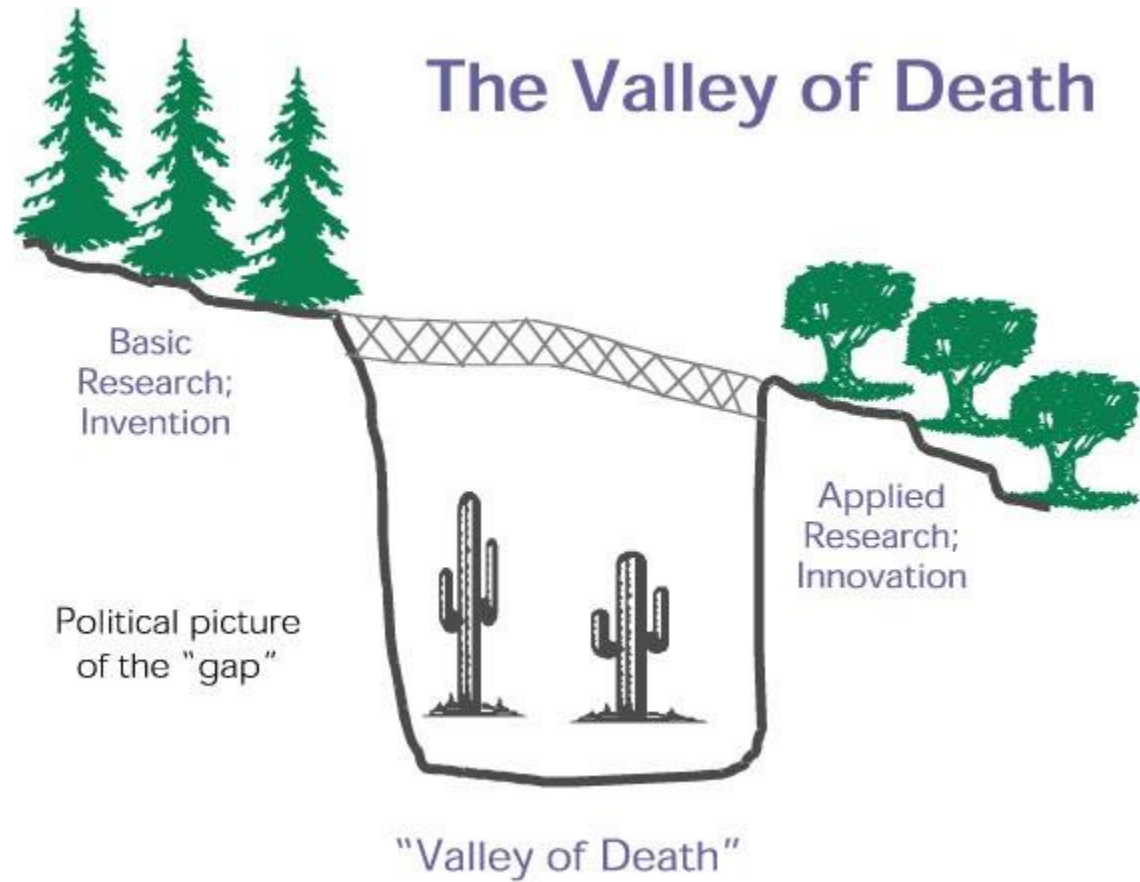
<http://www.nipne.ro/heptech/>











**Thank you !**

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**CTTM IFIN-HH**

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