VINCA INSTITUTE AND BEOBAL PROJECTS

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A1.Diversification, broadening and enhancement of international collaboration and cooperation

Vinca Institute propose collaboration in :

- neutron Investigations and Data Measurement
- application of SSNTD
- measurement of heavy nuclides in environment

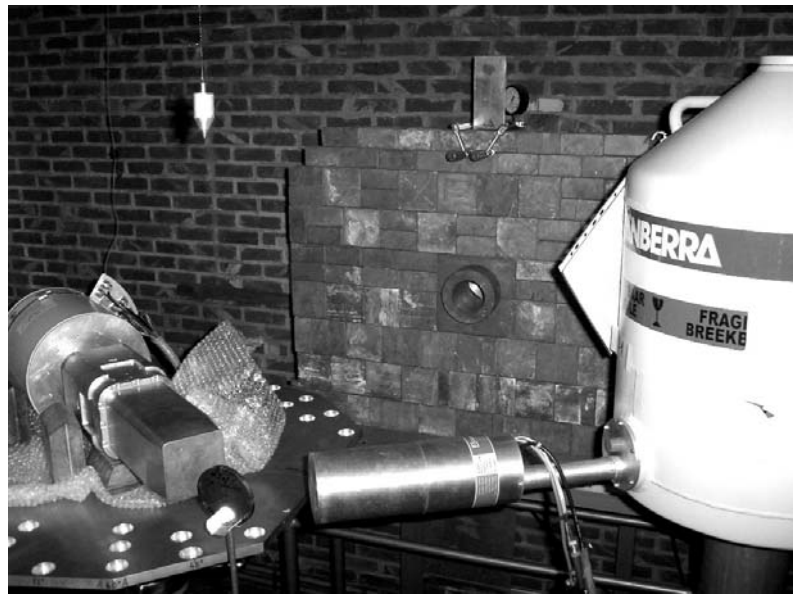
- development of biosensing systems for detection of potentialt biohazard of water soluble heavy metal salts in samples.
- effects of heavy metal salts on disturbance of neuronal and reproductive functions in mammals.
- content of metal ions in biological samples (invertebrates, vertebrates, plants).
- content of various elements in water and soil samples.
- human epidemiological monitoring of hormones (reproductive, thyroid, stress) and other biological substances with Delphia system LKB and ELISA

Explanation for first 3 points:
SCIENTIFIC COLLABORATION of VINCA Institute – Neutron Investigations and Data Measurement

- IReS-STRASBOURG,
- GSI-DARMSTADT,
- JINR-DUBNA,
- IRMM GEEL,
- ARISTOTLE UNIVERSITY, THESSALONIKI,
- CERN

What Do We Do?

- Bombard heavy nuclei (Pb, Th, W…) with white or monoenergetic neutron beams.
- Prompt γ spectroscopy using HPGe
- Digital or analog acquisition.
- Neutron time of flight



RESULTS up to now

- Methods mastered for (n,xnγ) cross-section measurement from threshold to 20 MeV in Geel and from 30 to 70 MeV in LLN.
- ^{232}Th(n,5nγ) measured in one point (38 MeV) in LLN.
- ^{nat}Pb(n,n'γ) and (n,2nγ) measured with low statistic from threshold to 14 MeV in Geel.
- Measurement campaign planned with IRMM-Geel, IReS-Strasbourg… for the period 2005-2010.

- Home-made digital spectroscopy system based on 14-bit, 65 MS/s ADCs.
- We use SSNTD in the frame of project "Energy and Transmutation" in JINR Dubna

Explanation for last 5 points you can have if you contact

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A3. The ***implementation and development of advanced methodology, technology, methods and advanced metrology***, ***monitoring and observing system and innovations transfer***, in the field of Global change and ecosystems and their regional and European projections and components

- Beside Workshops, Conferences
- ***VINCA INSTITUTE propose Visio-conferences among participants in BEOBAL***
- (Up to now we had this type of activity with NOKIA, DARESBERY, … It is not expensive and very successful and useful)

B. Improvement of Human Resources *including advanced Human Resources long-term management*

- VINCA INSTITUTE propose in the frame of SSA_A6:
- ***THESES en cotutelle for young researchers***

(Up to now we had 3 theses of this kind with France. Student has two co-directors of the these; during 3 years he stay certain time in each institute; the PhD diploma of two universities without nostrification)

CONCLUSIONS

- VINCA INSTITUTE HAS A HUMAN RESOURCES AND RESEARCH INFRASTRUCTURE FOR MANY OF ACTIVITIES DEVELOPED IN BEO CoE;
- WE WOULD LIKE TO USE YOUR EXPERIENCE AND WE ARE OPEN FOR ALL KIND OF COLLABORATIONS
- FOR THAT REASON A COUPLE WORDS ABOUT VINCA INSTITUTE

A couple words about Vinca Institute

- VINCA Institute of Nuclear Sciences was founded in 1948 as a research centre for the realization of the National Nuclear Programme. Since 1968 it has continued research with a mixed scientific concept (not only nuclear). Today VINCA is a multidisciplinary scientific institute which covers a wide range of scientific and engineering fields.
- The current number of employees is 787, Scientific staff: 420 (PhD:140; MSc:125; BSc:155; Technicians:244; Administrative&Services:123
- The institute is organized in work and research units, internally traditionally called laboratories (actually departments), which are to a large extent independent in business. There are 16 research departments, 3 centers, Import-Export Department, and a Joint Services Unit.
- Better insight into the activities of the Institute can be gained by visiting website www.vin.bg.ac.yu

Vinca Institute - aerial photo

DEPARTMMENTS OF VINCA INSTITUT

- Department of Physics
- Department of Nuclear Physics
- Department of Theoretical Physics and Physics of Condensed Matter
- Department of Radiation Chemistry and Physics
- Department of Atomic Physics
- Department of Physical Chemistry
- Department of Chemical Dynamics and Permanent Education
- Department of Radioisotopes
- Department of Radiobiology and Molecular Genetics
- Department of Molecular Biology and Endocrinology
- Department of Radiation and Environmental Protection
- Department of Electronics
- Department of Thermal Engineering and Energy
- Center for Nuclear Technologies & Research NTI
- Center for Motor Vehicles
- Department of Material Sciences
- Center for Multidisciplinary Research and Engineering
- Import Export Department
- Department of Computer Systems & Software Design
- Explosion Protection Center
- Medical Protection Unit

THE MAIN ACTIVITIES-**R&D**

- Fundamental research in Physics, Chemistry, Biology, Mechanics and Material science
- Nano-Sciences and Technologies
- Nuclear Physics and Technology, including Safety and Security
- Numerical Modeling of transport processes (particle, heat-mass, hydraulics), and development of correspondent computer codes
- Radiation Protection and Dosimetry
- Environmental Protection
- Thermal Energy, Fluid dynamics and Sustainable energy sources

Services

- Radioactive Waste Management
- Operational dosimetry
- Expertise in Nuclear Safety Assessment Study and Nuclear Security
- Expertise in the assessment of working and living environment pollution; support to the national monitoring program (radionuclide and heavy metals)
- Radiation Sterilization of single use medical devices, food additives and pharmaceuticals
- Characterisation of different materials and compounds

Testing, quality control and certification of different products, equipment and processes:

- Cable products (GAMA)
- Electrical apparatuses for potentially explosive atmospheres (Centex)
- Safety of household appliances (CENAD)
- Motor vehicles, buses and special purpose vehicles, including type approval of engines and motor vehicles
- Radiopharmaceuticals (in-vitro & in–vivo)
- Radiation sources for industry and medicine
- Nutritional and protective properties of food
- Diagnostic clinical analysis
- Genome identification: forensics, clinical genetics, blood products control
- Equipment and process quality in process industry and energy production
- Anti-hail reagent in cloud chamber
- Neutron activation analysis of industrial and environmental samples
- Neutron dosimeters in mixed neutron - gamma-ray fields of various neutron spectra

- Training for professionals in industry and medicine
- Training for teachers in science education

Some of the R&D equipment:

- Experimental nuclear reactor 0-POWER
- SQUID system
- Microscope Quesant Universal SPM
- Mass spectrometer TOF MALDI
- Laser scanner with ultros
- Multichannel fluorescence counter
- Laser - model NT 342/3
- Lambada spectro-fotometer 25UV/VIS S
- Atomic absorption spectrometer A
- Gas Analyser
- Automatic PCR diagnosis apertures
- High resolution HPGe gamma spectrometers
- Transmission Electron Microscopes Philips EM 400
- Scanning Electron Microscope Philips SEM 501