Ministry of Science

Initiative for the creation of a South-East European International Institute for Sustainable Technologies

Status as of September 2017

Dr. Sanja Damjanovic

WESTERN BALKANS
STEERING PLATFORM ON RESEARCH AND INNOVATION

27 September 2017, Belgrade, Serbia

Joint South-East European International Institute for Sustainable Technologies (SEEIIST) in the spirit of 'Science for Peace'

Initiative proposed by Prof. Herwig Schopper, former Director General of CERN

supported by

The main objectives of the Project

- To promote collaboration between science, technology and industry, but also to provide platforms for the development of the education of young scientists and engineers based on knowledge and technology transfer from European laboratories like CERN and others
- To mitigate tensions between countries in the region
- To form a research nucleus in the region of South-East Europe by bringing people from different countries to work together – not only scientists and engineers, but also industry and administration

The combination of all these tasks would imply another case of the 'CERN model'

The goals can only be achieved with one major new Institute based on the latest technologies to enable 'first class research' and thereby strongly revert brain drain and assure high competitiveness

Importance of the Project for the Region

- The project would be unique in the whole region
- Real international cooperation, bringing people together in the spirit of 'Science for Peace' could contribute to
  - ❖ develop the economic situation
  - ❖ improve the standard of living
  - ❖ reduce unemployment (in particular for young people)
  - ❖ revert brain drain
  - ❖ aim at excellence throughout

  this would imply a certain 'industrialization' of the region based on sustainable technologies

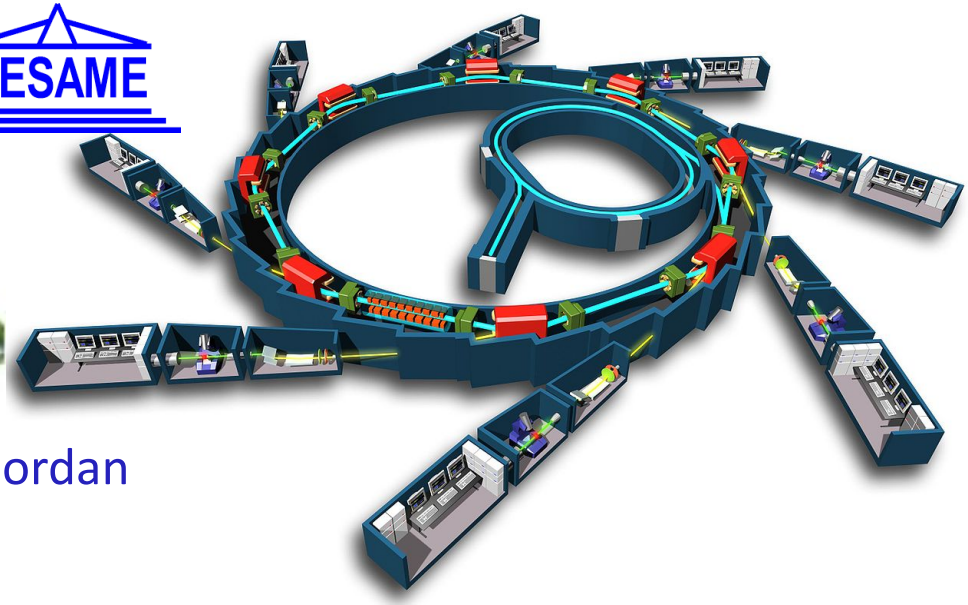
These type of projects represent 'knowledge-based economy'

The main mission of the Project

- Scientific Excellence through peaceful collaboration
- Project for young people who want to enter into a new field
- Science for the sustainable development of society
- Science for general development of the SEE region

SESAME project: 'Synchrotron Light for Experimental Science and Applications in the Middle East'

SESAME



Jordan

The success of such an initiative is being demonstrated by the SESAME project:

built in Jordan, unifies nine member states of different political systems and religions in the Middle East: Bahrain, Cyprus, Egypt, Israel, Iran, Jordan, Pakistan, Palestinian Authority, Turkey; has achieved all of them to peacefully work together

The founding father of the SESAME project is also Prof. Herwig Schopper

Candidate Members for the South-East European International Institute for Sustainable Technologies

Republic of Albania

Bosnia and Herzegovina

Republic of Bulgaria

Republic of Croatia

Hellenic Republic

Kosovo*

FYR of Macedonia

Montenegro

Republic of Serbia

Republic of Slovenia

Officially supported by the Government

Ministers of Science/Corresponding Ministers expressed interest

* This designation is without prejudice to positions on status and is in line with UNSC 1244/1999 and the ICJ option on the Kosovo Declaration of Independence

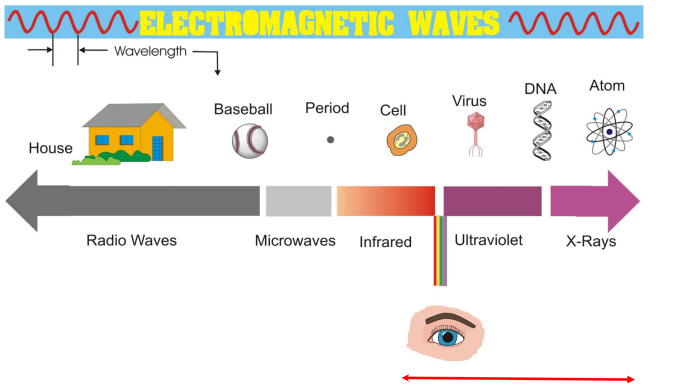
How the common central facility would look like?

Presently there are two completely different contenders, both based on accelerators

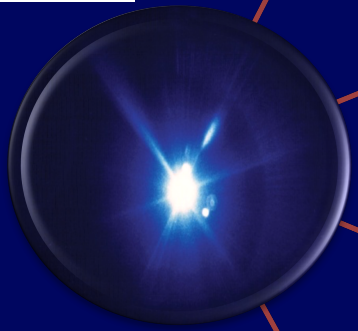
Option I: Synchrotron Light Source with a new technique which is used for the first time in Lund, Sweden

Science community of South-East Europe would be unified, more than 1000 Users, a broad spectrum of research and applications reaching from biology up to industrial aspects

Option I: Applications of Synchrotron Light



Synchrotron Radiation Light



- Life Sciences
  - ••Drug design
  - ••Imaging
  - ••Therapy
- Material Science
  - ••New materials
  - ••Energy
- Environmental Science
  - ••Air, soil and water pollution analyses
- Cultural Heritage
  - ••Non-destructive analyses

Examples of possible research domains which are relevant for the region

Option I: Applications of Synchrotron Light

Material Science/Physics/Chemistry

Glasses
Ceramics
Magnetic Materials
Polymers
Thin Films
Superconductors

Biological & Medical Sciences

Pathogen structure
Genetic diversity
Metalloenzymes and
plants and microorganisms
Metalloproteinases
Biosensors

Industrial Applications

Polymer characterisation
Synthesis and characterisation of novel materials
Chemical analysis
Screening for drug design

Environmental Science

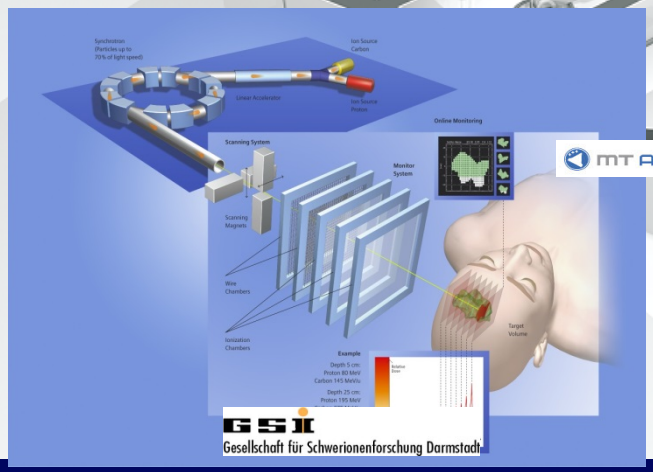
Clay minerals
Mineral analysis of rocks
Soil contaminants
Applications in agriculture and bioremediaton

Archaeology

Option II: Facility for Tumour Therapy and Biomedical Research with protons and heavier ions

Medical, Biomedical and some Technical Community of South-East Europe would be unified. About 1000 Researchers, including a major number from outside SEE. 500 Patients per year to be treated, with 50% beam time dedicated to research

HIT Heidelberg



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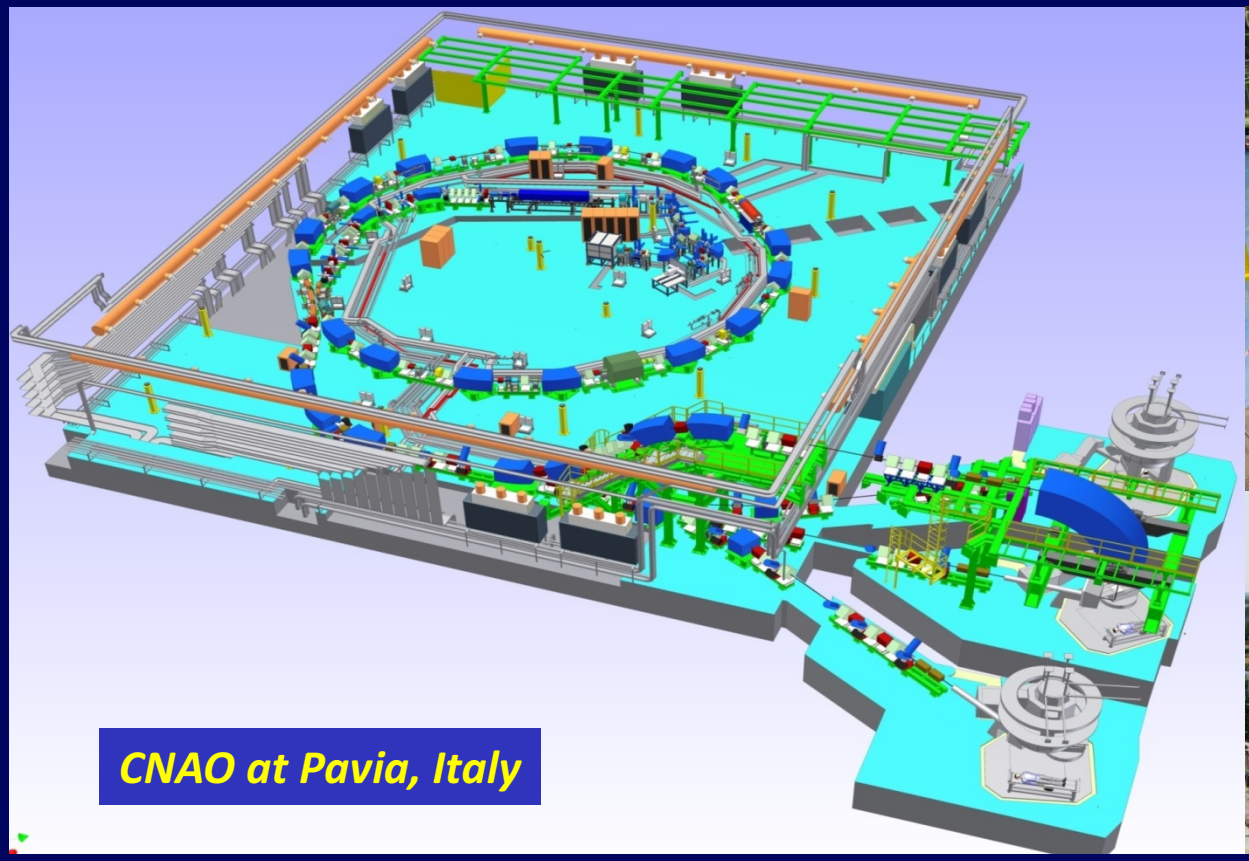
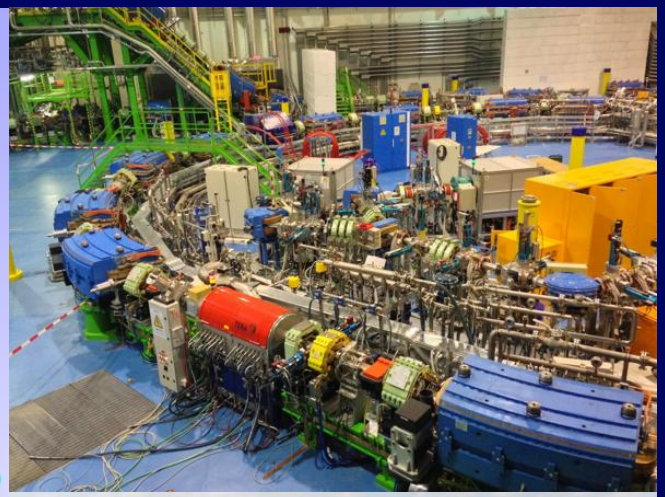
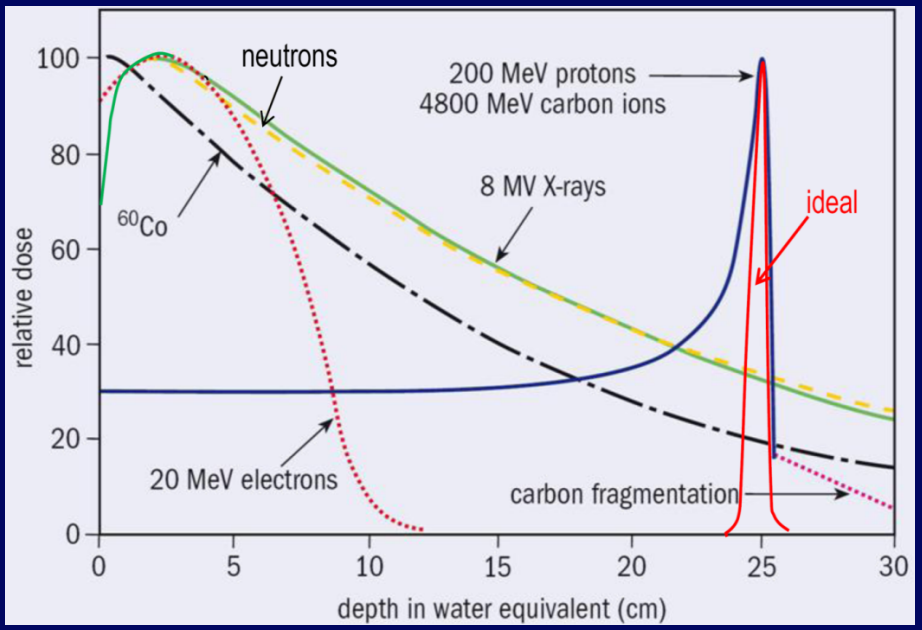


CNAO at Pavia, Italy



First Director of CNAO Prof. Ugo Amaldi, present Director Sandro Rossi



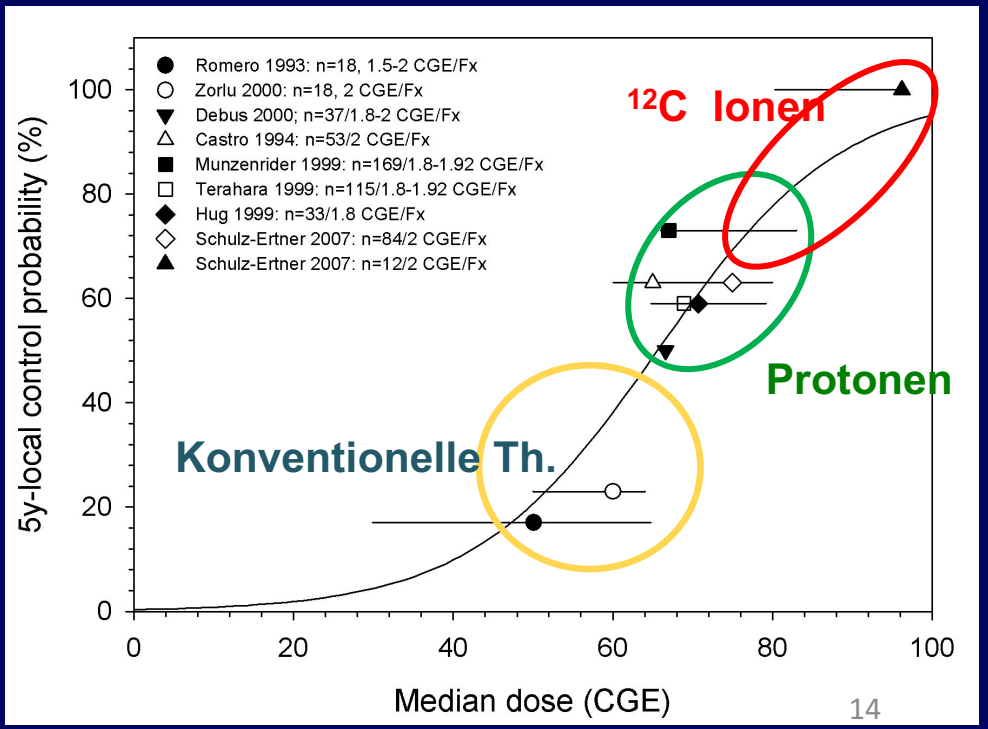
Deposited dose along the tissue depth

Hadron Cancer Radiation Therapy with protons and heavier ions - the most successful instrument for the treatment of many tumours

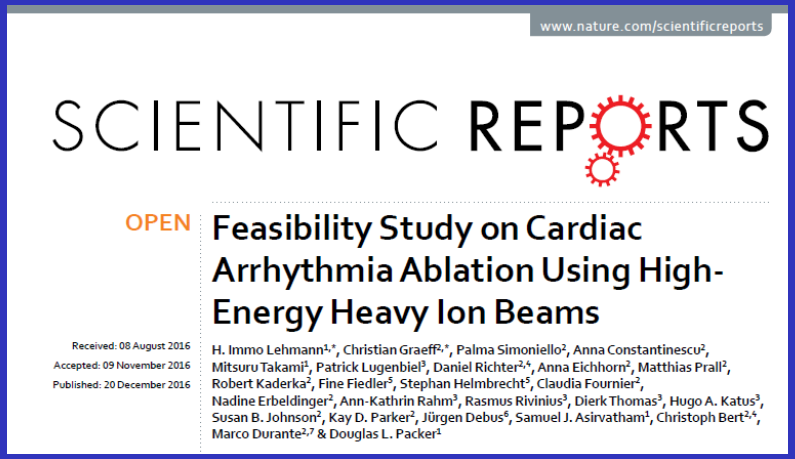
Results of therapy:

Chordomas of the Skull Base

Survival probability 5 years after treatment



Other use of ion beams: treatments of Heart Arrhythmia



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Feasibility Study on Cardiac Arrhythmia Ablation Using High-Energy Heavy Ion Beams

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The concrete next steps

- Formation of two international committees, consisting of eminent experts to work out Concept Studies for both project options; Concept Studies to be completed by the end of October

- 'Declaration of Intent' to be signed by the Science/Corresponding Ministers of all participating parties at a special meeting at CERN in October

- Organize a Scientific Forum at the ICTP in Trieste in January 2018, where the Editorial Committees will present the first design concepts including the main parameters of the facilities and very crude cost estimates

- Report the outcome of the Forum to the next 'Joint Science Conference of the Western Balkans Process/Berlin Process' to be held in Italy in 2018

- Start a training programme for young technical people and future users as soon as possible (2018) to prepare them for leadership in the frame of the selected project. The training programme should also include Chambers of Commerce

- Organize a meeting on the Education program and form a 'Training Committee'. Given that the realization of the project will take several years, there is sufficient time for such training

The concrete next steps

2017							2018
June	July	August	September	October	November	December	January

formation of two international committees of experts for each of the two project options

'Editor committee' meeting at CERN

'Editor Committees' work on Concept Studies

Meeting of Representativ-es of the Ministries of the different regions

Ministerial meeting at CERN

'Editor Committee' meeting in Podgorica

Scientific Forum meeting at the ICTP

Start a training program for young people

Members of Editor Committee for Option I –Synchrotron Light Source

Dr Amor Nadji, Director of Sources and Accelerator Division of SOLEIL, France

Chairman

Dr Dieter Einfeld, former Technical Director SESAME

Dr Petro Fernandez-Taverez, Machine-Director of MAX IV Lund, Sweden

Prof. Riccardo Bartolini, University Oxford and Diamond, UK

Dr Christoph Quitmann, Director of MAX IV, Sweden

Members of the Editor Committee for Option II – Facility for Tumour Therapy and Biomedical Research with *p* and heavier ions

Dr Sandro Rossi, Director of CNAO in Pavia, Italy

Chairman

Prof. Ugo Amaldi, President of TERA, former Director of CNAO in Pavia, CERN, Switzerland

Prof. Manjit Dosanjh, Staff at CERN

Prof. Philippe Lambin, Head of Radiation Oncology, University of Maastricht, Maastricht, Netherlands

Dr. Michael Scholz, Scientific Head of Biophysics Departm. GSI, Darmstadt, Germany

Prof. Dr. Jacques Balosso, CHU Grenoble Alpes, FR

Sources of funding - EU funds

Since it is widely accepted that the region needs economic help and further stabilization, the main funding of the project is expected to come from different EU programmes

Start with a Training Program – Support by IAEA

Training of scientists, engineers and technicians important from the beginning in order to build-up expertise, i.e. to form a sufficient critical mass of staff members for operation of the machines as well as Users communities

Most urgent need – fellowships for future operation (to build-up accelerator experts who would help to construct and operate the machine)

Continue the training scheme by granting fellowships for future users

Include in the training also Chambers of Commerce to get involved from the beginning fellowships for representatives from small companies (delivery of hardware, provision of services, design, control systems, development of technology…)

IAEA had an important role for the Training Program to help the success of the SESAME Project – similar support from the IAEA to this Initiative expected both from Departments of Technical Cooperation and Nuclear Sciences and Applications

FORUM on New International Research Facilities in South East Europe

- develop a research excellence nucleus in SEE - benefit for science and technology, training, investment in young people, job creation, reverse of brain drain, knowledge based economy

- Synchrotron Light Source 4th generation
- Facility for Tumour Therapy and Biomedical Research with protons and heavier ions

Organizing Committee:
Herwig Schopper (Chairman, former DG of CERN)
Fernando Ferroni (President of INFN)
Christoph Quitmann (Director of MAXIV Lund)
Nicholas Sammut (Deputy Dean, University of Malta)
Hans J. Specht (Heidelberg Univ., former DG of GSI)
Ruediger Voss (President of EPS)
Local Organizers: Nadia Binggeli (ICTP)

ICTP and Ministry of Science of Montenegro

The Abdus Salam International Centre for Theoretical Physics

25 & 26 January 2018, ICTP, Trieste

UNESCO IAEA EPS

Summary of the Project Missions

Economy based on knowledge

Sustainable Technology

Improve standard of living

Reduce unemployment

Science for Peace

Investment in young researchers

Increase competitiveness, success for EU grants

Scientific Excellence through peaceful collaboration

Collaboration between science, technology and industry

Medicine for Peace

Revert Brain drain

Develop a research excellence nucleus in South-East Europe

Build-up User Communities

Effort needed to start to form User Communities

- Minimum critical mass of Users from different Candidate Members have to be created well ahead of the Forum scheduled on January 25-26, since they have to be the main participants in the Forum

- Following SESAME experience, the best way to start to build-up User Communities is organization of regular user Workshops in different countries

- The purpose of such Workshops is not only to inform future Users, but also to determine the preferred research topics in order to develop a strategy for the future