

The Cyclotron Center of the Slovak Republic

Project of Accelerator Technology Applications in Slovakia

50
anniversary



JINR
Joint Institute for Nuclear Research
(Dubna, Russian Federation)



SOSMT
Slovak Office of Standards, Metrology and Testing
(Bratislava, Slovak Republic)

BACKGROUND AND OBJECTIVES

The Cyclotron Center of the Slovak Republic was established at the beginning of August 1999 - within the Slovak Office of Standards, Metrology and Testing (SOSMT), in Bratislava, Slovak Republic. It will have two cyclotrons - a large heavy and light ion cyclotron DC-72, which will be constructed by the Joint Institute for Nuclear Research (JINR), Dubna, Russian Federation, and a small commercial light ion cyclotron IBA 18/9. The heavy ion source of the electron resonance type (DECRIIS-2M) will be used for low and medium energy experiments in physics. The small electron accelerator is planned for different applications, including improving the properties of plastics, increasing the resistance of cables to fire and temperature, the sterilization of medical disposables in the CC SR. The main purpose of the Cyclotron Center of the Slovak Republic (CC SR) is to catch the present approach and trends in the area of improving of inhabitants life and health quality using the progressive technology, which is introduced by bringing into practice of the physical equipment - accelerators, producing beams of high energy particles. The Cyclotron Center of Slovak Republic will be commissioned in 2006.

ELECTRON ACCELERATORS

1. Radiotherapy. Sterilizing a wide range of products, including medical products

2. Crosslinking of selected thermoplastics

3. Curing coating on a wide range of substrates, including paper, wood...

4. Food Pasteurization - cereals, spices, poultry...

5. Hospital waste treatment, Bacillus anthracis, SIT Customs inspection systems

CCSR
2006

ION ACCELERATORS

1. Ion beam analysis

2. Accelerator mass spectrometry

3. Modification of materials

4. Radioisotope production

5. Hadron therapy

6. Education

Applications. Modifications of materials by low and medium energy of ion implantation, ion beam analysis, production of radioisotopes and radiofarmaceuticals for medicine and hadron therapy are the main application programs of ion sources of the CC SR. Ion beams produced by the CC SR 72 MeV cyclotron will be used for clinical treatment of different oncological diseases and for the research in the field of radiobiology. The most important planned therapeutic applications are neutron capture therapy and proton eye therapy.

SOSMT - guarantor • Ministry of education of the SR - responsible authority • Ministry of Health of the SR • Ministry of Defence of the SR • Ministry of Construction and Regional Development of the SR • Ministry of Environment of the SR • Ministry of Economy of the SR • Nuclear Regulatory Authority of the SR • Slovak Academy of Sciences

● Belgrade - TESLA Accelerator Installation, Bratislava - Cyclotron Center of Slovak Republic a members of TESLA Scientific Center

Electron beams of the CC SR will be used in the first stage mainly for sterilizing a wide range of medical products and crosslinking of thermoplastic tube to improve their mechanical properties. There is a big program to use the CC SR for education purposes on all levels. Activities of the CC SR will be regarded to create a modern scientific-research basis for training of experts in the fields of: atomic physics, nuclear physics and techniques, solid state physics, radiochemistry, radiobiology, radiopharmacy and nuclear medicine, with the priori aim - to bring new accelerator technologies into practice. The priority is given to creating the International Training Center, in co-operation with the International Atomic Energy Agency in Vienna (IAEA).

(1) K. Betghe, Nucl. Phys. News, 9/1 (1999) 20.

Illustrations from materials of cooperating organisations:

JINR Dubna, TESLA Scientific Center, Gamma Service GmbH, KJFT, DDG-TC IAEA, IBA, VLEPP - Protvino, National Electrostatics Corp., Comenius University - Bratislava, UNMS - SR, Nuctech Company Limited

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1996

1999

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