

10 DEPARTMENT OF ACCELERATOR PHYSICS AND TECHNOLOGY



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Overview

The principal Department's duties in 1999 have not changed and were consequently directed on development in the area of electron and ion accelerators and their applications in science, medicine and technology.

Two important events dominated the current and future orientation of R&D activity.

The first was finalizing of long time efforts for preparing of the ordered research project granted by the State Committee of Scientific Research and devoted to elaboration and design of a new electron accelerator for radiotherapy, with two energies of X-ray photon beams. This project was formally approved in March 1999 and due to organisatory procedures set in operation after few months. In the second half of 1999, an important progress was done in advancing the project.

The second mentioned event is foundation by the government of a Multiyear Research Programme - called "Isotopes and Accelerators". This programme formulates a broad spectrum of important tasks oriented on application of isotopes and accelerator techniques in many branches of science and national economy. The expected participation of the Department in this programme comprises following subjects: medical interoperative accelerator, high power electron accelerator for radiation technology, and upgrading of cyclotron for isotopes' production. In course of 1999, preparatory studies in these subjects were carried out. Some of the results were presented on conferences and seminars.

An interesting experience was the expertise done on technical status of Eindhoven isochronous cyclotron and its possible transfer to Świerk as a professional tool for isotopes' production.

In the group of medical applications, three subjects were continued during 1999 and brought important results:

- completion of microwave measurements of high gradient acceleration structure for low energy accelerators; such structure will be very useful solution for Co-Line and interoperative accelerator
- evaluation of design data and selection of solution for accelerating structure operating in broad energy range 6 to 15 MeV
- advance in technique and metrology of narrow photon beams for stereotactic radiosurgery

Collaboration with DESY was concentrated on problems in design and modelling of accelerating structure for TESLA collider. Successive series of numerical calculations was effectuated for evaluation of conditions for excitation and suppressing of higher order field modes.

The complete copper model of "superstructure" section has been built and measured in Świerk and Hamburg. In effect of positive results, a first series of niobium resonators for superconducting structure is in preparation.

In the frame of Italian-Polish collaboration a new proposal has been prepared for design and construction of a 10-12 MeV bunching section in the injector of Trieste electron synchrotron.