

## 10 DEPARTMENT OF ACCELERATOR PHYSICS AND TECHNOLOGY



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### Overview

The main activities of the Accelerator Physics and Technology Department were focused on following subjects:

- contribution to development and building of New Therapeutical Electron Accelerator delivering the photon beams of 6 and 15 MeV,
- study of the photon and electron spectra of narrow photon beams with the use of the BEAM/EGSnrc codes,
- design and construction of special RF structures for use in CLIC Test Facility in CERN,
- design and construction of 1:1 copper, room temperature models of accelerating superconducting 1.3 GHz structures for TESLA Project in DESY.

In spite of drastic reduction of scientific and technical staff (from 16 to 10 persons) the planned works were successfully completed, but requested some extraordinary efforts.

In realisation of 6/15MeV Accelerator Project, the Department was responsible all along the project for calculations of all most important parts (electron gun, accelerating structure, beam focusing, achromatic deviation) and also for construction and physical modelling of some strategic subassemblies. The results of scientific and technical achievements of our Department in this work are documented in the Annex to Final Report on realisation of KBN Scientific Project No PBZ 009-13 and earlier Annual Reports 2000 and 2001.

The results of Monte Carlo calculations of narrow photon beams and experimental verification using Varian Clinac 2003CD, Siemens Mevatron and CGR MeV Saturn accelerators ended up with PhD thesis prepared by MSc Anna Wysocka. Her thesis: Collimation and Dosimetry of X-ray Beams for Stereotactic Radiotherapy with Linear Accelerators was sponsored by KBN scientific Project Nr T11E 04121.

In collaboration with LNF INFN Frascati the electron beam deflectors were designed for CERN CLIC Test Facility CTF3. These special type travelling wave RF structures were built by our Department and are actually operated in CTF3 experiment.

As the result of collaboration with TESLA-FEL Project in DESY, the set of RF model resonators for a new type of 2x9cell accelerating superstructures was successfully designed, built and sent to DESY for further tests. In DESY, the long term tests of the first type 4x7-cell superconducting superstructure (part of which was made in our Department in 1999) ended with very good results. The works on RF vacuum windows protection against the multipactor effects in high power couplers are still continued in DESY. The new technologies of thin TiN coating of ceramic windows were tested and a new coating setup was designed. The results were presented on the Workshop on High-Power Couplers for Superconducting Accelerators held Oct. 2002.

The experience of Department's performance in last year evokes important conclusions:

- we are always able to undertake new important tasks in accelerator physics and technology, and collaborate with eminent accelerator laboratories,
- there exists a real necessity to keep and develop accelerator physics in our Institute.

Searching for new ways in difficult financial conditions, the Department should be stepwise reconstructed and developed.

*Eugeniusz Pławski*