

10. DEPARTMENT OF ACCELERATOR PHYSICS AND TECHNOLOGY



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Overview

In the context of general discussions concerning the activity of the Institute, it was important to look critically at current and future directions of the Department's activity.

Attention is given to development of basic accelerator knowledge, realized at home and throughout international collaborations. Of importance is a steady improvement of metrological and experimental basis for accelerator research.

Apart of this, some development tendencies were formulated during 1997, oriented to application fields of accelerators.

As examples should be named:

- **medical applications:**

a) A serious effort was given to an idea of using the existing compact cyclotron C-30 as a source for creation of a diagnostic centre in Świerk. The proposition was formulated in contact with the Nuclear Medicine Department of the Medical Academy, and the "Bródno" General Hospital. In spite of declared medical interest in such an installation, the project was not approved, due to lack of proper financial support.

b) Model measurements and verification of theoretical assumptions and calculations oriented on the design of a very short, high-gradient acceleration structure for the low energy accelerator COLINE/1000 were done. This project will enable us to achieve "source - isocentre distance", of 1000 mm, instead of existing 800 mm. This is important for therapy.

In 1998, this work will be supported by the State Committee for Scientific Research.

c) Preliminary discussions, and design approach were undertaken in collaboration with the Centre of Oncology, for elaboration of a movable low-energy accelerator with electron beam output, matched to interoperational irradiation during surgical therapy of tumours.

- **applications in radiation technology**

Comparison of isotope and machine radiation sources indicates that, under Polish conditions it is reasonable to use purpose-oriented high power accelerators. The working group composed of specialists from IChTJ and IPJ prepared the Survey Report with a feasibility study on design and construction of such accelerators in Poland.

Two types were defined as necessary:

S-band linear accelerator 10 MeV, 10-20 kW beam power (TAEL 10/20)

Modular 300 MHz accelerator 10 MeV, 20-50 kW beam power (ATENA 10/50)

It should also be emphasized that we performed:

- design, manufacturing and testing of 27 pieces of polarized coaxial-waveguide couplers for superconducting resonators in HERA accelerator.

This work was done for the collaboration agreement with DESY, and paid for by DESY.

Preliminary assembling of couplers was done in Hamburg in December 97. Final completion, matched to HERA time schedule will take place in March 98.

- design, manufacturing and testing of Pulsed Microwave Generator dedicated to beam bunches diagnostics of short beam pulses.

This work was done in collaboration with LNF-INFN/Frascati, and was paid for by INFN.

The generator was completed and tested in Świerk in December 97, and shipped to Frascati in January 98.