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PRESENT STATUS OF THE ALPI PROJECT

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At the end of 1988 our efforts have been mostly directed to fix the final Linac configuration in order to freeze the building design, the number of magnet pieces and the He-distribution net. The major changes of the Linac layout concern the basic module length (4.04 m for the low β-section and 4.28 m for the medium and high β-sections) and the configuration of the U-bend where the previous eight accelerating cavities (housed in two cryostats) have been replaced by a rebuncher unit (see fig. 1). The total number of accelerating structures has been restored by adding one module to the medium β-section in the north branch of the Linac just before the U-bend. The displacement of the Linac beam axis with respect to that of the Tandem machine has been fixed as -4m, and consequently the injection and the return line (to the switching magnet) result inclined of ~6 degrees.

The basic frequency for the Linac will be 160 MHz (medium and high β-sections) while all the other RF machine components will oscillate at frequencies scaled down by factors 2^n.

The double drift buncher for the XTU Tandem, replacing the old low efficiency unit, is now ready to be installed and we expect to increase the intensity of pulsed beams at least of a factor five compared to now (10% of the dc intensity).

To conform the existing 120 stripper foil capacity at the terminal to the increased demand of foils when injecting the Linac with medium heavy beams ($50 \leq A \leq 120$), we decided to purchase the NEC Model FS6 foil changer 300 position double density (target holder 12.7 mm aperture).

Negotiations for the cryogenics plant contract are going to be concluded in these days. The main specifications of the plant can be summarized as follows (between brackets the values of the project phase 1):

a) final refrigeration power of the refrigerator/liquefier cold box without using nitrogen precooling 1000-1300 W (500) at 4.5K and 3000 W (1600) at 60-70 K,

b) electric power for compressor operation less than 540 KW (270),

c) static power losses of the He-distribution lines (multipipe type) including distribution boxes and relative movable connections to the cryostats less than 340 W (150) at 4.5K and 1200 W (525) at 60-70K,

d) gas recovery system: final pressure 200 bar, total pumping speed of the system 150 Nm^3/h, balloon volume 100 m^3, 20 $1m^3$ containers at 200 bar.

After the construction and test of a resonator controller unit based on the design developed within the Weizmann Institute of Science - University of New York at Stony Brook collaboration, a new prototype has been built having in mind, as primary goals, the compactness, the self-test capability and the independence from the host computer architecture.

The new controller board includes, besides a MC680000 microprocessor with 8 MHz clock, 8 DAC channels (12 bits resolution) and 1 ADC with 24 multiplexed inputs, 384 K-bytes of RAM/EPROM, 2 serial ports for asynchronous communications (speed up to 19200 baud) and 1 parallel port (8 bits used for local control). Such a device avoids all the problems related to the transmission of analog signals to an external computer interface and allows transmission of commands and monitor signal read-out via a general purpose RS-232 interface to the host computer without speed limitation. The ECR positive ion injector design is now in progress.

Within the LNL - Weizmann Institute of Science - University of New York at Stony Brook collaboration the beam-dynamics studies of a Superconducting RF-Quadrupole (SRFQ) tailored to very slow ions produced by an ECR-source sitting on 300 KV platform are now complete. Moreover bead technique test in a Aluminium full scale model to map out the field multipole components have been done recently.

A preliminary design for a small 14.4 GHz ECR ion source is now ready. It is going to be tested out by an International Advisory Committee before proceeding to the construction stage.

Concerning the resonators (the lead plated resonators are shown in fig. 2 and they have produced field values very close to the design goal) steps forward have been taken in the Nb QWR-prototype construction.

By the end of this year a new 160 MHz bath-cooled all Niobium QW-resonator will be tested (LNL - Weizmann Institute of Science collaboration). For the QWR Nb-coated prototype, still we are testing the Superconducting film quality of small sizes movable probes placed in the most critical positions of the outer and inner conductor.

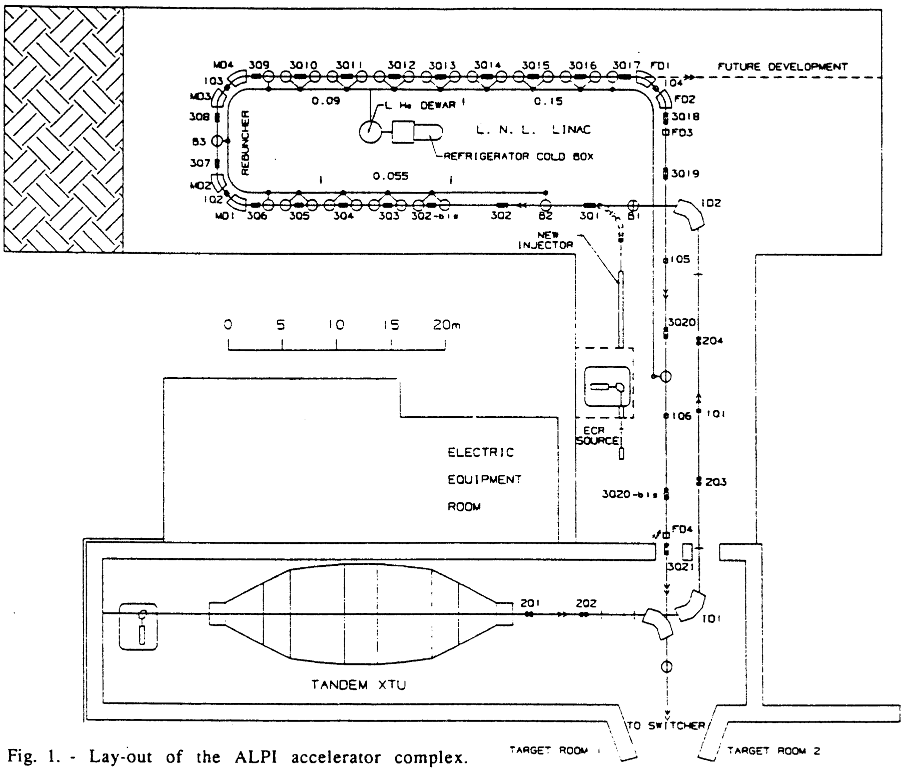

Fig. 1. - Lay-out of the ALPI accelerator complex.

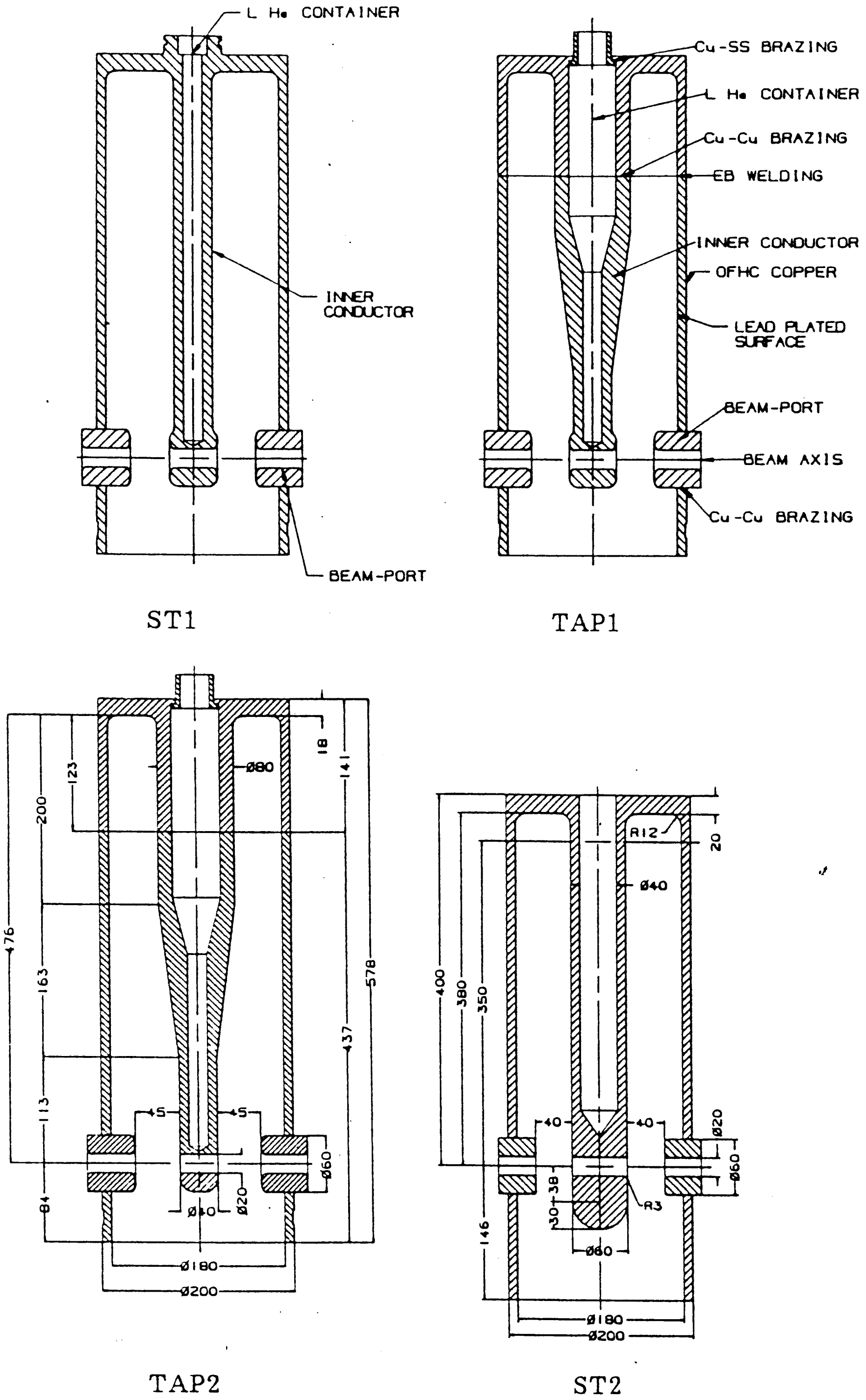

Fig. 2. - The QWR-prototypes fabricated at LNL: ST1, TAP1, TAP2 and ST2.