

INJECTOR TERMINAL OF THE RILAC

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Design aim and specifications of the Riken variable frequency linac, RILAC, have been given elsewhere.¹⁾ In order to produce the intended intensity for ions of various elements in the sufficiently high charge states, the high voltage terminal was designed to be able to accept a bulky and power consuming heavy ion source generally used at the time of contract with a factory. Fig. 1 shows its plan and side view schematics. Its floor area is 4 m by 4 m and the supporting ceramic insulators can bear 15 ton weight. The support structure also can withstand 0.4 g earthquake acceleration which is more than the largest imaginable in this Tokyo district. Necessary power for the ion sources is provided by a 200 V 50 Hz generator supported on a separate insulation structure and driven by a motor on the ground via a glass-fiber reinforced epoxy rod. Its capacity is 50 kVA.

Rating of the high voltage power supply is 500 kV, 10 mA and its voltage stability is 10^{-4} for change of the full load. The largest current drain when the source is off is 1.2 mA and the main contribution to it comes from the leakage through cooling water link made of the long Nylon tubings. Equivalent resistance of the water path is 1000 M Ω . Figure 2 is a photograph of the cooling water supplying column. It is hand-made in the laboratory.

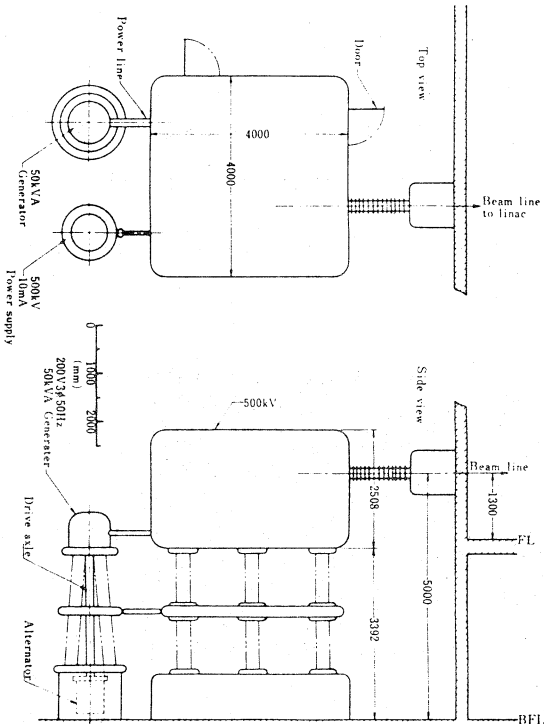


Fig.1 Plan and elevation of terminal

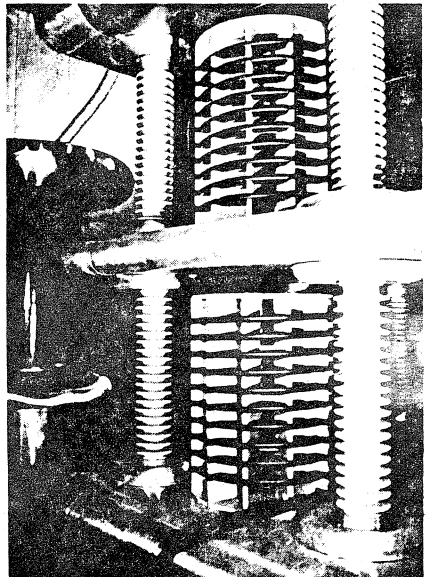


Fig.2 De-ionized cooling water supplying Nylon tube column

At present, two ion sources are being in use. One is an axially extracting and another is an indirectly heated side extracting PIG sources. Fig. 3 is a lay-out of the latter in the terminal.

The accelerating column is of the constant gradient type and its voltage distributing resistance chain has been adjusted to make change of the beam profile at the exit of the column minimum against variation of accelerating voltage. An example of the phase space profile is given in Fig. 4. Values of the emittance are small enough to assure high transparency through the drift tube accelerating section. Control of the equipments of the terminal is made through the optical links.

Reference

- 1) M. Odera; Proc. 1976 Proton Linear Accelerator Conf. Chalk River, Canada. Ed. E.O. Schriber p 62 (1976).
M. Odera, T. Kambara and Y. Chiba; Proc. 1979 Linear Accelerator Conf. Montauk, U.S.A. (to be published)

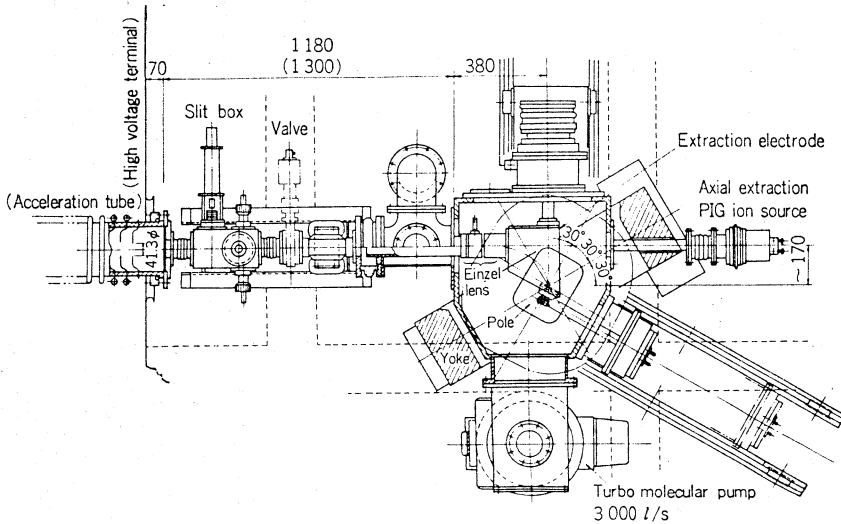


Fig.3 PIG source layout

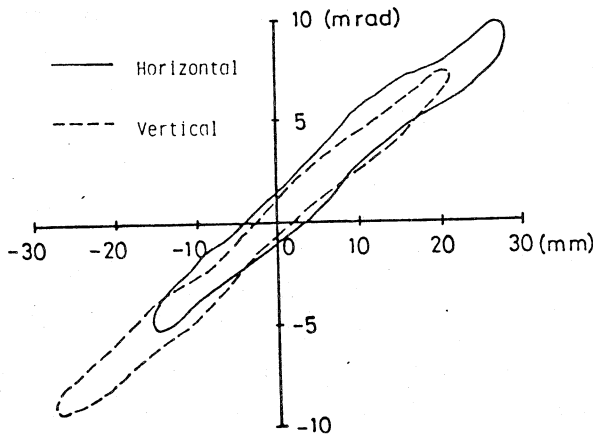


Fig.4 An example of emittance for 300 keV Ar³⁺