

THE NEW SYSTEM OF NEGATIVE ION SOURCES AND INJECTOR  
OF THE RCNST TANDEM ACCELERATOR

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At the RCNST tandem, a sputtering negative ion source ( G.I.C. HICONEX 834 ) was recently introduced and the ion sources-injector system was reconstructed. Expansion of fields of users made the former directly extracting duoplasmatron negative ion source ( DENIS ) insufficient and made it necessary to introduce a heavy ion source.

The new system is shown in Fig 1. In the system three ion sources can be installed, but at present two are installed, DENIS and HICONEX. The negative ion inflecting magnet ( NIM ) and the negative ion analysing magnet ( NAM ) are able to generate the maximum magnetic rigidity of 360 kGauss·cm and to bend 30 keV  $^{209}\text{Bi}^-$  ions. The combined mass resolution of the system was designed to be about 1/100. Also it was aimed, in the design, that beams of emittance up to 10 mm·mrad· $\sqrt{\text{MeV}}$  should pass through the system. As the acceptance of the accelerating tube of the tandem is smaller than this value, excessive beams are cut off by the slits of the SVF-2. The newly constructed power supply could deliver the maximum extracting voltage of 30 kV, and the maximum injecting voltage of 100 kV. It can also supply powers for the charge exchange negative ion source with a duoplasmatron as a possible expansion.

Evacuation of the system is performed by the turbomolecular pump system and the 6 inches oil diffusion pump system. The former evacuates mainly the ion sources and the latter the injector. As they need no liquid nitrogen, the system are continuously evacuated on usual Sundays. This elongates the available time of the system.

Now that,  $\text{H}^-$  ion beams from the DENIS are accelerated by the tandem and practical proton beams are utilised in experiments. Also recently,  $^{12}\text{C}^-$  ion beams were extracted from the HICONEX and measured to be several  $\mu\text{A}$  at the SVF-2. The  $^{12}\text{C}^-$  ion beams were successfully injected to the tandem and practical accelerated beams of  $^{12}\text{C}^{3+}$  and  $^{12}\text{C}^{4+}$  ions were obtained.

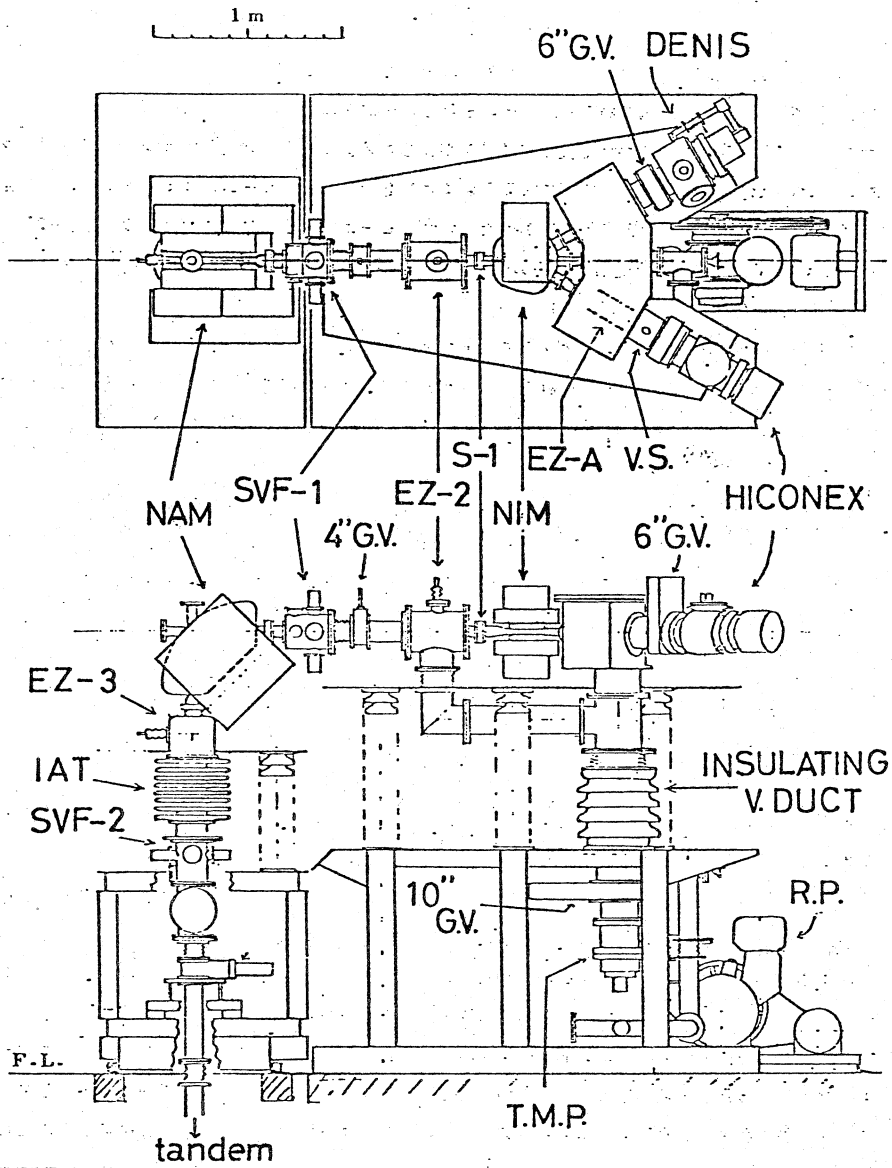


Fig 1 The new system of ion sources and injector of the RCNST tandem