

THE RIKEN SSC BEAM HANDLING SYSTEM

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A separated-sector cyclotron (SSC) is under construction at RIKEN, the Institute of Physical and Chemical Research. The maximum energy for light ions such as ^{12}C and ^{16}O is expected to be about 135 MeV/u, and for heavy ions such as uranium to be about 14 MeV/u. We shall present a very versatile system that allows us to make full use of the beam quality provided by the SSC regarding energy definition, time structure, and geometrical extent.

In designing the beam handling system, special care has been taken to meet the following requirements:¹⁾

- (1) Symmetrical arrangement of standerized ion-optical elements;
- (2) Achromatic, double-telescopic transport;
- (3) Monochromatic, double-telescopic transport with a momentam resolution up to 20000;
- (4) Isochronous, double-telescopic transport.

The plan view of the beam handling system is shown in Fig. 1. The previously reported design¹⁾ has been modified to provide more target areas. It provides the beam to eight main target areas. The beam reaches six target areas after passing two standarized 90° -bending magnets. The use of horizontal 90° -bending magnets, which are placed in mirror or anti-mirror symmetry, seems most practical in the limited space available for the building in order to fulfill the conditions mentioned above. Numerical calculations of first- and second-order ion optics have been carried out with the computer code "TRANSPORT".²⁾

The present system provides the following beam preparation modes: (1) achromatic, double-telescopic transport to every target area; (2) double-dispersive, double-telescopic transport with a momentum resolution up to 25000 in lab.2,3 and 6; and (3) isochronous ($\lesssim 500$ ps), nondispersive, double-telescopic transport to lab. 4 and 6. It should be stated that even in mode (1) or (3) the momentum resolution becomes to be about 10000. A crossed-beam experiment can be performed at T_7 .

References

- 1) T. Inamura, N. Kishida, H. Saito, and M. Watanabe, Sci. Papers of IPCR 75 (1981) 326.
- 2) K.L. Brown, F. Rothacker, D.C. Carey, and Ch. Iselin, SLAC Report (1974) p. 91.

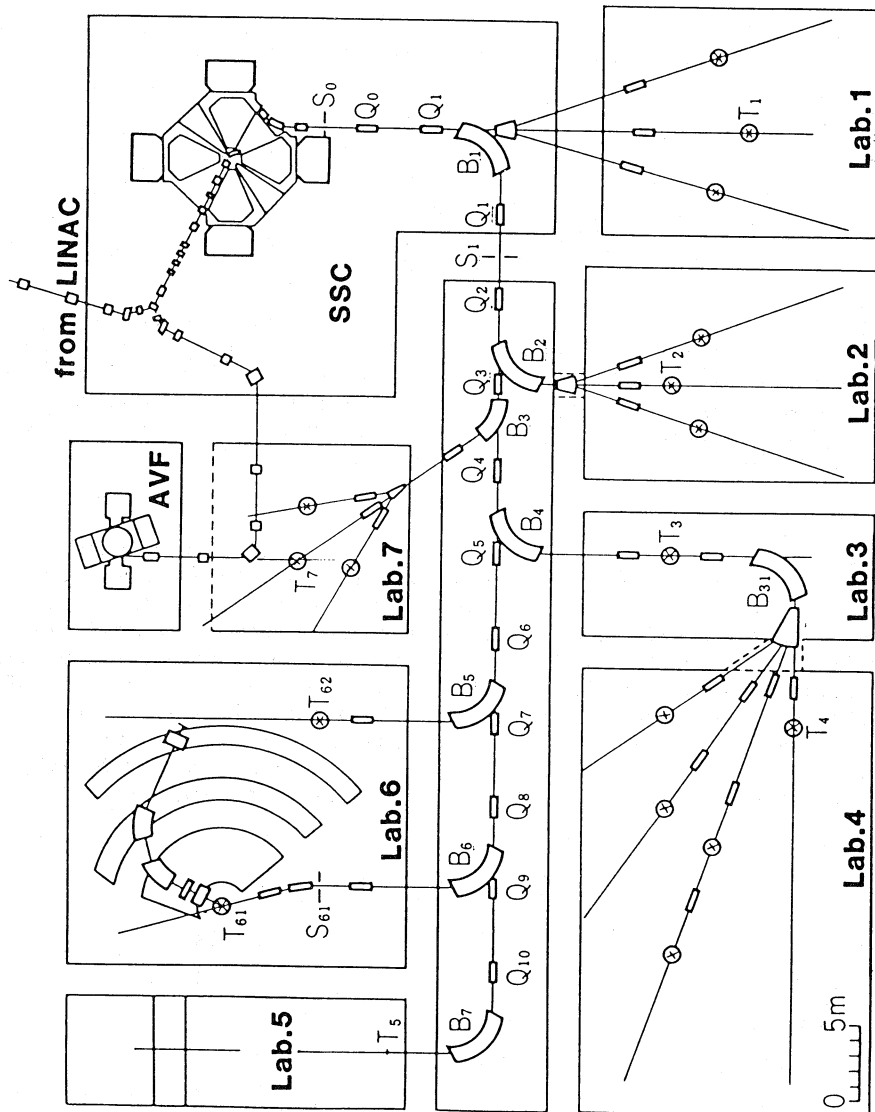


Fig. 1. Plan view of the beam handling system for the RIKEN SSC. S_0 is the object point of the system.