

**Design Study of a Multiple-Beam RFQ Version of a High-Current Linac Injector for a Neutron Source**, M. INOUE, V. KAPIN, A. NODA, Accelerator Lab., Inst. Chem. Res., Univ. Kyoto - A linac-based neutron source [1] had been outlined as a future plan of the Research Reactor Institute of Kyoto University. An alternative concept of a high-current injector for the linac is proposed. It consists of a multiple-aperture ion source, multiple-beam RFQ structures (MB-RFQ) [2] and beamlets-combining systems. In this injector, the beamlets arranged as a matrix-array are accelerated and combined into a single high-current beam. A reference layout of 8-MeV injector is presented. Ions of deuterons or hydrogen molecules extracted from a 50-keV ion source are accelerated to 400 keV by the first MB-RFQ in beamlets arranged as a 6 x 6-matrix array. Combining transversely groups of four neighboring beamlets, a system of electrostatic deflectors provides 9 united beamlets, which are accelerated by the second MB-RFQ to 1 MeV. Combining 9 beamlets longitudinally, a system of bending magnets and RF deflectors provides a resulting single beam, which is bunched and accelerated to 8 MeV by the third RFQ. The results of beam dynamics simulations are presented. Important design issues of the injector are discussed.

- [1] Y. Kawase et al, Proc. 11 Symp. on Accelerator Science and Technology, 1997, Japan, pp. 133-135.
- [2] V. Kapin et al, Proc. XVIII Linear Accelerator Conference, CERN 96-07, 1996, pp. 722-724.