

THE 40 MEV PROTON/DEUTERON LINAC AT SARAF

D. Berkovits, B. Bazak, Soreq NRC, Yavne;
K. Dunkel, ACCEL, Bergisch Gladbach;
G. Feinberg, I. Mardor, A. Nagler, J. Rodnizki, A. Shor, Y. Yanay, Soreq NRC, Yavne

Abstract

The Soreq Applied Research Accelerator Facility (SARAF) is built to be used for basic research, medical research, neutron based non-destructive testing and radio-pharmaceuticals development and production. The accelerator, designed and constructed by Accel Instruments GmbH, starts with a 5 mA, 20 keV/u ECR ion source. A LEBT transports the beam and matches it to a normal-conducting 4-rod RFQ. The RFQ bunches the beam at a frequency of 176 MHz 4 mA ions and accelerate the ions to 1.5 MeV/u. A 0.65 m long MEBT transports and matches the beam into the superconducting linac. The 20 m long linac is composed of six cryostats that contain a total of 44 half-wave resonators optimized for $\beta_0=0.09$ and 0.15, which are kept at a temperature of 4.5 K by liquid helium. In order to achieve the dose rate criterion for hands-on maintenance, beam loss is limited to 1 nA/m. Extensive beam dynamics simulations, including error analysis with high statistics, indicate that beam loss will indeed be below the above mentioned criterion. Currently, Phase I of the SARAF linac, including the ion source, LEBT, RFQ, MEBT and the first SC cryostat, is installed on site and is undergoing commissioning.

**CONTRIBUTION NOT
RECEIVED**