Injector Upgrade for the Superconducting Electron Accelerator S-Dalinac

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Abstract - Since 1991 the superconducting Darmstadt linear accelerator S-DALINAC provides an electron beam of up to 130 MeV for nuclear and astrophysical experiments. The accelerator consists of an injector and four main linac cryostats, where the superconducting cavities are operated in a liquid helium bath at 2 K. Currently, the injector delivers beams of up to 10 MeV with a current of up to 60 µA. The upgrade aims to increase both parameters, the energy to 14 MeV and the current to 150 µA. Due to an increase in the required RF power to 2 kW the old coaxial RF input couplers, being designed for a maximum power of 500 W, have to be replaced by new waveguide couplers. Consequently, modifications to the cryostat-module had become necessary. We review the design principles, the necessary changes in RF components (i.e., couplers, transition line, stub tuner), the production of the SRF cavities and the new magnetic shielding. A report on the status will be given.

Keywords - Cryostat design, SRF cavity, power couplers, RF

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