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QWR / HWR type cryomodule design for the RAON

The RAON driver linac uses 4 types of superconducting resonators and 5 individual cryomodule configurations. The SCL1 (Super Conducting Linac 1) consists of QWR (Quarter Wave Resonator) with $\beta=0.047$ and $f=81.25\text{MHz}$ and HWR (Half Wave Resonator) $\beta=0.12$ and $f=162.5\text{MHz}$. The SCL2 (Super Conducting Linac 2) consists of SSR1 (Single Spoke Resonator) with $\beta=0.3$ and 325MHz and SSR2 (Single Spoke Resonator) with $\beta=0.51$ and $f=325\text{MHz}$. The QWR cryomodule operates with a single cavity at 4.5K . Two types of HWR cryomodules are operated at 2K . One type of HWR cryomodule has two cavities, and the other type of HWR cryomodule has four cavities. Minimization of the total heat load is critical to machine performance and efficient operation of the system. The (static) heat load of the system was analytically computed for each configuration. The heat load of the QWR cryomodule is 19Watts and the heat load of the HWR#1 and HWR2 are 28watts and 50watts . We designed to optimization the cooling scheme in order to reduce the load of the cryogenic system.

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