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Status of the Proteus One S2C2 RF System

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IBA is currently developing a compact superconducting synchro-cyclotron intended for a low cost, single room proton therapy treatment system called Proteus One. The RF system of such a machine is challenging to optimize when compared with a fixed frequency isochronous cyclotron RF system.

During acceleration, the RF cavity resonating frequency must be varying from 90MHz to 60MHz. This is realized thanks to an innovative rotating condenser (Rotco) design. The RF power is provided by a triode based oscillator directly coupled to the cavity in the vicinity of the Rotco. In order to get a constant coupling a special anode circuit is used. Different oscillator configurations have been studied and finally a system with re injection onto the cathode has been selected. The signal is provided by a pick-up loop emerging in the main Dee resonator and transmitted to the cathode by an optimized equalizing circuit.

This paper describes the optimization method of the cavity in order to face the numerous space and RF constraints. It also describes how the oscillator is coupled and fed-back. Some details on how the Rotco is designed in order to solve the technical challenges are also shown.

Please indicate preferred presentation (poster or talk?)

poster

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