

A NORMAL CONDUCTING 820 MeV C.W. ELECTRON ACCELERATOR

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As a new machine, suitable for a future experimental program at the Institute for Nuclear Physics at Mainz University, a cw accelerator is proposed consisting of a preaccelerator with 2.11 MeV output energy and three cascaded race track microtrons with output energy of 14, 100 and 820 MeV respectively. Acceleration is accomplished by normal conducting linacs at S-band frequency. Beam optics of this machine have been investigated by computation of many particle trajectories including all couplings and aberrations up to third order. From these computations it is concluded that it should be possible to achieve a 100 μ A beam at 820 MeV with a transverse emittance of $3.10^{-2} \pi$ mm mrad and a relative energy spread of 2.10^{-4} with reasonable margins of safety. Model measurements have been done on the bending magnets and their fringe field optics, a beam steerer system compatible with narrow spacing of the return path and a suitable monitor system. At present a 50 kW cw S-band test facility is being installed which will be used in the near future for measurements on the cw power handling capability of suitable rf structures.

Note. A detailed description of this proposal is presently in print for Nuclear Instruments and Methods.