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## Boosting 250 MeV protons from a cyclotron to 350 MeV For Therapy and Radiography Applications

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We propose to upgrade existing proton therapy facilities by adding a Linac, which boosts typical cyclotron beams of 230 or 250 MeV protons to 350 MeV. This energy allows proton radiography of all sites in the patients body (yielding improved dose calculations). Furthermore, the transversal penumbra of a 350 MeV proton is comparable to that of carbon ion beams. This can be used in stereotactic proton irradiations of small volumes or if a sharp dose gradient is needed.

Based on work conducted by the TERA Foundation a design of a 3 GHz Cell Coupled Linac (CCL) has been made. The CCL-technology enables strong (20-25 MV/m) electric fields for the acceleration. This confines the total linac length to less than 7 m, which allows for upgrading existing proton therapy facilities.

As the linac will be pulsed at 200 Hz repetition rate, we have modified the beam intensity control in the central region of the cyclotron to make a pulsed beam (pulse length 5 mus, rise/fall time 1 mus), to minimize beam losses between linac pulses.

A first unit accelerating from 250 MeV to 275 MeV is planned to be built and inserted for tests in the existing beam line of the proton therapy facility at PSI.

### Please indicate preferred presentation (poster or talk?)

talk

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