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A Design of a Gantry With Super Conducting Magnets For 350 MeV Protons

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Also for energies up to 350 MeV use of a gantry is essential in proton therapy. Compared to gantries for 250 MeV protons, the maximum field strength of all magnets must be increased with only 21% to keep the same gantry dimensions.

A 230 MeV gantry design for 3D scanning recently developed by ProCure, employs super conducting magnets to limit the gantry weight to 18 tons. An arrangement of the SC-magnets as two achromatic bends yields a very large momentum acceptance of $\pm 3\%$. We present a gantry design for 350 MeV protons based on this principle.

The ion optics uses a 1-1 imaging from coupling point to isocenter and the gantry radius has been kept the same.

The gantry is suitable for fast energy scanning between 70 and 230 MeV. Since the SC-magnets limit the field-variation speed, the change of field is proposed to be performed during the delivery of an energy layer. The large momentum acceptance in the achromatic system would allow this feature, provided the magnets change field in a synchronous way.

First prototype SC magnets have been built and are now being tested at ProCure under an SBIR development grant.

Please indicate preferred presentation (poster or talk?)

poster (or talk)

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