



TRIUMF Beam Physics Note
TRI-BN-12-12
Jan, 2012

Curved Deflector for TRIUMF Cyclotron

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Abstract: The deflector which follows the inflector has plates which are straight vertically, only curved radially. Curving the plates to the point that they are spherical instead of cylindrical has beam dynamical advantages.

The current deflector is flat in the vertical direction, and its radial curvature radius is 6.5 inches. The curved deflector case has spherical electrodes, radius is 6.5 inches in both directions.

Tunes derived for case of $500 \mu\text{A}$ are given in the table. Corresponding envelopes are in the figure.

Quad	Flat Deflector	Curved Deflector
Q5-Q19	3.00000	3.00000
Q20	2.81795	2.27100
Q21,Q22	2.89490	2.81997
Q23,Q24	0.68958	0.66388
Q25	3.40802	3.44186
Q26	3.85243	3.74419

There are two advantages to the spherical deflector: the matching is better in the cyclotron, and the beam envelope max size in the vertical line is smaller.

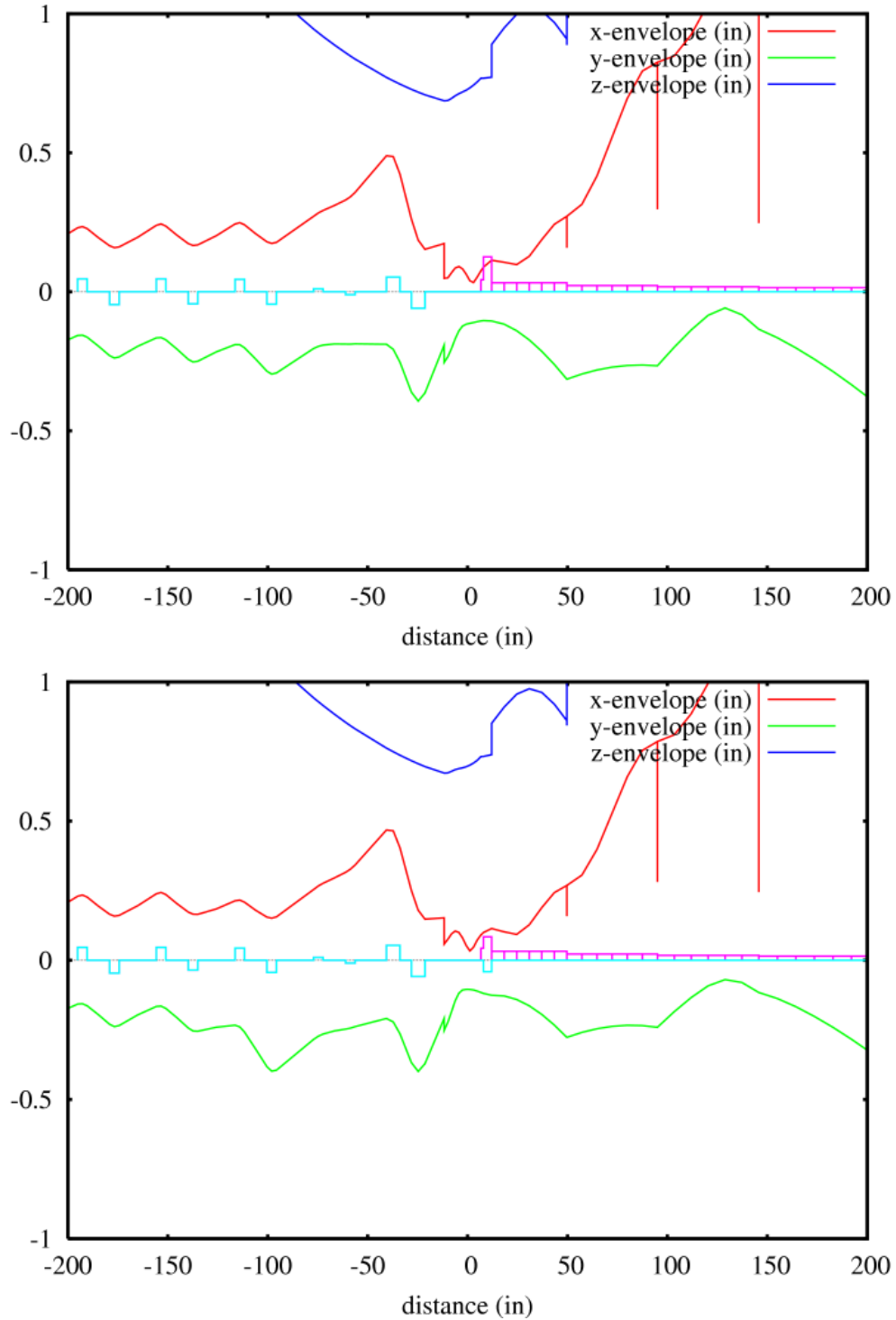


Figure 1: Envelopes for the flat deflector (upper), and spherical deflector (lower). The bottoms of the red spikes are the radial envelope with dispersion removed. Visible are the final 10 quads Q17-Q26.