Booster Gradient Magnet Replacement Specifications

Purpose: To allow the increase of long straights in the Booster where necessary.

Injection region for a larger girder that can accommodate higher energy injection.

Extraction region to allow greater separation of doglegs and allow the septa magnet to be raised.

Parameters:

Beta beating will not increase from our present level estimated to be about 8%.

A working specification is that replacement magnet(s) will not have a notable impact or be less than 1% of our present beta beating.

The working length has been set as follows:

Physical length: 1.8896 m

Path length: 1.889 m

Bending angle: 0.060 radians

Apertures will be no smaller than our present magnets in the vertical plane of 2.24 inches at beam center.

A working specification is that the new gradient magnet will be between 2.5 and 3 Inches.

Higher order fields quality will be no worse than our present magnets which have been documented in Specifications # 0321-ES-2540, TM -0695, TM-0695 Addendum.

Working Tune Qx: 6.653 and Qy 6.801

A working specification is that the dipole and quadrupole fields will be linear to 1% across beam aperture. The coefficients for both body and integral at reference radius corresponding to beam center shall not exceed +/- 1 unit.