A Lattice for the 50 GeV Muon Collider Ring,

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- The lattice design of the 50-50 Gev muon collider is presented. Due to the short lifetime of the 50 GeV muons, the ring needs to be as small as possible. Due to the continuous decay of muons into electrons there is a special requirement for a shielding dipole between the high focusing quadrupoles and the detector. To obtain a luminosity on the order of $\sim 1 \times 10^{33}$ cm^{-2} s^{-1} it is required to have beam intensities on the order of 1×10^{12} particles per bunch and rms beam sizes at a collision point (IP) on the order of 82 microns. The rms momentum spread of the beam is equal to $\sim 0.1\%$ and the beta functions at the IP are equal to 0.04 m. Because the muon beams have large momentum spread the aperture of the final focusing quadrupoles must be kept rather large. The maxima of the betatron functions at these quadrupoles are 1560 m, resulting in large chromaticities which must be corrected by sextupoles. Pairs of these horizontal and vertical chromatic sextupoles are located at locations where the corresponding betatron functions are 100 m and the values of the horizontal dispersion functions are 2.5 and 3.2 m. They are carefully placed so that most of their nonlinear effects are canceled. The dynamic aperture is larger than 7 times the mean size of the beam for the momentum offsets larger than -6 and +10 sigmas.