SINGLE PASS COLLIDER MEMO

CN- 259

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TITLE: LOWERING THE BEAM IN THE SLC ARCS

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It has been decided, at least tentatively, to mount the arc magnets on pedestals, the motivation being to provide the most rigid support possible. In the same spirit the pedestals should be as short as possible. It has been proposed to shorten the pedestals by about 10 inches by either raising the floor of the tunnels or lowering the beams. A relatively simple means for lowering the beams is considered here.

It is assumed that beam height in the switchyard up to the entry into the arcs will remain unchanged. The basic maneuver then is to use the rolls and magnet spacing of the first four achromats, A,B,C and D to introduce an inflection in the vertical profile of the beam so as to give the required lowering and preserve all other parameters defining the beam axis at the end of achromat D. This leaves the geometry of the rest of the beam unchanged except for the lowering. The maximum roll perturbation is about 2 degrees and the increase in magnet spacing is only about 200 microns. This amounts to a total, uniform stretching of the four achromats of about 1.6 cm.

The same procedure would be applied, with slightly different numbers, in both the North and South arcs.

In addition, if it were desirable to maintain present beam height in the FFS, the inverse of the foregoing procedure could be applied using the last four achromats, S,T, U and V. A minor drawback would be that the maximum magnet roll with respect to horizontal in the S,T,U,V group would be increased from an already large value of 14.6 degrees to about 15.0 degrees.

It should be noted that the beam axis in the vicinity of the breakouts from the switchyard would be lowered by only about 0.2 inches.

Standard evaluations using TURTLE show that there would be no observable degradation in beam performance as a result of these changes.

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