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Resizing the SPEAR Booster Ring

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During the down of 2005 an unscheduled job was requested by the SPEAR physicists to realign the booster ring. Using past survey maps of the quad positions and with beam diagnostics the physicists concluded that the booster ring was too large by approximately one centimeter in circumference. We were unable to locate the fixtures used for mapping the quads in the past. Due to time constraints fixtures could not be made and it was decided to use the FARO arm to fiducialize the quad magnets in the ring. Vacuum personnel were also concerned with respect to potential damage to bellows. Adding to this problem was supplying enough manpower to support this task. This poster is an overview of the challenges faced by the Alignment Engineering Group (AEG) with respect to the survey network, fiducialization, mapping and moving of the components, and how the FARO arm proved to be a very effective tool fiducializing the quadrupoles.



Booster Girder

Typical booster girder made up of one quadrupole, one extupole, and one bend magnet. All components are fixed on the girder, therefore the whole girder has to be moved. Four bushings were welded on to the quadrupoles and one bushing was welded on the upstream and downstream end of the girder.











Quadrupole Fiducialization

Five sides of the quad were probed with the FARO arm along with the top four tooling balls. A reference system was made from the five planes giving the tooling balls values with respect to the mechanical center of the magnet



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