



BNL-101686-2014-TECH

RHIC/AP/30;BNL-101686-2013-IR

A Comparison of the Dynamic and Physical Apertures of the RHIC90 Lattice

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May 1986

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USDOE Office of Science (SC)

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May 15, 1986

A COMPARISON OF THE DYNAMIC AND PHYSICAL APERTURES OF THE RHIC90 LATTICE

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The dynamic and physical apertures of RHIC90 have been determined using the following values for the radial apertures of the lattice elements.

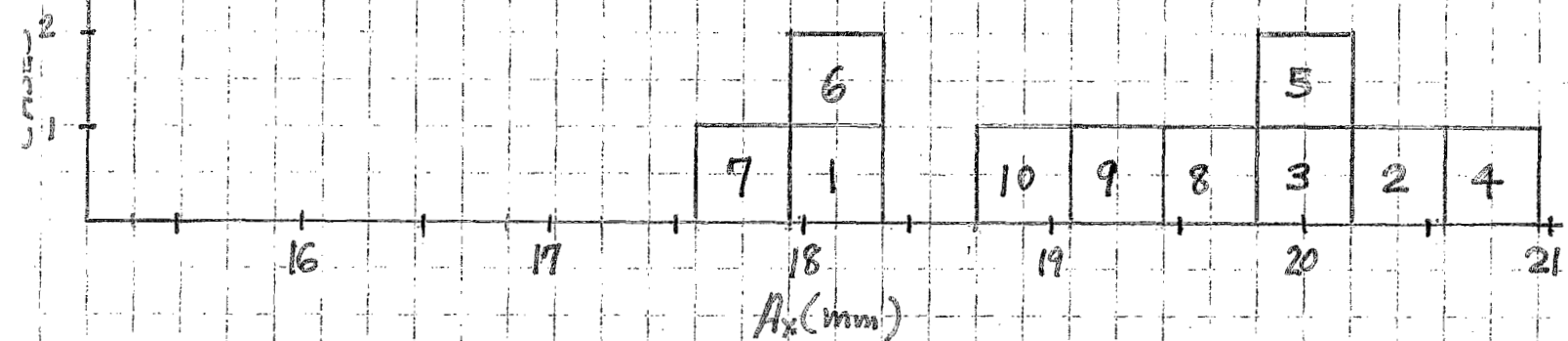
Arc dipoles, QF,QD,Q4 - Q9	36 mm
Q1 - Q3	61 mm
BC1	96 mm
BC2	46 mm .

For the determination at $\Delta P/P = 0.0\%$, all particles were lost either at Q4I or Q4O. Increase of the Q4 aperture from 36 to 61 mm restored the physical aperture to nearly the value of the dynamic aperture. It is pointed out that β_x in Q4 has increased to ~ 120 m for the RHIC90 lattice as compared with ~ 55 m for the RHIC60 lattice. This increase is sufficient to make the Q4 quadrupoles the elements that limit the aperture.

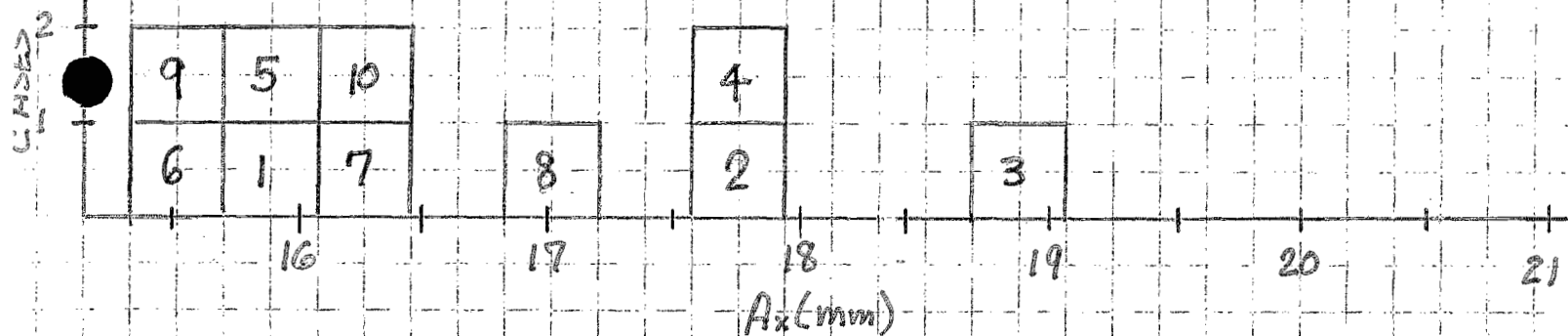
RHIC90 APERTURE AT QF. $\sigma_{a_1} = \sigma_{b_1} = 0, (\sigma_{a_n}, \sigma_{b_n}) \neq 0, 2 \leq n \leq 10$
 $\Delta p/p = 0.0\%$ (FOR TEN SETS OF RANDOM MULTIPOLES)

5/15/86

DYNAMIC APERTURE



PHYSICAL APERTURE $(A(Q4) = 36 \text{ mm})$



PHYSICAL APERTURE $(A(Q4) = 61 \text{ mm})$

