



BNL-101686-2014-TECH

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

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

G. F. Dell

May 1986

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No. DE-AC02-76CH00016 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

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

G. F. Dell

BNL

May 15, 1986

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

G.F. Dell

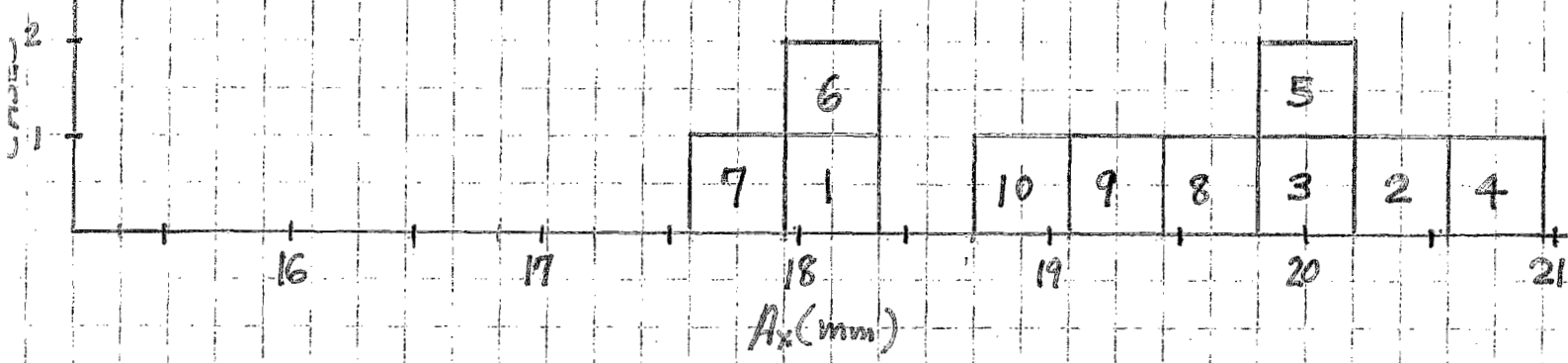
The dynamic and physical apertures of RHIC90 have been determined using the following values for the radial apertures of the lattice elements.

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

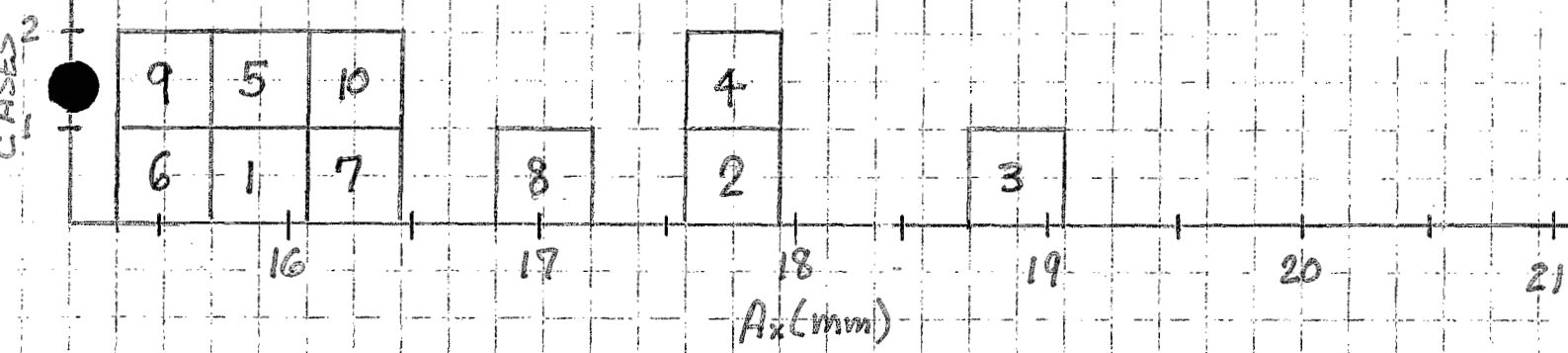
For the determination at $\Delta P/P = 0.0\%$, all particles were lost either at Q4I or Q4O. Increase of the Q4 aperture from 36 to 61 mm restored the physical aperture to nearly the value of the dynamic aperture. It is pointed out that β_x in Q4 has increased to ~ 120 m for the RHIC90 lattice as compared 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. $\sigma_{a_i} = \sigma_{b_i} = 0, (\sigma_{a_n}, \sigma_{b_n}) \neq 0, 2 \leq n \leq 10$
 $\Delta p/p = 0.0\%$ (FOR TEN SETS OF RANDOM MULTIPOLES) 5/15/86

DYNAMIC APERTURE



PHYSICAL APERTURE
 $(A(\phi_4) = 36 \text{ mm})$



PHYSICAL APERTURE
 $(A(\phi_4) = 61 \text{ mm})$

