



Brookhaven  
National Laboratory

BNL-101668-2014-TECH

RHIC/AP/12;BNL-101668-2013-IR

## Lattice and Magnet Design Assumptions

H. Hahn

January 1985

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.

LATTICE AND MAGNET DESIGN ASSUMPTIONS 11

H. Hahn

Brookhaven National Laboratory 12

January 4, 1985

1/4/85

## MAGNET CONSTRAINTS:

## 1) FOR 100 GeV/amu Au OPERATION

ARC DIPOLE 10m EFF;  $B_{arc} = 3.26$  T  
8 cm COIL APERTURE

BC2 4.1 T, LENGTH AS REQUIRED  
SINGLE LAYER COSINE  
COIL APERTURE 10 cm

BC1 5.5 T, LENGTH AS REQUIRED  
DOUBLE LAYER COSINE  
~ 20 cm COIL APERTURE

ARC QUADS  $G/B_{arc} = 19.84$  m<sup>-1</sup>

INS QUADS SPECS TO BE DEVELOPED  
PROBABLY 2 LAYER COSINE, 13 cm COIL APERTURE  
FOR SYNCH: EQUAL TO ARC

GOOD FIELD ROOM FOR  $6\sigma$  (30 GeV) IN ALL MAGNETS  
CHROMATIC AND RANDOM ERRORS CORRECTED

DEFINE QC AS REQUIRED BY LATTICE

MAGNET DIVISION WILL PROVIDE CONCEPTUAL DESIGN  
COSINE, WINDOW FRAME, SEPTUM DIPOLE

## 2) HIGH ENERGY p OPERATION (~ 345 GeV)

EQUAL QUENCH MARGIN IN ALL DIPOLES

BC2 = 4.5 T

BC1 = 6 T

$B_{arc} = 4.5$  T

ACCEPT IRON SATURATION EFFECTS

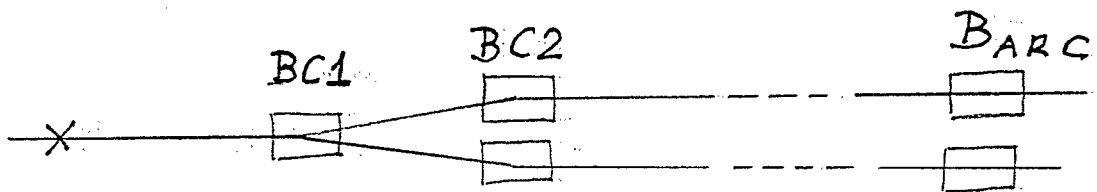
ALL CORRECTION ELEMENTS DESIGNED FOR HIGH FIELD OPERATION

LATTICE SUMMARY

STUDY 2 LATTICES

- SYMMETRICAL
- ASYMMETRICAL

BASED ON FOLLOWING DESIGN ASSUMPTIONS:



FREE SPACE TO BC1

- $\pm 11$  m TO EFFECTIVE POSITION (SYNCH)
- $\pm 10$  m FOR PHYSICS

INNER/OUTER RING SPACING

35 cm

DESIGN INSERTION FOR OPTIMUM LUMINOSITY Au/Au

30 - 100 GeV/amu

$\alpha = 0$  - 2 mrad FOR Au-Au, Au-p

RETUNE INSERTION FOR HIGH ENERGY p OPERATION

WITHOUT PHYSICAL CHANGE

$\alpha \neq 0$  ACCEPTED