Accelerator Division
Alternating Gradient Synchrotron Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, New York 11973

Accelerator Division
Technical Note

No. 234

Booster Parameter List

Z. Parsa

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ABSTRACT

THIS NOTE DESCRIBES THE PARAMETER LIST FOR THE AGS - BOOSTER. A SCHEMATIC LAYOUT OF THE LATTICE AND ITS SUPERPERIODS ARE ALSO INCLUDED.
INTRODUCTION

In this note we describe the parameter list of the AGS - Booster. In section II the present values of the Booster parameters are tabulated. This updates the Booster parameter list given in References 1 and 2. Schematic diagram of the lattice [3,4] showing the layout of the AGS Booster, the labeling convention of the lattice and its superperiods are also included.

References:


AGS BOOSTER PARAMETER LIST

ENERGY [MeV]

INJECTION:

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PROTONS</td>
<td>200 MeV</td>
</tr>
<tr>
<td>POL PROTONS</td>
<td>200 MeV</td>
</tr>
<tr>
<td>HEAVY IONS</td>
<td>&gt; 1 MeV/AMU</td>
</tr>
</tbody>
</table>

[POL == POLARIZED]

EJECTION (MAXIMUM)

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<tr>
<td>PROTONS</td>
<td>1 GeV</td>
</tr>
<tr>
<td>POL PROTONS</td>
<td>1 GeV</td>
</tr>
<tr>
<td>HEAVY IONS</td>
<td>P = 5 Q/A GeV/AMU</td>
</tr>
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[Q is the charge of the Heavy Ions (whether fully stripped or not) delivered from the Tandem.]

LATTICE

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CIRCUMFERENCE</td>
<td>201.78 M (1/4 AGS)</td>
</tr>
<tr>
<td>PERIODICITY</td>
<td>6</td>
</tr>
<tr>
<td>NUMBER OF CELLS</td>
<td>24 FODO</td>
</tr>
<tr>
<td></td>
<td>[SEPARATE FUNCTION, MISSING DIPOLES]</td>
</tr>
<tr>
<td>LENGTH</td>
<td>8.4075 M</td>
</tr>
<tr>
<td>PHASE ADVANCE/CELL</td>
<td>71.25</td>
</tr>
<tr>
<td>QX = QY</td>
<td>4.75</td>
</tr>
<tr>
<td>BETAX MAX/MIN</td>
<td>13.88/3.67 M</td>
</tr>
<tr>
<td>BETAY MAX/MIN</td>
<td>13.67/3.80 M</td>
</tr>
</tbody>
</table>
XP MAX 2.94 M
TRANSITION GAMMA 4.795

RF SYSTEM

NUMBER OF STATIONS
1 FOR PROTONS
1 FOR POL PROTONS
2 FOR HEAVY IONS
[where POL == POLARIZED]

HARMONIC NUMBER
3 FOR PROTONS
3 FOR POL PROTONS
3 FOR HEAVY IONS (1 FOR RHIC)

FREQUENCY RANGE (MHz)
FOR PROTONS 2.5 - 3.9
FOR POL PROTONS 2.5 - 3.9
FOR HEAVY IONS 0.178 - 2.5 (.06 - .84 FOR RHIC)

PEAK RF VOLTAGE [KV]
FOR PROTONS 35
FOR POL PROTONS 35
FOR HEAVY IONS 17

ACCELERATION TIME [M-SEC]
FOR PROTONS 50
FOR POL PROTONS 50
FOR HEAVY IONS 500

REPETITION RATE
FOR PROTONS 10 Hz (4 PULSES/AGS PULSE)
FOR POL PROTONS 1 Hz (1 PULSE/AGS PULSE)
FOR HEAVY IONS 1 Hz (1 PULSE/AGS PULSE)

DIPOLES
[DIPOLES ARE CURVED AND WEDGED FOR 0 ENTRANCE ANGLE]
NUMBER 36
LENGTH (MAGNETIC) 2.4 M
GAP 82.55 MM
GAP VACUUM CHAMBER 66 MM
GOOD FIELD REGION (<10^-4) 16 X 6.6 CM

INJECTION FIELD [KG]
FOR PROTONS 1.56
FOR POL PROTONS 1.56
FOR HEAVY IONS 0.105 A/Q

[EJECTION FIELD [KG]
FOR PROTONS 4.0
FOR POL PROTONS 4.0
FOR HEAVY IONS 12.0
LAMINATION THICKNESS 1.5 MM
[0.6 MM AROUND ENDS]

QUADRUPOLES

NUMBER 48

LENGTH (MAGNETIC) 0.50375 M

APERTURE 16.5 CM

VACUUM CHAMBER AP. 15.5 CM

[AP. == APERTURE]

INJECTION POLE TIP FIELD [KG]

FOR PROTONS 1.02

FOR POL PROTONS 1.02

FOR HEAVY IONS 0.068 A/Q

[Q is the charge of the Heavy Ions, (whether fully stripped or not), delivered from the Tandem.]

EJECTION POLE TIP FIELD [KG]

FOR PROTONS 2.7

FOR POL PROTONS 2.7

FOR HEAVY IONS 7.9

LAMINATION THICKNESS 0.6 MM

FIELD QUALITY

SEXTUPOLE HARMONIC 0.0
(6θ/2θ)

(SHAPE POLE TIP TO ELIMINATE)

ALL OTHER HARMONICS < 10⁻⁴

MAX. VACUUM PRESSURE (N₂ EQU.) 10⁻¹⁰ TORR
MAX. INTENSITY (PARTICLES PER PULSE)

FOR PROTONS \( 1 - 1.5 \times 10^{13} \)
FOR POL PROTONS \( 10^{12} \)
FOR HEAVY IONS \( 2 \times 10^{11} / z \).
Acknowledgement:

We thank E. Courant, and other members of the Booster Design study group for discussions and Ms. K. Brown for our drawings.
Fig. 1  The Booster Lattice