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Booster Parameter List with 1,2,4,7 Sextupole Configurations

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February 12, 1986

ABSTRACT

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THIS NOTE DESCRIBES THE PARAMETER LIST FOR THE AGS - BOOSTER, WITH SEXTUPOLE CONFIGURATIONS 1,2,4,7. A SCHEMATIC LAYOUT OF THE LATTICE AND ITS SUPERPERIODS ARE ALSO INCLUDED.

INTRODUCTION

This note describes the parameter list of the AGS -Booster with 1,2,4,7 sextupole configurations and tunes of 4.82 and 4.83. In section II the present values of the Booster parameters are tabulated. The values listed are for theoretical calculations and are "precise but may not be accurate". This updates the Booster parameter list given in Reference 1. Schematic diagrams of the lattice [2,3] showing the layout of the AGS Booster, the labling convention of the lattice and its superperiods are also included.

References:

- 1. AGS Booster Parameter List, Booster Tech. Note No. 2, Z. Parsa, (January 16, 1986).
- Booster Lattice, Booster Tech. Note No. 1, E. Courant and Z. Parsa, (January 15, 1986).
- 3. Booster Coordinates, Booster Tech. Note No. 6, Z. Parsa, (January 28, 1986). See also, BST/ TN NO. 3, Z. Parsa, G. F. Dell, (January 17, 1986).

Page 3

AGS BOOSTER PARAMETER LIST

ENERGY [MeV]

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INJECTION:

PROTONS (INCLUDING POL PROTONS) 200 MeV

HEAVY IONS > 1 MeV/AMU

[POL == POLARIZED]

EJECTION (MAXIMUM)

PROTONS (INCLUDING POL PROTONS) 1 GeV

HEAVY IONS P = 5 Q/A GeV/AMU-C

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

LATTICE

CIRCUMFERENCE	201.78 M (1/4 AGS)		
PERIODICITY	6		
NUMBER OF CELLS	24 FODO [SEPARATE FUNCTION, MISSING DIPOLS]		
LENGTH	8.4075 M		
PHASE ADVANCE/CELL	72.3°, 72.45°		
TUNES	QX= 4.82, QY= 4.83		
BETAX MAX/MIN BETAY MAX/MIN	13.865/3.5754 13.644/3.7033		
XP MAX	2.9515 M		
TRANSITION GAMMA	4.8812		

RF SYSTEM

NUMBER OF STATIONS (3 IN TOTAL)

1 FOR PROTONS (INCLUDING POL PROTONS)

2 FOR HEAVY IONS

[where POL== POLARIZED]

HARMONIC NUMBER

3 FOR PROTONS (INCLUDING POL PROTONS) 3 FOR HEAVY IONS (1 FOR RHIC)

FREQUENCY RANGE (MHz)

FOR PROTONS (INCLUDING POL PROTONS) 2.5 - 3.9 FOR HEAVY IONS 0.178 - 2.5 (.06 - .84 FOR RHIC)

PEAK RF VOLTAGE [KV]

FOR PROTONS (INCLUDING POL PROTONS) 35 FOR HEAVY IONS 17

ACCELERATION TIME [M-SEC]

FOR PROTONS (INCLUDING POL PROTONS) 50 FOR HEAVY IONS 500

REPETITION RATE

FOR	PROTONS	$10 \ Hz$	(4 PULSES/AGS PULSE)
FOR	POL PROTONS	$1 \mathrm{Hz}$	(1 PULSE/AGS PULSE)
FOR	HEAVY IONS	$1 \mathrm{Hz}$	(1 PULSE/AGS PULSE)

DIPOLES

[DIPOLES ARE CURVED AND WEDGED FOR O 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]

OTONS) 1.5633 0.1047 A/Q
PROTONS) 4.1049 12.129
1.5 MM [0.6 MM AROUND ENDS]
48
0.50375 M
16.52 CM
15.5 CM
89 [KG/M]
204
683 A/Q
95

FOR HEAV BF = 7.6805 , BD = 7.9170.6 MM LAMINATION THICKNESS

 $p_{\rm c}$

QUADRUPOLES

WITH

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FIELD QUALITY

SEXTUPOLE HARMONIC 0.0

(SHAPE POLE TIP TO ELIMINATE) (6 THETA/2 THETA)

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Page 6

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ALL OTHER HARMONICS < 10	
-10 MAX. VACUUM PRESSURE (N2 EQU.) 10 TORR	
MAX. INTENSITY (PARTICLES PER PULSE)	
FOR PROTONS $1 - 1.5 \times 10$	
FOR POL PROTONS 10	
FOR HEAVY IONS $2 \times 10 / Z$	
SEXTUPOLES	
LOCATION 17 (SF) 24 (SD)	
$\frac{100}{100} \frac{10}{100} \frac{10}{10$	
$\frac{10000000}{1000000} = \frac{12}{1000000} = \frac{12}{100000000} = \frac{12}{10000000000000000000000000000000000$	
LENGIN IO CM	
APERTURE 16.52 CM	
AT 1 GEV WITH INTEGRATED STRENGTH [T/M]: 1.7 ,	1.761
INJECTION POLE TIP FIELD [KG]	
FOR PROTONS (INCLUDING POL PROTONS) 0.44139 FOR HEAVY IONS 0.02956 A/Q	0.45761 0.03065 A/Q
EJECTION POLE TIP FIELD [KG]	
FOR PROTONS (INCLUDING POL PROTONS) 1.159 FOR HEAVY IONS 3.4246	$1.2015 \\ 3.5504$

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Page 7

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Fig. 1 The Booster Lattice

