BNL-101555-2014-TECH
RHIC/PG/12;BNL-101555-2013-IR

120 Degree Phase Advance\ Cell Lattice

A. G. Ruggiero

December 1983

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy
USDOE Office of Science (SC)

DISCLAIMER

RHIC-PG-12

120° PHASE ADVANCE/CELL LATTICE

A. G. RUGGIERO

(BNL, December 6, 1983)

RHIC-PG-12

120° Phase Advance / Cell Lattice

A. G. Ruggiero

BNL, Dec. 6, 1983

Lattice

No. of Period 12

Each Period has a symmetry point

Structure for half a superperiod

(8C) (CS) (2CE) (LS)

C is a regular cell :

QF/2	OO	B	OO	QD/2
QD/2	OO	B	OO	QF/2

CS is a dispersion killer cell :

QF/2	OO	LB	OO	QD/2
QD/2	OO	B	OO	QF/2

CE is an empty cell :

QF/2	OO	LB	OO	QD/2
QD/2	OO	LB	OO	QF/2

LS is the long straight section:

QF/2 (O3 Q3 O2 Q2
O1 Q1) O0 AL LØ

Bρ = 839.72 T-m

Drifts:

O0	0.9960	m
LB	7.85	
AL	18.	
LØ	10.	
O1	} to be adjusted	
O2		
O3		

Dipole: (B)

Field	3.29469	T
Length	7.85	m

Quadrupoles :

QF', QD

total length	1.9 m
$B'/B\rho$	0.077637 m^{-2}

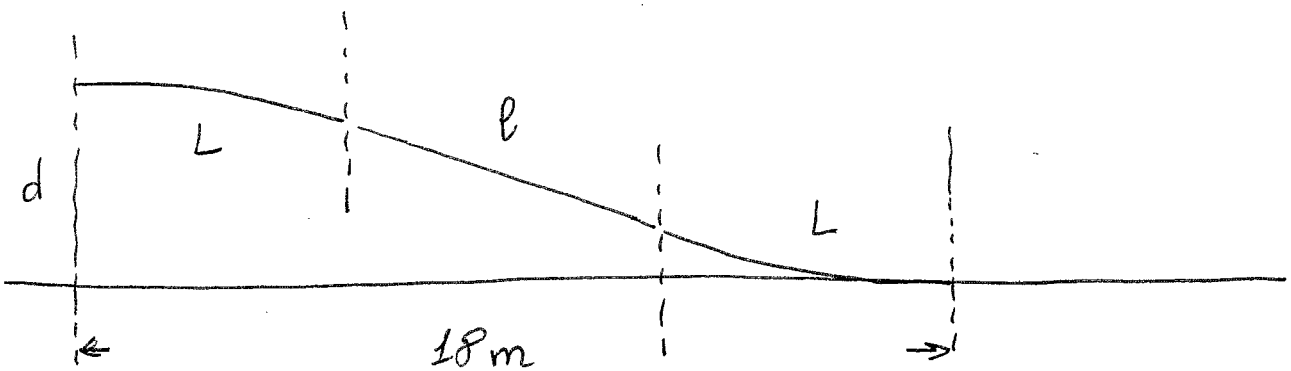
(adjust strength for a phase advance of 120° per cell)

Q_1, Q_2, Q_3 length, strength and location adjusted to get $\beta_H^* = \beta_V^* = 2.0$ m

Supplementary Condition :

Length of (Q3 Q3 Q2 Q2 Q1 Q1) = 31.2148 m

Vertical Bend (AL)



$$d = (18 - L)\,\theta$$

$$L = 9 - \sqrt{81 - d/a} \qquad a = 0.003924$$

$$\theta = \frac{0.0308}{7.85} L$$

$$d = 0.003924\,(18 - L)L$$

d	L	$\rho\theta^2/2 = aL^2/2$	ℓ
10 cm	1.55 m	0.47 cm	14.90 m
15	2.46	1.19	13.08
20	3.52	2.43	10.96
25	4.84	4.60	8.32
12	1.90	0.71	14.2

Replace AL with : BV L BV

L Drift 14.2 m

BVM and BVP are vertical bends { Length 1.90 m ; Field 3.29459 T