RHIC-PG-12

# 120° PHASE ADVANCE/CELL LATTICE

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(BNL, December 6, 1983)

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# 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 | ( 03 | Q3 | 02 | Q2 |
| 01 | Q1 ) | 00 | AL | Lϕ |

$B\rho$ = 839.72 T-m

<u>Drifts</u> :

| | | |
|---|---|---|
| 00 | 0.9960 | m |
| LB | 7.85 | |
| AL | 18. | |
| Lϕ | 10. | |
| 01 | } | to be adjusted |
| 02 | } | to be adjusted |
| 03 | } | to be adjusted |

<u>Dipole</u> : (B)

| | | |
|---|---|---|
| Field | 3.29469 | T |
| Length | 7.85 | m |

<u>Quadrupoles</u> :

QF', QD

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

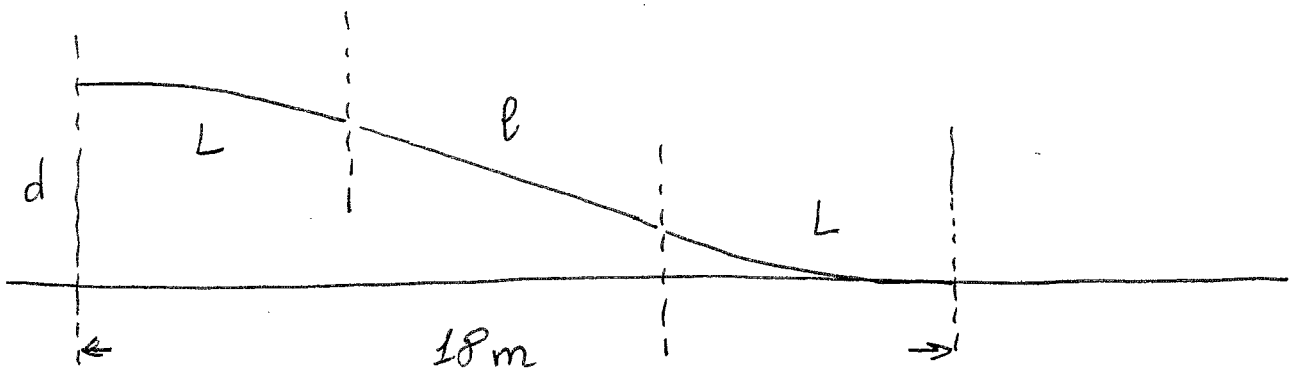
(adjust strength for a phase advance of 120° per cell)

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

Supplementary Condition :

Length of (O3 Q3 O2 Q2 O1 Q1) = 31.2148 m

# Vertical Bend (AL)




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

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

$$\theta = \frac{0.0308}{7.85}\,L \qquad d = 0.003924\,(18 - L)\,L$$

| 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 }