Proton Driver II 8 GeV Synchrotron Lattice

(March 4, 2002)

STRUCTURE

Size and shape	474.2 m, racetrack
Cell	doublet, 10.773 m, 96°/60°
Arc module	3-cell, short dipole in middle, 288°/180°
Arc	5 modules (15 cells), 8 π / 5 π
Long straight (LS)	7 cells
Superperiod	1 arc + 1 LS
Ring	2 superperiods
RF and Extraction	one LS
RF and Injection	one LS
Collimation	in the arc

TWISS PARAMETERS

β_x/β_y (max)	15.7 m/18.7 m
Dispersion (max)	2.4 m (arc), zero (LS)
γ_t	13.82
ξ_x/ξ_y (natural)	-12.8/-10.9
ν_x/ν_y	11.7/7.34

MAGNET AND SPACE INVENTORY

Dipole (2 types)	124.8 m, 1.5 T (nominal)
B1, 5.72 m × 20	
B2, 1.04 m × 10	
Quadrupole (2 types)	96.5 m, 10 T/m (nominal)
QF, 1.18 m × 44	
QD, 1.014 m × 44	
Sextupoles	20 h, 20 v, 30 cm each
Correctors in arc	2 per 3 QF, 2 per 3 QD
Q-Q spacing	0.62 m × 44 = 27.3 m
B1-Q spacing	1.12 m × 40 = 44.8 m
B2-Q spacing	3.46 m × 20 = 69.2 m

LS slots	7.96 m × 14 = 111.4 m

PERFORMANCE

Dynamic aperture	250 π	
$\Delta\nu$ *vs*. $\Delta p/p$	< 0.016 at ±1%	
$\Delta\beta$ *vs*. $\Delta p/p$	< 2 m at ±1%	
ΔD *vs*. $\Delta p/p$	< 0.7 m at ±1%	
$\Delta\gamma_t$ *vs*. $\Delta p/p$	< 1.3 at ±1%	
$\Delta\nu$ *vs*. ampl.	0.205	0.062
	0.062	0.347
Space charge	$\Delta\nu = 0.15$ at injection	
3rd order resonance	cancelled	
4th order resonance	cancelled except one	