

Table 1: Technical Systems Parameters – Phase I/Stage 2 (09/08/00)

<b>New linac front end</b>	
H <sup>-</sup> source:	
Extraction energy (keV)	50
Current (mA)	115
Pulse length ( $\mu$ s)	90
Rep rate (Hz)	15
Normalized transverse emittance (95%, mm-mrad)	$1.0 \pi$
RFQ:	
Extraction energy (MeV)	1 (1st RFQ) 2.235 (2nd RFQ)
RF frequency (MHz)	201.25
Current (mA)	100
Modified Tank 1:	
Extraction energy (MeV)	10
RF frequency (MHz)	201.25
Current (mA)	90
Normalized transverse emittance (95%, mm-mrad)	$2.5 \pi$
End of linac:	
Extraction energy (MeV)	400
RF frequency (MHz)	805
Current (mA)	86
Normalized transverse emittance (95%, mm-mrad)	$3.0 \pi$
<b>Chopper</b>	
Chopping frequency (MHz)	5.4
Energy modulation (keV)	$\pm 3$
Rise- and fall-time (ns)	$< 20$
Duty factor	$4.5 \times 10^{-4}$
<b>16 GeV ring (lattice)</b>	
Circumference (m)	711.3
Max $\beta_x, \beta_y$ (m)	35, 30
Max $D_x$ (m)	2.8
Horizontal/vertical tune	11.4/12.4
Transition $\gamma_t$	42
Number of straight sections	3
Momentum acceptance	$\pm 2.5\%$
Dynamic aperture	$> 100 \pi$

<b>16 GeV ring (beam)</b>	
Normalized transverse emittance (95%, mm-mrad)	
Injection beam	$3 \pi$
Circulating beam	$60\pi$
Longitudinal emittance (95%, eV-s)	
Injection beam	0.1
Extraction beam	0.4
Extracted bunch length $\sigma_t$ (rms, ns)	3
Momentum spread at extraction (95%)	$\pm 0.3\%$
Laslett tune shift	
Injection	0.36
Extraction	0.06
Injection turns	27
<b>RF system</b>	
Frequency (MHz)	5.41-7.57
Accelerating gradient (kV/m)	30
Maximum rf voltage (MV)	1.4
Cavity type	Finemet loaded
Cavity quality factor	3
<b>Magnets</b>	
Dipoles:	
Max/Min field (T)	1.5/0.0846
Vertical/horizontal full aperture (cm)	12.7/31.8
Good field region (cm)	$\pm 10$
Quadrupoles:	
Max gradient (T/m)	8.7494
Pole tip radius (cm)	8.52
<b>Power supplies</b>	
Type	dual resonance
Magnet current	
Peak (A)	6316
DC/15 Hz/30 Hz component (A)	3336/2895/362
Magnet stored energy, peak (MJ)	12
Voltage to ground, peak (kV)	3
Total loss (MW)	8
<b>Vacuum system</b>	
Beam vacuum (torr)	$1 \times 10^{-8}$
Beam pipe	thin Inconel
Pipe dimensions (cm $\times$ cm)	12.7 $\times$ 22.9
<b>Collimators</b>	
Type	2-stage
Efficiency	> 99%