ILC Damping Rings Baseline Configuration Lattice Specifications

23 January 2006 – 500 MHz RF frequency

General Parameters

Circumference	6476.7163 m
Energy	5 GeV
RF frequency	**500 MHz**
Harmonic number	10802
Transverse damping time, e^+ DR (e^- DR)	<25 ms (<50 ms)
Normalized natural emittance	5 μm
Equilibrium bunch length	6 mm
Equilibrium energy spread	<0.13%
Momentum compaction	~ 4×10^{-4}
Damping wiggler peak field	1.67 T
Damping wiggler period	0.4 m
Energy acceptance	$\|\delta\|<0.5\%$
Dynamic aperture	$A_x+A_y<0.09$ m-rad (up to $\|\delta\|=0.5\%$)

Fill Patterns (Electron Damping Ring)

Ring circumference [m]	6476.7163					
Harmonic number	10802					
Ring RF frequency [MHz]	500					
Linac RF frequency [GHz]	1.3					
Linac pulse length [ms]	0.97					
Linac bunch spacing [linac RF wavelengths]	468	390	351	312	260	234
Linac bunch spacing [ring RF wavelengths]	180	150	135	120	100	90
Linac bunch spacing [ns]	360.00	300.00	270.00	240.00	200.00	180.00
Ring bunch spacing [linac RF wavelengths]	5.2					
Ring bunch spacing [ring RF wavelengths]	2					
Ring bunch spacing [ns]	4.00					
Bunches per train	45					
Number of bunch trains	60	72	80	90	108	120
Gaps per train	45	30	22.5	15	5	0
Gap length [ns]	184.00	124.00	94.00	64.00	24.00	4.00
Total number of bunches	2700	3240	3600	4050	4860	5400
Bunch charge [$\times10^{10}$]	2.00	1.67	1.50	1.33	1.11	1.00

Additional Requirements

- Fractional tunes should be below the half-integer, to minimize resistive-wall growth rates.
- Tunes should be a safe distance from coupling resonances, to minimize the sensitivity of the vertical emittance to coupling errors.
- Optics should accommodate injection and extraction systems (to be specified).
- Magnet strengths should be kept sufficiently low to accommodate vacuum chamber with required aperture (to be specified).