# ILC Damping Rings Alternative Configuration Lattice Specifications

*26 January 2006*

## General Parameters

| | |
|---|---|
| Circumference | 17227.9195 m |
| Energy | 5 GeV |
| RF frequency | 650 MHz |
| Harmonic number | 37353 |
| 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 | ~ $1.5\times10^{-4}$ |
| 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

| | | | |
|---|---|---|---|
| Ring circumference [m] | 17227.9195 | | |
| Harmonic number | 37353 | | |
| Ring RF frequency [MHz] | 650 | | |
| Linac RF frequency [GHz] | 1.3 | | |
| Linac pulse length [ms] | 1.03 | | |
| Linac bunch spacing [linac RF wavelengths] | 540 | 360 | 180 |
| Linac bunch spacing [ring RF wavelengths] | 270 | 180 | 90 |
| Linac bunch spacing [ns] | 415.38 | 276.92 | 138.46 |
| Ring bunch spacing [linac RF wavelengths] | 18 | 12 | 6 |
| Ring bunch spacing [ring RF wavelengths] | 9 | 6 | 3 |
| Ring bunch spacing [ns] | 13.85 | 9.23 | 4.62 |
| Bunches per train | 6 | 9 | 18 |
| Number of bunch trains | 415 | | |
| Gaps per train | 12 | | |
| Gap length [ns] | 60.00 | | |
| Total number of bunches | 2490 | 3735 | 7470 |
| Bunch charge [$\times10^{10}$] | 2.25 | 1.50 | 0.75 |

## 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).