

parameter tolerances

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	2007 com.	nominal	effect/reason
peak closed orbit	?	4 (3) mm [2]	mechanical aperture
rms closed orbit	?	0.40 mm [2]	feed down, dynamic aperture
orbit stability	?	0.2 σ (0.6 σ [6,13])	arc beam losses, collimation
static off-momentum (1.5×10^{-3}) peak β beat	?	21% [1,2,3]	aperture, collimation
transient peak β beat	?	<8% [6,13]	arc beam losses, collimation, aperture
peak dispersion $D/\sqrt{\beta}$?	27% [4]	collimation, aperture
coupling κ	?	0.001 [7,8]	tune control, diag.
tune	?	0.003/0.001 [7]	stable tune region, & tune spread
δ deviation	?	1.5×10^{-3}[2] 2×10^{-3}[7]	aperture, collimation
δ stability	?	10^{-4} [8]	rf capture, HERA
dynamic aperture	?	6 (10-12) σ [2]	lifetime, beam control

proposal/guesses	2007 com.	nominal	effect/reason
peak closed orbit	4 (6?) mm?	4 (3) mm [2]	mechanical aperture
rms closed orbit	0.7 mm?	0.40 mm [2]	feed down, dynamic aperture
orbit stability	1 σ [5]	0.2 σ (0.6 σ [6,13])	arc beam losses, collimation
static off-momentum (1.5×10^{-3}) peak β beat	< 90% ?	21% [1,2,3]	aperture, collimation
transient peak β beat	< 90% [1]	<8% [6,13]	arc beam losses, collimation, aperture
peak dispersion $D/\sqrt{\beta}$	< 40%?	27% [4]	collimation, aperture
coupling κ	0.01 [7]	0.001 [7,8]	tune control, diag.
tune	0.01 [7]	0.003/0.001 [7]	stable tune region, & tune spread
δ deviation	2×10^{-3} ?	1.5×10^{-3} [2] 2×10^{-3} [7]	aperture, collimation
δ stability	2×10^{-4} ?	10^{-4} [8]	rf capture, HERA
dynamic aperture	$\sim 4 \sigma$	6 (10-12) σ [2]	lifetime, beam control

	2007 com.	nominal	effect/reason
chromaticity Q'	5±5 [5,7]	2±1 [7]	instabilities, dyn. ap.
2 nd order Q''	few 1000	1000/2000 [2]	head-tail stability for Q' meas., ΔQ
3 rd order Q''	3x10⁶?	>-5x10⁵ [7,9], <3x10⁶	head-tail stability, dyn. aperture, ΔQ
detuning/amplitude@6σ	0.005?	0.002 [7]	dynamic aperture, ΔQ
$\partial^2 Q / (\partial \varepsilon) / (\partial \delta)$?	7x10⁶ m⁻¹ [2]	total tune spread ΔQ
bunch-to-bunch intensity	?	±10% peak [11]	PS booster rings, PS
bunch-to-bunch transv. emittance variation	?	±10% peak [11]	PS booster rings, PS
bunch-to-bunch longit. emittance variation	?	±10% peak [11] +0/-10% [12]	PS booster rings, PS
minimum / maximum transverse emittance	?	3 μm < ε < 3.75 μm	beam-beam, collimator survival, aperture
vacuum beam lifetime	1 (30?) h ?	100 h [10]	nuclear interaction

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