

TABLE 4.1

TESLA parameters for an upgrade to 800 GeV. It is assumed that the linac is built with 2 9-cell superstructures and the rf power has been doubled (see text).

		TESLA-800
Accelerating gradient	E_{acc} [MV/m]	35
Fill factor		0.79
Repetition rate	f_{rep} [Hz]	4
Beam pulse length	T_P [μ s]	860
Number of bunches per pulse	n_b	4886
Bunch spacing	Δt_b [ns]	176
Charge per bunch	N_e [10^{10}]	1.4
Emittance at IP	$\gamma\varepsilon_{x,y}$ [10^{-6} m·rad]	8, 0.015
Beta at IP	$\beta_{x,y}^*$ [mm]	15, 0.4
Beam size at IP	$\sigma_{x,y}^*$ [nm]	391, 2.8
Bunch length at IP	σ_z [mm]	0.3
Beamstrahlung	δ_E [%]	4.3
Luminosity	L [10^{34} cm $^{-2}$ s $^{-1}$]	5.8
Power per beam	$P_b/2$ [MW]	17
Two-linac primary electric power	P_{AC} [MW]	\approx 160