Table 3.5.1.1: US Superconducting Linear Collider: overall parameters

Parameter	Unit	Reference design	Upgrade
Beam Energy	GeV	250	500
RF gradient	MV/m	28	35
Two-Linac total length[a]	km	27.00	42.54
Bunches/pulse		2820	2820
Electrons/bunch	10^{10}	2	2
Pulse/s	Hz	5	5
$\gamma\varepsilon_x$(IP)	μm-rad	9.6	9.6
$\gamma\varepsilon_y$(IP)	μm-rad	0.04	0.04
β_x(IP)	mm	15	24.4
β_y(IP)	mm	0.4	0.4
σ_x(IP)	nm	543	489
σ_y(IP)	nm	5.7	4.0
σ_z(IP)	mm	0.3	0.3
D_y		22.0	17.3
H_D[b]		1.77	1.68
$\mathcal{L}$	$10^{33}\text{cm}^{-2}\text{s}^{-1}$	25.6	38.1
N_γ		1.48	1.58
δ_E	%	3.0	5.9
Average power per beam	MW	11.3	22.6
Peak beam current during pulse	mA	9.51	9.51
Beam pulse length	μs	950	950
Q_{ext} (matched)	10^6	2.95	3.69
Cavity filling time	μs	501	626
External bandwidth (matched)	Hz	440	352
Total number of klystrons		603	1211
Peak beam power per klystron	MW	8.3	8.3
Total number of cavities		18096	29064
Peak beam power per cavity	kW	276	345
Total AC power for RF[c]	MW	87.3	184.3
Total AC power for cryogenics[c]	MW	21.3	73.7
Total AC power[d]	MW	108.6	258.0
Overall AC[d] to beam efficiency	%	20.8	17.5

[a] including overheads and insertions
[b] Vertical waist assumed to be at the IP
[c] Main linacs only
[d] Main linac RF and cryogenics