

FEL Beam Design Parameters	Nominal Operation Mode		Special Operation Mode	
	Long Pulses	Short Pulses	Large Bandwidth	Ultra-Short Pulses
Undulator period (mm)	15	15	15	15
Undulator parameter	1.2	1.2	1.2	1.2
Energy spread (keV)	350	250	17000 (FW)	1000
Saturation length (m)	47	50	50	50
Saturation pulse energy (μJ)	150	3	100	15
Effective saturation power (GW)	2.8	0.6	2	50
Photon pulse length (fs, rms)	21	2.1	15	0.06
Beam radius (μm)	26.1	17	26	17
Divergence (μrad)	1.9	2	2	2.5
Number of photons (×10 <sup>9</sup> )	73	1.7	50	7.5
Special bandwidth, rms (%)	0.05	0.04	3.5 (FW)	0.05
Peak brightness (# photon/mm <sup>2</sup> . mrad <sup>2</sup> . s <sup>1</sup> .0.1% bandwidth)	7.10 <sup>32</sup>	1.10 <sup>32</sup>	8.10 <sup>30</sup>	1,3.10 <sup>33</sup>
Average brightness (# photon/mm <sup>2</sup> . mrad2.s <sup>1</sup> .0.1% bandwidth)	2,3.10 <sup>21</sup>	5,7.10 <sup>18</sup>	3.10 <sup>19</sup>	7,5.10 <sup>18</sup>