

Simulating Inverse Compton Source at Bates Lab

March 17, 2018 2:07 PM

Experimental Parameters

From personal communication, Tables 1 and 2 contain experiment parameters for the inverse Compton source (ICS) at Bates Lab. All of the values reported assume rms, not FWHM.

Quantity	Variable	Value	Unit
Wavelength	λ_0	1030, 515	nm
Duration	T	1.5	ps
Normalized length (rms)	$\tilde{\sigma}$	437	μm
Spot size (rms)	σ_l	10	μm
Energy (per shot)	E	200	mJ
Repetition rate	f_l	1	kHz
Normalized vector potential	a_0	0.06, 0.03	

Table 1: Laser pulse parameters for Bates Lab inverse Compton source.

Normalized length was computed from

$$\tilde{\sigma} = \frac{\sigma_l}{\lambda_0} = \frac{cT}{\lambda_0} = 437. \quad (1)$$

Quantity	Variable	Value	Unit
Energy	E_e	35	MeV
Repetition rate	f_e	1	kHz
Charge	Q	200	pC
Duration	T	500	fs
Relative energy spread	σ_{E_e}/E_e	5×10^{-4}	
Horizontal emittance (normalized)	ϵ_x	1	mm mrad
Vertical emittance (normalized)	ϵ_y	1	mm mrad
Focusing at IP	β^*	3	mm

Table 2: Electron beam parameters parameters for Bates Lab inverse Compton source.