

LIST OF SYMBOLS

Symbol	Details
E_b	Kinetic Energy
m_e	Rest mass of electrons
c	Speed of light in vacuum
e	Charge of electron
V_o	Anode-cathode potential difference
γ_o	Initial relativistic gamma factor
γ_r	Resonant gamma factor
γ	Total relativistic gamma factor
v_o	Initial electron velocity
v_b	Drift velocity or velocity of electron
v_w	Wiggler velocity
P	Momentum of beams
ω_L	Radiation frequency
k_L	Radiation wave number
k_w	Wiggler wave number
λ_L	Radiation wavelengths
λ_w	Wiggler wavelengths
a_w	Wiggler parameter or wiggler constant
F_p	Ponderomotive force
A_p	Ponderomotive Amplitude
v_p	Ponderomotive velocity
n_p	Ponderomotive density
B_w	Wiggler magnetic field
k_p	Ponderomotive wave number
J	Current density
E_L	Electric field
B_L	FEL signal magnetic field
A_L	Amplitude of electric field
A_w	Amplitude of wiggler field
v_L	FEL signal velocity
A	Arbitrary constant
ψ	Phase of the signal

t	Time
p	Momentum of FEL signal
L	Length of interaction chamber
ξ	Normalized length
α	Arbitrary constant
C_1	Arbitrary constant
C	Arbitrary constant
n_o	Initial charge density
n_{op}	Plasma density
ω_p	Plasma electron frequency
η	Electronic efficiency
I_b	Total beam current
ω_{co}	Frequency of electron cyclotron
ϵ_o	Permittivity in free space
ϵ_r	Permittivity in dielectric
ϵ	Total permittivity
χ_b	Susceptibility
Γ	Growth Rate
G	Gain
$\alpha_{stim.}$	Net rate of stimulated emission
$W_{absorp.}$	Upward transition probabilities per atom per unit time
$W_{emiss.}$	Downward transition probabilities per atom per unit time
N_1	Number of electrons in the lower state
N_2	Number of electrons in the upper state
γ_2	Spontaneous emission
A_{area}	Cross-sectional area of an optical wave field
Φ_p	Ponderomotive potential
Φ	Free space charge potential