LIST OF SYMBOLS

Symbol	*Details*
γ	Relativistic factor
α	Pitch factor
r_w	Radius of cavity
r_b	Electron beam radius
r_L	Larmor radius
$v_\perp$	Perpendicular electron velocity
$v_\parallel$	Axialelectron velocity
ω_{cut}	Cutoff frequency of the waveguide
ω_c	Cyclotron frequency
c	Velocity of light in free space
e	Electron charge
m_e	Mass of electron
B_0	DC magnetic field
v_p	Phase velocity of RF wave
v_g	Group velocity of RF wave
T_c	Time taken by an electron beam to complete its one gyration
ω	Angular frequency of the RF wave
s	Harmonic number
m, n, q	Azimuthal, radial, and axial mode indices
$k_\perp$	Transverse propagation constant
$Jm_{()}$	m^{th} order ordinary Bessel function of first kind
C_{mn}	Coupling coefficient
v_{mn}	The n^{th}zero of J (Bessel function)
θ , r, z	Azimuthal, radial, and axial cylindrical coordinates
k_0	Free-space propagation constant
ε_0	Free-space permittivity
μ_0	Free-space permeability
k_c	Cutoff wave number
I	Normalized beam current
I_b	Beam current
$\beta_\perp$	Normalized transverse electron velocity
$\beta_\parallel$	Normalized axial electron velocity
p	Normalized momentum of the electrons
$p_\perp$	Transverse momentum of the electrons
$p_\parallel$	Axial momentum of the electrons

Δ	Detuning parameter
ε	Electron energy
u	Normalized energy of the electron beam
Z	Axial dependence
F	Normalized field amplitude
θ	Phase of electron
P_{in}	Driver power at the input cavity
$\eta_{\perp}$	Transverse efficiency
η	Electronic efficiency
ς	Normalized axial position
V_b	Beam voltage
$k_{\parallel}$	Axial wave number of waveguide mode
ζ	The angle of the electron momentum vector about the gyro-center
ψ	Phase of the RF wave
μ	Normalized length of cavity
E_0	Electric field amplitude in the input cavity
Q	Total quality factor of the cavity
P_{out}	RF output power
μ_d	Normalized length of the drift tube
q	Bunching parameter of the electron beam
r_d	Drift tube radius
L_d	Drift tube length
ρ_{ohm}	Ohmic loss density on the cavity wall
σ	Electrical conductivity of the cavity wall
δ	Detuning between operating frequency and the cold cavity frequency
U_w	Stored energy in the cavity
L	Length parameter of the individual cavity
P	Power in the cavity
V_d	Voltage depression
I_L	Limiting current
χ	Susceptibility
A	Amplitude of the signal
Q_{cpl}	Coupling quality factor
Φ	Normalized gain-bandwidth product
G	Gain
ξ	Stagger-tuning parameter