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LIST OF ABBREVIATIONS

Abbreviation	Full form
HPM	High power microwaves
RF	Radio Frequency
PRF	pulse repetition frequency
DEW	Direct energy weaponry
EM	Electromagnetic
TWT	Traveling wave tube
RBWO	Relativistic backward wave oscillator
MILO	Magnetically insulated line oscillator
GHz	Giga-hertz
MHz	Mega-hertz
GW	Giga-watt
MW	Mega-watt
Ns	Nano-second
RKO	Relativistic klystron oscillator
RKA	Relativistic klystron amplifier
CRM	Cyclotron resonance masers
FEL	Free Electron Laser
SWS	Slow-wave structure
TM	Transverse Magnetic
MW	Mega-watt
SCO	Split cavity oscillator

TE	Transverse Electric
EEE	Explosive electron emission
CTL	Coaxial transmission line
UHF	Ultrahigh frequency
RBF	Relativistic Brillouin flow
VCO	Virtual cathode oscillator
PIC	Particle-in-cell
HEM	Hybrid electromagnetic
HE	Hybrid electric
FFT	Fast Fourier Transform
AC	Alternating Current
DC	Direct Current
TTO	Transit time oscillator
BFMILO	Bi-frequency magnetically insulated line oscillator
TGR	Temporal growth rate
SCW	Space charge wave
Cm	Centimeter
Mm	Millimeter
kV	Kilo-volt
kA	Kilo-ampere
TEM	Transverse Electromagnetic

LIST OF SYMBOLS

Symbol	Details
v_e	Electron velocity
v_p	phase velocity
L_e	Equivalent series inductance per unit length
C_e	Equivalent shunt capacitance per unit length
G_e	Equivalent shunt conductance per unit length
R_e	Equivalent series resistance per unit length
r_c	Cathode radius
r_d	Disc inner radius
r_w	Outer wall radius
L	Periodicity
T	Thickness
E	Electric field
H	Magnetic field
β_n	Axial propagation constant
ω	Angular frequency
γ_n	Radial propagation constant
k	Free space propagation constant
J_0	Bessel functions of 1st kind with zero order
Y_0	Bessel functions of 2nd kind with zero order
ρ_s	Surface charge density
I_z	Axial current
V	Voltage
J_z	Axial current density
c	Speed of light
F	Frequency

A_z	Vector potential
μ	Permeability
ε	Permittivity
I_θ	Azimuthal current
Z_0	Charatecteristic impedance
$f_1\{x, p, t\}$	RF distribution function
ς_n	velocity shifted frequency
Γ_n^*	Radial beam parameter in presence of beam
ω_p	Plasma frequency
Q_{int}	Internal quality factor
Q_{ext}	External quality factor
Q_0	Loaded quality factor
P_0	Initial injected power
ρ	Complex reflection coefficient
L_{IC}	Equivalent series inductance per unit length for Interaction structure
C_{IC}	Equivalent shunt capacitance per unit length for Interaction structure
W_{nm}	Inductance factor
P_{nm}	Capacitance factor
$L_{ch}(z)$	Equivalent series inductance per unit length for tapered choke section
$C_{ch}(z)$	Equivalent shunt capacitance per unit length for tapered choke section
L_{ext}	Equivalent series inductance per unit length for extractor section
C_{ext}	Equivalent shunt capacitance per unit length for extractor section
L_{cx}	Equivalent series inductance per unit length for coaxial section
C_{cx}	Equivalent shunt capacitance per unit length for coaxial section
Z_{IC}	Impedance of interaction structure
Z_{ext}	Impedance of extractor section

$\Gamma(z)$	Nominal propagation constant
$K(z)$	Nominal characteristic impedance
$q_v(z)$	Reflection coefficient at tapered cathode section
$C_{E.G}$	Capacitance of the extractor gap
$E_{E.G}$	Electric field at the extractor gap
$\sigma_{E.G}$	Charge per unit length at extractor
Z_{stub}	Impedance of stub
L_{stub}	Inductance of stub
l_{stub}	Length of stub
λ	Wavelength
λ_g	Guided wavelength
l_T	Length of tapered cathode
$\hat{v}_z$	Axial drift velocity
γ	Relativistic factor
P_z	Axial momentum
n_e	Charge number density
r_e	Electron beam radius
η	Normalized factor
$\delta(r-r_e)$	Delta function
I_A	Alfven current
P_θ	Azimuthal momentum
J_θ	Azimuthal current density
γ_n^*	Radial propagation constant in presence of electron beam
v_{slow_sc}	Slow space charge velocity
f_i	Imaginary value of frequency
f_r	Real value of frequency
I_a	Anode current
I_{cr}	Critical current

B_c	Cut-off magnetic field
V_H	Hull cut-off voltage
V_{BH}	Buneman-Hartee voltage
e	Electron charge
m_0	Electron mass
χ_{np}	Modal root of the nth order Bessel–Neumann combination
dB	Decibel