

Electron-Matter Interactions in TEM: list of symbols and definitions

λ	Electron wavelength (elastic scattering theory) Inelastic scattering mean free path (EELS)
p	Momentum of electron
ψ	Wave function
$\vec{k}$	Wave vector
$ \vec{k} = k = \frac{1}{\lambda}$	
$\vec{k}_0$	Incident wave vector
$\vec{k}'$	Scattered wave vector
$\vec{q} = \vec{k}' - \vec{k}_0$	Scattering vector
h	Planck's constant
$\hbar = \frac{h}{2\pi}$	Reduced Planck's constant
$\vec{q} \cdot \hbar$	Momentum change of scattering
m_0	Rest mass of electron
m	Relativistic mass of electron
e	Magnitude of the charge of the electron
c	Speed of light
v	Speed of electron
E_0	Elastic scattering lectures: high tension/accelerating voltage (V) EELS lectures: energy of incident electron beam (eV)
E_{kin}	Kinetic energy of electron
E_{el}	Total energy of electron
E_{eig}	Energy of wave function eigenstate
ν	Time frequency of electron wave

ω	Angular time frequency of wave function
W	Relativistic total energy of electron
$\hat{H}$	Hamiltonian operator
$\hat{E}$	Energy operator
$\hat{p}$	Momentum operator
$V(\vec{r}, t)$	Potential energy in function of position $\vec{r}$, time t (i.e. potential energy operator)
$\phi(\vec{r})$	Potential distribution of atom or lattice
ϕ_0	Mean potential of a medium/crystal
U_i	Mean inner potential
ρ_n	Charge density of nucleus
ρ_e	Charge density of atomic electrons
a_0	Bohr radius
ϵ_0	Permittivity of free space
n	Refractive index
θ	Scattering semi-angle (diffraction) / Scattering angle (EELS)
θ_B	Bragg angle
$\vec{g}$	Diffraction vector
$\vec{a}, \vec{b}, \vec{c}$	Real space lattice vectors
$\vec{a}^*, \vec{b}^*, \vec{c}^*$	Reciprocal lattice vectors
$(h\ k\ l)$	Crystal plane with Miller indices h, k, l
$[U\ V\ W]$	Lattice vector $U\vec{a} + V\vec{b} + W\vec{c}$
V_c	Volume of the unit cell
σ	Scattering cross-section
Ω	Solid angle