

List of terms and symbols used in this volume

(1) Vector spaces and tensor analysis

Basis vectors in direct space (covariant)	$\mathbf{e}_i, \mathbf{a}_i$
Basis vectors in reciprocal space (contravariant)	$\mathbf{e}^i, \mathbf{a}_i^*$
Contravariant components of vectors in direct space	x^i
Covariant components of vectors in reciprocal space	x_i
Direction indices (of a lattice row)	$[uvw]$
Dual (or reciprocal) space (n dimensions)	E_n (Chapter 1.1)
Element of	\in
Euclidian space, direct space (n dimensions)	E^n
Hermitian conjugate of matrix M	M^+
Integers (positive)	\mathbb{Z}^+
Integers (ring of)	\mathbb{Z}
Kronecker symbol	δ_i^j
Metric tensor	g_{ij}
Miller indices (of a lattice plane)	(hkl)
Nabla operator	∇
Orthogonal transformation	R
Outer product	\wedge
Partial derivative with respect to x_i	∂_i
Permutation tensor	$\varepsilon_{ijk}, \hat{\varepsilon}_{ijk}$
Position vector in reciprocal space	\mathbf{G}, \mathbf{k}
Reciprocal lattice vector	\mathbf{g}_{hkl}
Sum of spaces	\oplus
Tensor of rank n, p times covariant and q times contravariant ($n = p + q$)	$t_{i_1 \dots i_p}^{j_1 \dots j_q}$
Tensor product	\otimes
Transpose of matrix M	M^T
Unit transformation, matrix or element	E
Vector in superspace	\mathbf{a}_{si}
Vector in reciprocal superspace	\mathbf{a}_{si}^*
Vector product	\wedge, \times
Volume element	$d\tau$
Volume of unit cell in direct (reciprocal) space	$V (V^*)$

(2) Group theory

Character	χ
Character (irreducible)	χ_α
Character (value at R)	$\chi(R)$
Class multiplication constants	c_{ijk}
Conjugacy class	C_i
Cyclic group of order m	C_m
Dihedral group of order $2n$	D_n
Dimension of irreducible representation α	d_α
Lattice translation subgroup	$T(n)$
Matrix representation of point group K	$\Gamma(K)$
Multiplicity	m_α
Octahedral group	O
Order of class C_i	n_i
Orthogonal group	$O(n)$
Orthogonal group (special)	$SO(n)$
Physically irreducible representation	$R\text{-irep}$
Point group	K (Chapter 1.2), G_o (Chapter 2.1), G (Part 3)
Point group (order of)	$ K , N$

Representation of point group K	$D(K)$
Space group	G, \mathcal{G} (Part 3)
Tetrahedral group	T

(3) Physical properties

(a) Elastic properties

Bulk modulus (volume isothermal compressibility)	κ
Components of the displacement vector	u_i
Elastic compliances (second-order)	s_{ijkl}
Elastic compliances (second-order adiabatic)	$(s_{ijkl})^\sigma$
Elastic compliances (second-order reduced)	$s_{\alpha\beta}$
Elastic compliances (third-order)	s_{ijklmn}
Elastic stiffnesses (second-order)	c_{ijkl}, C_{ijkl}
Elastic stiffnesses (second-order adiabatic)	$(c_{ijkl})^\sigma$
Elastic stiffnesses (second-order reduced)	$c_{\alpha\beta}$
Elastic stiffnesses (third-order)	c_{ijklmn}
Lamé coefficients	λ
Normal stress	\bar{v}
Poisson's ratio	ν
Pressure	p
Shear stress	$\bar{\tau}$
Strain tensor	S_{ij}, u_{ij} (Chapters 1.4, 1.5 and 3.1), η_{ij} (Chapter 2.3)
Strain Voigt matrix	S_α
Stress tensor	T_{ij}, τ_{ij} (Chapter 1.4), σ_{ij} (Chapters 2.1, 2.3, 2.4)
Stress Voigt matrix	T_α
Velocity of sound	v
Volume	V
Volumic mass	ρ
Young's modulus	E

(b) Electric properties

Charge density	$\rho(\mathbf{r})$
Charge of the electron	e
Current density	$\mathbf{j}(\mathbf{r}), J$
Dielectric impermeability	η_{ij}
Dielectric permittivity or constant	ε
Dielectric permittivity of vacuum	ε_0
Dielectric permittivity tensor	ε_{ij}
Dielectric permittivity tensor (adiabatic)	$(\varepsilon_{ij})^\sigma$
Dielectric susceptibility	$\chi_{ij}^e, \chi_{ijk}^e \dots$
Dielectric susceptibility (n th-order)	$\chi^{(n)}$
Effective mass of the electron	m^*
Electric dipole operator	\hat{p}
Electric displacement	\mathbf{D}
Electric field	\mathbf{E}
Electric polarization	\mathbf{P}
Electric polarization (n th-order)	\mathbf{P}_n
Electric polarization (nonlinear)	\mathbf{P}^{NL}
Electro-optic tensor	r_{ijk}
Electrostriction tensor	Q_{ijkl}
Electrostriction tensor (reduced)	$Q_{\alpha\beta}$
Hall constant	R_H ijk
Piezoelectric tensor	d_{ijk}
Piezoelectric tensor at constant strain	e_{ijk}

