

CH1. Wave Nature of Electron

- Wavelength, phase
- Duality of wave and particle
- Schrodinger Equation
- Uncertainty Principle
- Temporal and spatial coherency
- Coherent Length

CH2. Mathematical tool: Fourier Transform and Convolution

- Periodicity and Frequency Domains
- Fourier Synthesis
- Useful Examples of Fourier Transform
- Convolution Theory
- Useful Example of Convolution
- De-convolution
- Inverse Filter
- Wiener Filter
- Maximum Entropy Deconvolution

CH3. Near-Field and Far Field Diffraction

- Scattering and Diffraction
- Theory of Diffraction
- Fresnel Diffraction

CH4. Interaction of Electron with Crystal

- Interaction of electron with matter
 - Electron-Atom
 - Electron-Unit cell
 - Electron-Specimen
- Imaging mode
 - Focus Beam
 - Parallel Beam
 - Hollow Cone

CH5. Multi-Slice Calculation

- Propagation of Electron Wave inside the Crystal

CH6. Fourier Optics

- Lens Aberrations
- Exit Wave Reconstruction
- Phase Contrast in TEM

CH7. Quantitative Analysis of HRTEM IMAGE

- Determination of Atomic Structure
- Displacement Map
- Compositional Map
- Extension of Resolution
- Atomic Resolution Tomography