

**A** comprehensive overview of X-ray scattering using nano-focused beams for probing matter at the nanoscale is presented. The monograph includes guidance on the design of nano-beam experiments and discusses various sources, including free electron lasers, synchrotron radiation and special laboratory sources.

The rapid progress of this research area was initiated by the availability of brilliant well-collimated synchrotron X-ray sources and is strongly linked to the recent development of state-of-the-art devices now capable to focus hard X-rays. Accordingly, several experimental methods have developed, such as nano-beam based scanning diffraction microscopy and spectroscopy, coherent diffraction imaging, etc. They are used in a broad range of applications in material science, from semiconductor nanostructures to biological specimen.

It therefore seems a good time to give a first résumé on the achievements made, an overview on techniques and applications currently available, and based on that, an outlook on the potential of this approach.

#### From the contents:

- X-ray diffraction principles
- X-ray focusing elements characterization
- Nanobeam diffraction
- Nanobeam diffraction setups
- Spectroscopic techniques using focused beams
- Coherent diffraction
- Coherent limits
- Future developments



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# Contents

**Foreword** IX

**Preface** XI

## **1 Introduction** 1

- 1.1 X-ray Interaction with Matter 1
  - 1.1.1 Transmission of X-ray 1
  - 1.1.2 Diffraction of X-rays 2
  - 1.1.3 X-ray Elemental Sensitivity 5
- 1.2 Diffraction at Different Lengthscales and Real-Space Resolution 5
  - 1.2.1 How to Produce an X-ray Nanobeam 6
  - 1.2.2 Experiments with Nanobeams 7
  - 1.2.3 Coherence Properties of Small Beams 9
  - 1.2.4 Side Issues ? 10
- 1.3 Future Developments 11

## **2 X-ray Diffraction Principles** 13

- 2.1 A Brief Introduction to Diffraction Theory 13
  - 2.1.1 Interference of X-ray Waves 13
- 2.2 Kinematic X-ray Diffraction Theory 17
  - 2.2.1 The Structure Factor 19
  - 2.2.2 The Form Factor 20
  - 2.2.3 Reciprocal Lattice of Nanostructures 22
  - 2.2.4 The Phase Problem 23
- 2.3 Reflectivity 24
- 2.4 Properties of X-ray Beams 27
- 2.5 A Note on Coherence 29
  - 2.5.1 Longitudinal Coherence and Wavelength Distribution 29
  - 2.5.2 Longitudinal Coherence Length 30
  - 2.5.3 Transverse Coherence and Thermal Sources 31
  - 2.5.4 Transverse Coherence Length 32
- 2.6 X-ray Sources 33
- 2.7 Diffraction Measurement: How to Access  $q$  in a Real Experiment 35
  - 2.7.1 Diffraction Geometries 35



2.7.2	Lengthscales	37
<b>3</b>	<b>X-ray Focusing Elements Characterization</b>	<b>39</b>
3.1	Introduction and Context	40
3.2	Refractive X-ray Lenses	42
3.2.1	Characterization of Focusing Elements	44
3.2.2	Spherical Refractive X-ray Lenses	47
3.2.3	Parabolic Compound Refractive Lenses (CRL)	50
3.2.4	Kinoform Lenses	53
3.2.5	Characteristics of the Refractive Lenses	53
3.3	X-ray Mirrors. Reflection of X-rays at Surfaces	56
3.3.1	Reflective X-ray Optics (Kirkpatrick–Baez Mirrors)	56
3.3.2	Capillaries	61
3.3.3	Waveguides (Resonators)	62
3.3.4	Other Reflective Optical Elements	66
3.4	Diffraction X-ray Optics	66
3.4.1	Fresnel Zone Plates	67
3.4.2	Hologram of a Point Object	70
3.4.3	Quantities Characterizing a Binary Zone Plate	72
3.4.4	Multilevel Zone Plate	73
3.4.5	Getting a Clean and Intense Focused Beam with ZPs	74
3.4.6	Bragg–Fresnel Lenses	75
3.4.7	Multilayer Laue Lenses	76
3.4.8	Photon Sieves	77
3.4.9	Beam Compressors	77
3.5	Other X-ray Optics	80
3.6	Measuring the Size of the X-ray Focused Spot	81
3.7	Conclusion	83
<b>4</b>	<b>Scattering Experiments Using Nanobeams</b>	<b>89</b>
4.1	From the Ensemble Average Approach towards the Single Nanostructure Study	89
4.1.1	A Motivation for the Use of Small X-ray Beams	91
4.1.2	Required Focused Beam Properties	94
4.2	Scanning X-ray Diffraction Microscopy	98
4.3	Finite Element Based Analysis of Diffraction Data	103
4.4	Single Structure Inside a Device	110
4.5	Examples from Biology	117
4.6	Recent Experiments: The Current Limits	122
4.6.1	Strain Distribution in Nanoscale Ridges	123
4.6.2	Between Single Structure and Ensemble Average	127
4.7	Outlook	127
4.7.1	Experimental Developments	127
<b>5</b>	<b>Nanobeam Diffraction Setups</b>	<b>131</b>
5.1	Introduction	131



5.2	Typical X-ray Diffraction Setup	132
5.3	Nanodiffraction Setup Requirements	139
5.3.1	Diffraction Setup	140
5.3.2	Restriction of Setup	142
5.3.3	Stability: How to Keep the Beam on the Sample	143
5.3.4	Beating Drifts: More Solutions	147
5.4	Nanobeam and Coherence Setup	148
5.5	Detectors: Pixel and Time Resolution, Dynamical Range	149
5.6	Some Intrinsic Issues	151
5.6.1	Angular Divergence	151
5.6.2	Beam Damage	152
5.7	Sample Environment: Specific Solutions for Nanobeams?	152
<b>6</b>	<b>Spectroscopic Techniques Using Focused Beams</b>	<b>155</b>
6.1	Introduction and Context	155
6.1.1	Requirements of Spectroscopy Compared to Diffraction	161
6.2	Scanning X-ray Microscopy with Various Contrasts	163
6.2.1	Very Specific Contrast Signals	167
6.3	Soft X-rays Used for Imaging with Magnetic Contrast	169
<b>7</b>	<b>Coherent Diffraction: From Phase Sensitivity to Phase Retrieval</b>	<b>177</b>
7.1	Matter in the Light of Coherent X-rays	177
7.1.1	Coherent versus Incoherent Illumination	178
7.1.2	Formalism	179
7.1.3	Typical Coherent Nanofocusing Setup	182
7.1.4	Data Acquisition: From Fourier Space to Direct Space	184
7.2	Exploiting the Phase Sensitivity: Statistical Investigation of Defects in Matter	186
7.3	Encoding the Phase Directly: The Holographic Approach	188
7.3.1	Inline Holography	189
7.3.2	Off-axis Holography	190
7.3.3	Fourier Transform Holography	191
7.4	Support-based Phase Retrieval Coherent Diffraction Imaging	196
7.4.1	Principles	196
7.4.2	Phase Retrieval Algorithms	198
7.4.3	Imaging the Morphology of Nanomaterials	200
7.4.4	Imaging Strain in Nanocrystals	202
7.5	Fresnel Coherent Diffraction Imaging	208
7.6	Ptychography	210
<b>8</b>	<b>Lensless Microscopy Imaging: Context and Limits</b>	<b>217</b>
8.1	Resolution and Sensitivity	217
8.2	Experimental Design	219
8.2.1	Coherence and Flux	219
8.2.2	Sample Environment	222
8.2.3	Stability: Beam, Mechanics	222



8.3	How to Model: Defining the Physics Scheme	223
8.3.1	Illumination Wavefield	224
8.3.2	The Kinematics Approximation	224
8.3.3	Refraction Effects	225
8.3.4	Fresnel versus Far-field Regime	226
8.4	Phase Retrieval Strategies	226
<b>9</b>	<b>Future Developments</b>	<b>231</b>
9.1	Nanobeams: Hopes and Doubts	231
9.1.1	Smaller and Brighter Beams	232
9.1.2	Quality Control	233
9.1.3	Side Issues	234
9.2	Beamlines at Third-generation Synchrotron Sources	235
9.3	The Role of Free Electron Lasers	238
9.4	Conclusion	239
	<b>Abbreviation list</b>	<b>241</b>
	<b>References</b>	<b>245</b>
	<b>Index</b>	<b>265</b>