1. Record Nr. UNINA9910483013903321

Autore	Zdora Marie-Christine
Titolo	X-ray phase-contrast imaging using near-field speckles / / Marie-Christine Zdora
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] Â©2021
ISBN	3-030-66329-9
Edizione	[1st ed. 2021.]
Descrizione fisica	1 online resource (XXI, 337 p. 102 illus., 88 illus. in color.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	538.36
Soggetti	Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Principles of X-Ray Imaging -- Synchrotron Beamlines, Instrumentation and Contributions -- X-ray Single-Grating Interferometry -- Principles and State of the Art Of X-Ray Speckle-Based Imaging -- The Unified Modulated Pattern Analysis -- At-Wavelength Optics Characterisation Via X-Ray Speckle- And Grating-Based Unified Modulated Pattern Analysis -- 3d Virtual Histology Using X-Ray Speckle With The Unified Modulated Pattern Analysis -- Recent Developments and Ongoing Work In X-Ray Speckle-Based Imaging -- Summary, Conclusions and Outlook -- Appendices.
Sommario/riassunto	This thesis presents research on novel X-ray imaging methods that improve the study of specimens with small density differences, revealing their inner structure and density distribution. Exploiting the phase shift of X-rays in a material can significantly increase the image contrast compared to conventional absorption imaging. This thesis provides a practical guide to X-ray phase-contrast imaging with a strong focus on X-ray speckle-based imaging, the most recently developed phase-sensitive method. X-ray speckle-based imaging only requires a piece of abrasive paper in addition to the standard X-ray imaging setup. Its simplicity and robustness combined with the compatibility with laboratory X-ray sources, make it an ideal candidate for wide user uptake in a range of fields. An in-depth overview of the state of the art of X-ray speckle-based imaging and its latest

developments is given in this thesis. It, furthermore, explores a broad range of applications, from X-ray optics characterisation, to biomedical imaging for 3D virtual histology and geological studies of volcanic rocks, demonstrating is promising potential. Moreover, the speckle-based technique is placed in the context of other phase-sensitive X-ray imaging methods to assist in the choice of a suitable method, hence serving as a guide and reference work for future users.