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Quantum Security
Building Quantum-Resilient Digital Platforms for the Future

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As quantum computing advances, ensuring the resilience of critical digital ecosystems and platforms within the Data Economy has become one of today's most important scientific and technological challenges. This book examines the emerging threat that quantum computing poses to digital security and explores three complementary approaches to building quantum-resilient systems.

The first approach focuses on the development and adoption of post-quantum cryptographic primitives and electronic signatures based on mathematical problems for which no efficient classical or quantum algorithms are currently known. The second examines the design and implementation of individual quantum-resistant components and connections that provide mathematically provable levels of robustness.

The third explores a more fundamental transformation: the development and software-hardware implementation of new quantum-mechanical models for digital ecosystems and Data Economy platforms, grounded in the physical principles and laws of quantum mechanics.

Bringing these three perspectives together, the book provides a comprehensive examination of quantum resilience, from post-quantum cryptography and provably secure components to fundamentally new quantum-based architectures. It presents potential solutions to the scientific and technical challenges ahead while offering researchers, engineers, cybersecurity professionals, and technology leaders a framework for understanding and preparing for a quantum-secure digital future.

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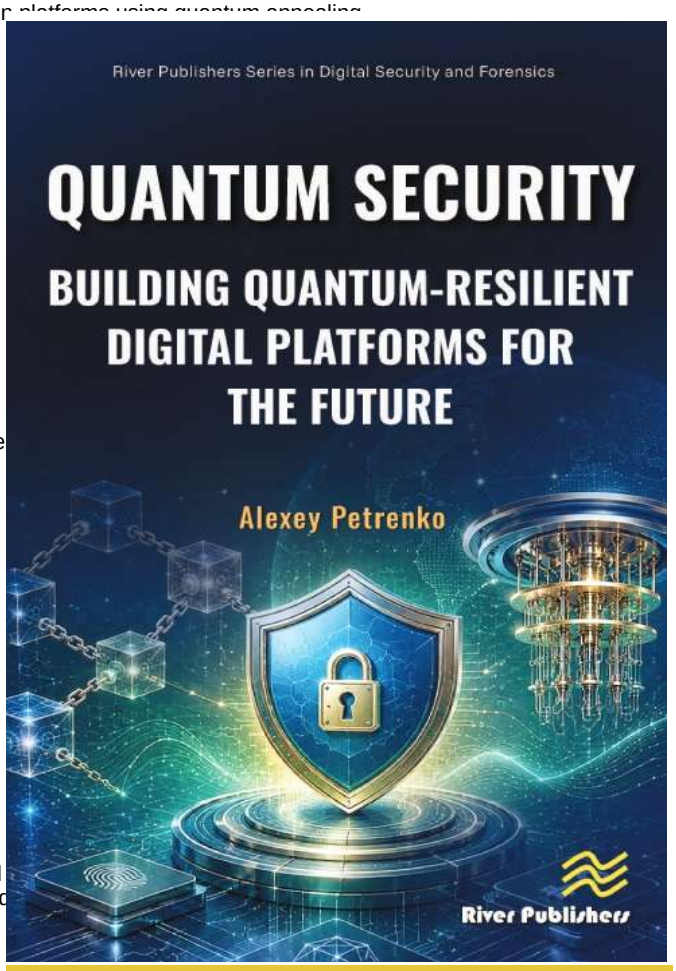

River Publishers Series in Digital Security and Forensics

ISBN: 9788743816409
e-ISBN: 9788743816416
Available From: February 2027
Price: € 132.11

KEYWORDS:
Quantum Security, Quantum-Resilient Digital Platforms, Blockchain and distributed ledger technology (DLT), Quantum resilience, Post-quantum cryptography, Quantum computing, Blockchain security, Cryptographic primitives, Secure digital infrastructures

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