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Autore	LINGARD, John
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Autore	Palacios-Berraquero Carmen
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ISBN	3-030-01482-7
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Descrizione fisica	1 online resource (125 pages)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	621.38152
Soggetti	Quantum computers Spintronics Quantum optics Optical materials Electronics - Materials Surfaces (Physics) Interfaces (Physical sciences) Thin films Quantum Information Technology, Spintronics Quantum Optics Optical and Electronic Materials Surface and Interface Science, Thin Films

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Formato	Materiale a stampa
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Nota di contenuto	Introduction -- 2D-Based Quantum Technologies -- Experimental Techniques -- Deterministic Arrays of Single-Photon Sources -- Atomically-Thin Quantum Light Emitting Diodes -- 2D Quantum Light-Matter Interfaces -- Conclusions and Outlook.
Sommario/riassunto	This book presents the first established experimental results of an emergent field: 2-dimensional materials as platforms for quantum technologies, specifically through the optics of quantum-confined excitons. It also provides an extensive review of the literature from a number of disciplines that informed the research, and introduces the materials of focus – 2d Transition Metal Dichalcogenides (2d-TMDs) – in detail, discussing electronic and chemical structure, excitonic behaviour and response to strain. This is followed by a brief overview of quantum information technologies, including concepts such as single-photon sources and quantum networks. The methods chapter addresses quantum optics techniques and 2d-material processing, while the results section shows the development of a method to deterministically create quantum dots (QDs) in the 2d-TMDs, which can trap single-excitons; the fabrication of atomically thin quantum light-emitting diodes to induce all-electrical single-photon emission from the QDs, and lastly, the use of devices to controllably trap single-spins in the QDs –the first step towards their use as optically-addressable matter qubits.