1. Record Nr. UNINA9910300392103321

Autore	Wasley Nicholas Andrew
Titolo	Nano-photonics in III-V Semiconductors for Integrated Quantum Optical Circuits [[electronic resource] /] / by Nicholas Andrew Wasley
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-01514-1
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (139 p.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	530 621.36/5
Soggetti	Semiconductors Quantum optics Quantum computers Spintronics Lasers Photonics Quantum Optics Quantum Information Technology, Spintronics Optics, Lasers, Photonics, Optical Devices
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Doctoral Thesis accepted by the University of Sheffield, UK.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Introduction -- Experimental methods -- Disorder limited photon propagation and Anderson localisation in photonic crystal waveguides -- On-chip interface for in-plane polarisation transfer for quantum information processing -- Direct in-plane readout of QD spin -- InP QDs in GaInP photonic crystal cavities -- Development of additional technological approaches -- Conclusions and future directions.
Sommario/riassunto	This thesis breaks new ground in the physics of photonic circuits for quantum optical applications. The photonic circuits are based either on ridge waveguides or photonic crystals, with embedded quantum dots providing the single qubit, quantum optical emitters. The highlight of the thesis is the first demonstration of a spin-photon interface using an all-waveguide geometry, a vital component of a quantum optical

circuit, based on deterministic single photon emission from a single quantum dot. The work makes a further important contribution to the field by demonstrating the effects and limitations that inevitable disorder places on photon propagation in photonic crystal waveguides, a further key component of quantum optical circuits. Overall the thesis offers a number of highly novel contributions to the field; those on chip circuits may prove to be the only means of scaling up the highly promising quantum-dot-based quantum information technology.