Quantum Communications (Signals and Communication Technology)

By Gianfranco Cariolaro

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This book demonstrates that a quantum communication system using the coherent light of a laser can achieve performance orders of magnitude superior to classical optical communications

Quantum Communications provides the Masters and PhD signals or communications student with a complete basics-to-applications course in using the principles of quantum mechanics to provide cutting-edge telecommunications. Assuming only knowledge of elementary probability, complex analysis and optics, the book guides its reader through the fundamentals of vector and Hilbert spaces and the necessary quantum-mechanical ideas, simply formulated in four postulates. A turn to practical matters begins with and is then developed by:

· development of the concept of quantum decision, emphasizing the optimization of measurements to extract useful information from a quantum system;

· general formulation of a transmitter–receiver system

· particular treatment of the most popular quantum communications systems?OOK, PPM, PSK and QAM;

· more realistic performance evaluation introducing thermal noise and system description with density operators;

· consideration of scarce existing implementations of quantum communications systems and their difficulties with suggestions for future improvement; and

· separate treatment of quantum information with discrete and continuous states.

Quantum Communications develops the engineering student’s exposure to quantum mechanics and shows physics students that its theories can have practically beneficial application in communications systems. The use of example and exercise questions (together with a downloadable solutions manual for instructors) will help to make the material presented really sink in for students and invigorate subsequent research.

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Editorial Review

Review

“The present book appears as a very nice introduction to quantum communication theories for students of electrical engineering and communication sciences. It also may serve researchers as starting reference to head into new fields of communication theory.” (Gisbert Janßen, zbMATH 1323.81002, 2015)

From the Back Cover

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About the Author

Gianfranco Cariolaro was born in 1936 and graduated in Electrical Engineering at the University of Padova (Italy) in1960. He received the Libera Docenza in Electrical Communication in 1968 and was appointed full professor in 1975. Presently he is Professor Emeritus of Optical and Quantum Communications at the

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