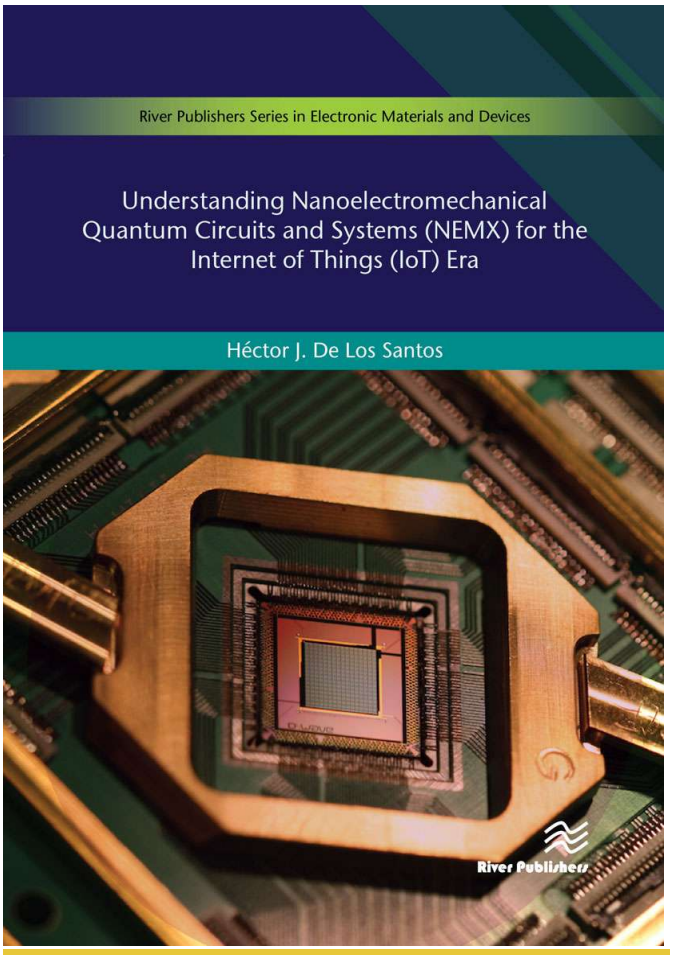
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Understanding Nanoelectromechanical Quantum Circuits and Systems (NEMX) for the Internet of Things (IoT) Era

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The operational theme permeating most definitions of the IoT concept, is the wireless communication of networked objects, in particular, smart sensing devices and machines, exchanging data a la Internet. In this book, a detailed look is taken at the fundamental principles of devices and techniques whose exploitation will facilitate the development of compact, power-efficient, autonomous, smart, networked sensing nodes underlying and encompassing the emerging IoT era.

The book provides an understanding of nanoelectromechanical quantum circuits and systems (NEMX), as exemplified by firstly the uncovering of their origins, impetus and motivation, and secondly by developing an understanding of their device physics, including, the topics of actuation, mechanical vibration and sensing. Next the fundamentals of key devices, namely, MEMS/NEMS switches, varactors and resonators are covered, including a wide range of implementations. The book then looks at their energy supply via energy harvesting, as derived from wireless energy and mechanical vibrations. Finally, after an introduction to the fundamentals of IoT networks and nodes, the book concludes with an exploration of how the NEMX components are encroaching in a variety of emerging IoT applications.



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