

Design and Numerical Modelling of Nanoplasmonic Structures at Near-Infrared for Telecom Applications

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Abstract

Industrial innovation is mostly driven by miniaturization. As a result of remarkable technological advancements in the fields of equipment, materials and production processes, transistor, the fundamental active component in conventional electronics, has shrunk in size. Semiconductor technology is unique in that all performance metrics are enhanced, while at the same time unit prices are reduced. Moore's Law, which predicts that the number of components per chip will double every two years, was established in 1965, and the industry has been able to keep up with this prophetic prognosis since. Thermal management, on the other hand, has become a key limiting factor for current electronic circuits and is set to put a stop to Moore's Law. Given the fact that complementary metal oxide semiconductor (CMOS) scaling is reaching fundamental limits, there are several new alternative processing devices and architectures that have been investigated for both traditional integrated circuit (IC) technologies and novel technologies, including new technologies aimed at contributing to advances in scaling progress and cost reductions in manufacturing operations in the coming decades. These factors will encourage the development of new information processing and memory systems, new technologies for integrating numerous features heterogeneously and new system architectural design layouts, among other things. Energy efficiency is advantageous from a sustainability perspective and for consumer electronics, for which fewer power-hungry components mean longer times between charges and smaller batteries. The creation of novel chip-scale tools that can aid in the transfer of information across optical frequencies and microscale photonics between nanoscale electronic devices is now a possibility. Read the whole thesis on www.miun.se.



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