Physics AT QUEENS COLLEGE

# Colloquium Notice


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## *Future opportunities for nanoelectronics*


The talk will be based on the recent paper [1]. I will give a brief review of the recent research and development of ultrasmall electron devices, including nanoscale field effect transistors (FETs), single-electron transistors (SETs), and some other new devices and nanometer-scalable memory cell concepts. It will be argued that nanofabrication permitting, silicon FETs can be scaled down to ~3 nm gate length, although sub-5-nm devices would be extremely sensitive to random fabrication spreads, and their power consumption would grow very significantly. So far no other device, comparable with the FET in universality, has been found for sub-3-nm operation so far. For example, single-electron transistors, which are scalable to atomic size (below 1 nm), suffer from low voltage gain and high sensitivity to single charged impurities. However, there are several promising ideas for terabit memories and electrostatic data storage, and some exciting prospects of using hybrid SET/FET circuits in new architectures for advanced information processing, including self-evolving neuromorphic networks.



[ 1 ] K. Likharev, in: H. Morkoc (ed.), Advanced Semiconductor and Organic Nano-Technologies, Pt. 1, Academic Press (2002)


Monday
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Starts at 12:15 PM
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