Semiconductor Technology Needs More Science

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Abstract:

The semiconductor industry and the digital technologies that it enables have lifted most other technologies, industries, and even sciences, thereby increasing human's ability to deal with future challenges.
Can they continue to do the same? Unlike most other technologies, semiconductor devices can potentially be still smaller and their production quantity be still larger by orders of magnitude without overwhelming natural resources. The energy consumption of data processing can theoretically still be reduced by orders of magnitude.
But, to realize these potential gains will be very challenging and require the exploration and exploitation of the knowledge of physics, chemistry, and biology to create new nanofabrication technologies and materials, new operational principles of devices, and new computational paradigms. It needs "Nanoelectronics Physics".