The Photon: Spotlight

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On Spintronics

A new class of device based on the quantum of electron spin, rather than on charge, may yield the next generation of microelectronics

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The last half of the 20th century, it has been argued with considerable justification, could be called the microelectronics era. During that 50-year period, the world witnessed a revolution based on a digital logic of electrons.

From the earliest transistor to the remarkably powerful microprocessor in your desktop computer, most electronic devices have employed circuits that express data as binary digits, or bits—ones and zeroes represented by the existence or absence of electric charge. Furthermore, the communication between microelectronic devices occurs by the binary flow of electric charges.

The technologies that emerged from this simple logic have created a multi-trillion dollar per year global industry whose products are ubiquitous. Indeed, the relentless growth of microelectronics is often popularly summarized in Moore's Law, which holds that microprocessors will double in power every 18 months as electronic devices shrink and more logic is packed into every chip.

Yet even Moore's Law will run out. Click here for full story in Adobe PDF

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