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NANOELECTRONICS AND ITS APPLICATION IN FUTURE INFORMATION PROCESSING

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ABSTRACT

With the continuing advance of VLSI technology, the size of individual transistors has been reduced significantly. Today, chips already are made with transistors that have nanometer scale, and are a driving force for nanotechnology. This will continue to be the case for many years in the future. Yet, new and novel silicon nanodevices have appeared and others have been suggested. The behavior of such small devices, with characteristic lengths on the 5-20 nm scale is described by quantum mechanics, and this brings new limitations into play. Even so, there are many novel technologies which are claimed to have a future that will supplant Si as the dominant technology. In this paper, we discuss a number of limitations which suggest that this will not be the case. Moreover, we will examine the needs for new information processing, such as quantum information processing, and set some limitations that may occur when this is eventually implemented in semiconductor technology.