

EEI-KOLLOQUIUM

SiGe BiCMOS Platform: Baseline Technology for More than Moore Process Module Integration

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Future silicon based integrated circuits technology is targeting on reduced transistor dimensions, increased transistor counts and increased operating frequencies. By reaching the nanometer scale region lateral and vertical structures have to be processed which are close to atomic dimensions (ITRS “More Moore” approach). Moreover, emerging research devices and technologies are under investigation to extend the CMOS technology further on or to evaluate solutions for beyond Si CMOS technologies. According to the ITRS the alternative “More Than Moore” approach is targeting on diversification by combining different technologies based on a reasonable scaling level. The paper gives an overview of the “More than Moore” strategy based on examples of IHP’s SiGe BiCMOS technology. SiGe BiCMOS technologies combine high speed SiGe HBTs and computing power of CMOS on a single chip. RF performance of HBTs has been improved a lot over the years reaching half THz now, enabling mm-wave applications like automotive radar (77 GHz), high data rate fiber links (>100 Gb/s), and Gb/s wireless links (60 GHz, 122 GHz). In a “More than Moore” approach the functionality of the BiCMOS technology is extended by integrating optical components (Si Photonics) and MEMS structures. Moreover, the monolithic or hybrid hetero-integration of Si and III/V compound semiconductor technologies are under investigation enabling new System-on-Chip-solutions.