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Carbon nanotubes and graphene nanoribbons for future IC interconnect technology

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Given their physical limits, conventional materials such as copper are expected to fail in meeting many of the requirements for future nanoscale IC interconnects. Due to their outstanding electrical, thermal and mechanical properties, Carbon Nanotubes (CNTs) or Graphene Nano-Ribbons (GNRs) are proposed as innovative interconnect materials.

This presentation will first discuss the first examples of real-world successful integration between such interconnects and CMOS technologies. Then, a simple transmission line model will be presented, to describe the electrical propagation along CNT or GNR interconnects, derived from a semi-classical electro-dynamical model. Referring to the nanointerconnects predicted for the 22nm and 16 nm technology at chip and package level, a performance comparison will be carried out between copper, CNT, GNR and hybrid solutions.

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