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Global Seminar

# Challenges of Compound Semiconductor Nanostructures for Future Applications

**1 March, 2011, 13:30 – 15:00**
**Lecture Hall, Kanri-tou-Building 1F,**
**The Institute of Scientific and Industrial Research (ISIR),**
**Suita-Campus, Osaka University; Ibaraki, Osaka, Japan**

## Speaker


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**Paul-Drude-Institute for Solid State Electronics, Germany**


## Abstract


**With the concept developed 60 years ago [H.Welker, Z.Naturforschg. 7a(1952)744] compound semiconductors, like GaAs, were long considered to be able to replace Si as the dominant semiconductor material in commercial applications. However, today Si remains to be the dominant semiconductor, and the question arises about the future role of compound semiconductor nanostructures in industry.**

**With their direct bandgap and small electron effective mass, many compound semiconductors are indispensible for efficient light emitting devices, IR and UV photodetectors, and solar cells, and they provide superior characteristics in high-speed and high-power transistors. Some of the challenges and bottlenecks associated with these applications will be outlined.**

**We will then discuss the possible incorporation of compound semiconductors in the Si-CMOS roadmap, taking into account the expected huge power requirements of next-generation exaflop/s supercomputers, if current supercomputer designs are simply scaled up. Power constrained scaling of future CMOS chips, optical interconnects for increased IO bandwidths, and memory technologies with reduced energy needs provide ample opportunities for integration of compound semiconductor nanostructures in future information processing devices, chips, and systems.**



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