Compound Semiconductor Based Micro (Nano) Electronics

William Stanchina

Wrap-up of the session

Discussant:
Thomas Swahn

Rapporteur:
Alain Cappy

Wrap-up of the CSIC session

- Existing (e.g. cell phones) and emerging (e.g. Solid State Lighting) market, all provide an environment and infrastructure support that will be helopful as new III-V technologies and capabilities are explored.

- Three trends:
  - Scaling
  - Compound SC integration in silicon technologies
  - Recent III-V nanotechnologies (nanowires)

Wrap-up of the CSIC session

- Four decades of Compound Semicond. technol.
- Ranging from new concepts to mature, well-characterized, foundry technologies with important uses for society.
- Follows scaling laws, but do not challenge CMOS on the digital playground
- Facilitates key building block in systems – ”widening bottlenecks”
- Integrable with CMOS today in systems, long-term potential to evolve into compund-CMOS technologies.

Wrap-up of the CSIC session

- Bandgap engineering = a very versatile toolbox.
- Very high speed performance (f_max 1 THz)
- Very low-power performance when operated at low(er) speed.
- III-V still offers unique possibilities to integrate photonic and electronic funcdtions. Not new, but becoming more doable today!

Wrap-up of the CSIC session

- High-power efficiency and high-power densities for e.g. GaN Power amplifiers
- Lighting, solar cells, power electonics = much broder than ”just” nanoelectronics
- Recent nano-scale III-V structures (nanowires) – potential for new devices and bridging the nano ← → micro technology integration gap (nA → mA)
- Vital field – especially within MtM, expected to continue to evole and play important roles in future systems, due to advantagous properties given by nature and inventive approaches (like band-gap engineering, …)