

Seminar

**High-mobility two-dimensional electron gases in
GaN/AlGaN heterostructures –
From basic research to a competitive device
technology**

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Abstract

High-mobility two-dimensional electron gases in GaN/AlGaN heterostructures – From basic research to a competitive device technology

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Over the past decade significant progress has been made in understanding basic electronic properties of high-quality GaN/AlGaN heterostructures. Growth by molecular beam epitaxy led to 2-dimensional electron gases (2DEGs) confined in GaN/AlGaN heterostructures exceeding mobilities of $160.000\text{cm}^2/\text{Vs}$ [1]. Quantum transport measurements disclosed principal scattering mechanisms [2] and the origin of spin-orbit coupling [3] in these 2DEGs and individually addressable one- and zero-dimensional systems [4,5]. Nowadays GaN-based transistors are promising candidates in commercial high-power and energy-efficiency applications. The talk summarizes the bumpy path from understanding fundamental material properties from the basic research point of view towards the use of GaN in competitive device technologies.

- [1] M. Manfra et al., Appl. Phys. Lett. **85**, 5394 (2004)
- [2] M. Manfra et al., Appl. Phys. Lett. **85**, 5278 (2004)
- [3] S. Schmult et al., Phys. Rev. B **74**, 033302 (2006)
- [4] H.T. Chou et al., Appl. Phys. Lett. **86**, 073108 (2005)
- [5] H.T. Chou et al., Appl. Phys. Lett. **89**, 033104 (2006)