Seminar

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

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Abstract

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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 cm²/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.