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## **NANOSCIENCE COLLOQUIUM**

**Thursday April 18th 2013 at 15:15, K-space, Fysicum**

### **Nanostructures for Energy Device Applications**

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Nanostructured materials offer many potential advantages over thin film epitaxial materials in application to energy devices such as solar cells and light emitting diodes. Ordered arrays of nanorods and nanosheets of various materials grown by catalyst-free selective area growth (SAG) have been explored within the Center for Energy Nanoscience for these applications. Nanorods offer many potential advantages to form multiple bandgap solar cells by expanding the selection of substrate and cell materials that one may be able to integrate owing to the relaxation of lattice matching constraints. They also enable one to achieve full absorption of the solar spectrum with less material use owing to the light guiding, scattering and trapping properties of these arrays. We will describe recent progress in understanding the growth and properties of selectively grown GaAs nanorods and the defects that are formed in them. We will also describe how this understanding has led to the demonstration of stacking - defect - free nanostructures in certain materials. Similarly, highly perfect nanorods and nanosheets in GaN grown by are employed as templates for the growth of InGaN quantum wells that serve as the active regions for visible light emitting diodes. The properties of core-shell nanorod LEDs will also be described.

*This is one in a series of Nanoscience Colloquia, aimed at researchers and students with an interest in nanoscience. They will cover different areas of nanoscience, and are given a couple of times per semester. The series is arranged by the Strategic Research Environment "The Nanometer Structure Consortium at Lund University", "nmC@LU", and part of the Linnaeus grant "Nanoscience and Quantum Engineering", funded by the Swedish Research Council (VR).*



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