

# Special Invitation Talks

**Title : Basic Research on Nanoelectronics: Myanmar-Thailand Connection since 2001**

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## Extended Abstract

Research on solar cells and lasers has been conducted since 1975 at the Semiconductor Device Research Laboratory (SDRL), Chulalongkorn University, and Bangkok, Thailand. Lectures on solar cells and lasers were given at Yangon University in 2001 when the author was invited to be a visiting professor to Yangon University under Distinguished Professor Program of ASEAN University Network (AUN). After 2002, few Myanmar students have come to study Master and Ph.D. programs at Chulalongkorn University in Bangkok, Thailand under AUN/SEED-Net scholarships. They have joined doing basic research on Nanoelectronics at SDRL and spent few months doing research in leading laboratories in Japan. Some of them have returned home after graduation.

Nanoelectronics have been developed by making use of quantum nanostructures in tiny devices. The quantum dots (QDs) grown by Molecular Beam Epitaxy (MBE) are used as key nanostructures in many devices like quantum dot transistors, quantum dot lasers, quantum dot solar cells, etc. Those nanoelectronic and nanophotonic devices have high efficiency and high performance due to zero dimensionality of electron in quantum dots. They can work at high speed and consume very small power.

Various kinds of quantum nanostructures have been fabricated by different MBE growth techniques, like cross hatched quantum dots, quantum dot chains, bi-quantum dots, quadra quantum dots, quantum rings and quantum dot rings. Some of those nanostructures have potentials in working as quantum bits in new computer architecture.

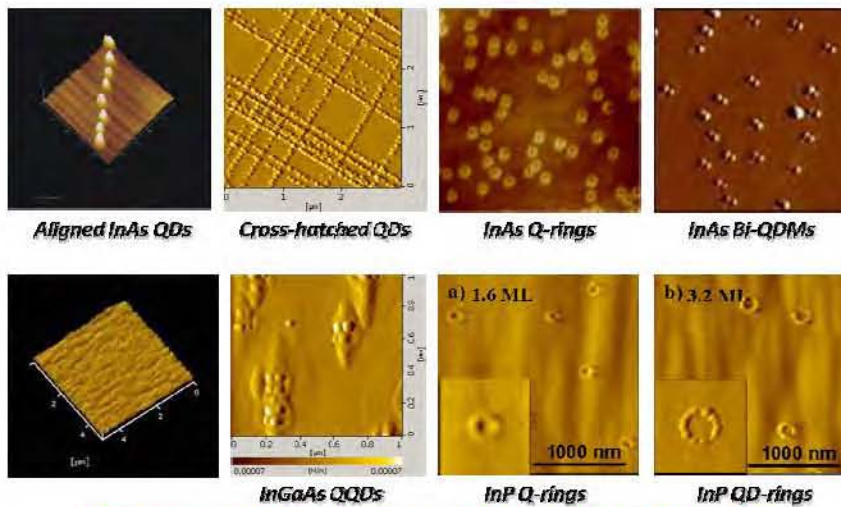
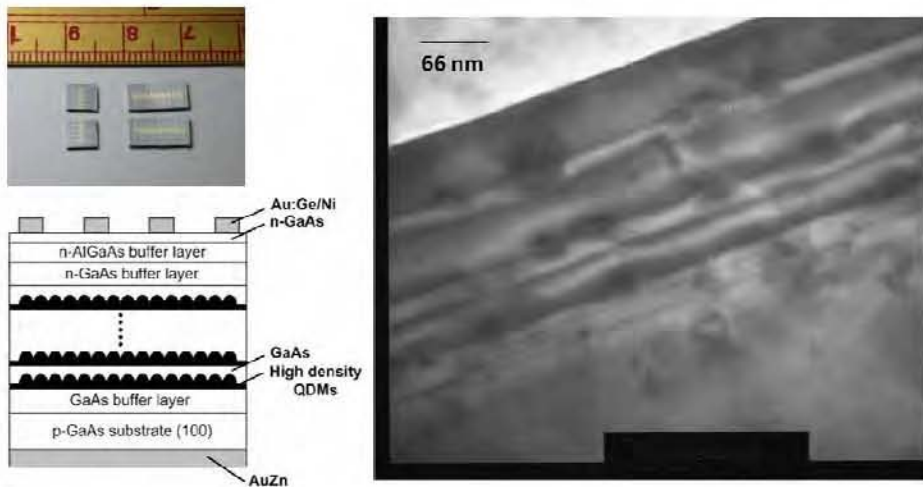
High density quantum dot molecules are used as active part of high performance solar cells which have broader solar response as well as stable performance at high concentration sunlight.

In conclusion, new frontier of basic research in nanoelectronics has been conducted at Chulalongkorn University in Bangkok, Thailand and has become a foundation in scientific human resource development of ASEAN.



***Third generation multi-stack  
HD-QDM solar cells by MBE***





*Various quantum nanostructures (As- and P-based) under investigation at SDRL*