

1st International Workshop on Quantum Nanostructure; Physics and Solar Cell Applications

Special Meeting of Samukawa-Project in CREST

✓ **Date** : February 20 (Fri.), 2015

✓ **Venue** : Meeting Hall, Main Building 3F, University of Miyazaki Library, Miyazaki, Japan
(1-1 Gakuen-Kibanadai-Nishi, Miyazaki 889-2192, Japan)

✓ **Aim** :

Silicon nanostructures have extensively been studied owing to their potential applications in future photovoltaics and optoelectronics. We integrate our concept of physics and engineering in nanoscale techniques with sub 10 nm silicon nanodisks (Si-NDs) for high efficiency intermediate band and multiple-junction solar cells. We are now on a step to form a true quantum dot super lattice (QDSL) structure with 3D array of Si-NDs results controllable bandgap energy, highly optical absorption and conductivity. The aim of this workshop is to offer an opportunity for exchange of current research results on fabrication of quantum nanostructures, application of quantum dot solar cells, new concept for the solar cells using quantum effect, and miniband formation in the quantum structures.

This workshop is co-hosted by with the special Meeting for discussing the outcome of Samukawa-Project in CREST.

✓ **Organizing Committee**

- Seiji Samukawa (Chair), Innovative Energy Research Center, IFS, Tohoku University
- Tetsuo Ikari, Dept. Applied Physics and Electronic Engineering, University of Miyazaki
- Akio Higo, WPI Advanced Institute for Materials Research, Tohoku University
- Atsuhiko Fukuyama, Dept. Applied Physics and Electronic Engineering, University of Miyazaki

✓ **Invited Speakers**

- Prof. Seiji Samukawa, Tohoku University
- Prof. Noritaka Usami, Nagoya University
- Prof. Masakazu Sugiyama, The University of Tokyo
- Prof. Yoshio Honda, Nagoya University
- Prof. Jitsuo Ohta, The University of Tokyo
- Prof. Tomah Sogabe, The University of Tokyo
- Prof. Akio Higo, Tohoku University
- Prof. Toshiuki Kaizu, Kobe University
- Prof. Cedric Thomas, Tohoku University
- Prof. Takayuki Kiba, Hokkaido University
- Prof. Yiming Li, National Chiao Tung University, Taiwan
- Prof. Jean-Francois Guillemoles, IRDEP, France
- Prof. Tetsuo Ikari, University of Miyazaki
- Prof. Atsuhiko Fukuyama, University of Miyazaki

✓ Time Schedule

- February 19 (Thu.), Welcome Reception in the city center of Miyazaki
 - February 20 (Fri.), Workshop, Lunch meeting and Banquet
- ※Oral presentations are 15 minutes in length with an additional 5 minutes for discussions.
- ※The official language of the Workshop is English.

✓ Registration and Fee

This international workshop is open for the public and free of charge. However, we require your information in order to preparing the meals (Welcome Reception, Lunch meeting, and Banquet). Note that the Welcome Reception and the Banquet fees will be charged at the conference site.

✓ Accommodations

We recommend a Hotel located at tachibanadori-nishi or Central Station of Miyazaki as follows. Of course you can book a package tour to Miyazaki. Miyazaki 'Bougainvillea' Airport is about 20 min by taxi from the city center of Miyazaki. JR line can access from the airport to Miyazaki Stations. But the latter is not so frequently (<http://www.miyazaki-airport.co.jp/access.html>).

Hotel list:

Hotel JAL City Miyazaki / Hotel ROUTE INN Miyazaki / APA HOTEL Miyazaki-Tachibanadori
JR Kyushu Hotel Miyazaki / Richmond Hotel Miyazaki-Ekimae etc.

✓ Information

- How to Access to University of Miyazaki
http://www.miyazaki-u.ac.jp/english/contents/locations_map_address/location.html
- Miyazaki Tourist Information
<http://www.kanko-miyazaki.jp/english/index.html>

✓ Contact

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Session I : Physics and Solar Cell Applications of Quantum Nanostructures

Chaired by Tetsuo Ikari, *Univ. of Miyazaki, Japan*, Atsuhiko Fukuyama, *Univ. of Miyazaki, Japan*

10:00-10:05	Tatsuo Suganuma <i>President of Univ. of Miyazaki</i>	Opening remarks
10:05-10:15	Tetsuo Ikari <i>Professor, Univ. of Miyazaki</i>	Univ. of Miyazaki, why do we work on solar cell physics and technology, especially for quantum structures?
10:15-10:35	Yiming Li <i>Professor, National Chiao Tung Univ., Taiwan</i>	(To be determined)
10:35-10:55	Jean-Francois Guillemoles <i>Co-Director, CNRS-RCAST, The Univ. of Tokyo, Japan / IRDEP, France</i>	Evidence of hot carrier solar cell operation in III-V heterostructures
10:55-11:15	Masakazu Sugiyama <i>Associate Professor, The Univ. of Tokyo, Japan</i>	Carrier transport in InGaAs/GaAsP superlattice solar cells
11:15-11:35	Atsuhiko Fukuyama <i>Associate Professor, Univ. of Miyazaki, Japan</i>	Study of miniband formation in InGaAs/GaAsP superlattice solar cells by photoreflectance, surface photovoltage, and piezoelectric photothermal spectroscopies
11:35-11:55	Yoshio Honda <i>Associate Professor, Nagoya Univ., Japan</i>	In-situ monitoring of InGaN/GaN hetero-epitaxy by MOVPE
11:55-12:15	Jitsuo Ohta <i>Research Associate, IIS, The Univ. of Tokyo, Japan</i>	Group III nitride devices prepared by pulsed sputtering deposition
12:15-12:35	Noritaka Usami <i>Professor, Nagoya Univ., Japan</i>	Control of geometry in silicon-based photonic nanostructures coupled with quantum dots and their photovoltaic applications

★Lunch meeting (12:45-14:00 at Main Conf. Room of Faculty of Engi.)

Session II : Special Meeting of Samukawa-Project in CREST

Chaired by Akio Higo, *Tohoku Univ., Japan*, Takayuki Kiba, *Hokkaido Univ., Japan*

14:20-14:50	Seiji Samukawa <i>Professor, IFS, Tohoku Univ., Japan</i>	Control of Quantum Effect in 3D Nano Structure to Develop New Functions Using Bio-template and Ultimate Top-down Etching
14:50-15:10	Cédric Thomas <i>Assistant Professor, IFS, Tohoku Univ., Japan</i>	Top-down approach for III-V nanostructure fabrication: a case study from GaAs based quantum dots
15:10-15:30	Takayuki Kiba <i>Postdoctoral Researcher, Hokkaido Univ., Japan</i>	Spin dynamics in GaAs nanodisks fabricated by neutral-beam etching using bio-templates
15:30-15:50	Toshiuki Kaizu <i>Research Associate, Kobe Univ., Japan</i>	Regrowth and photoluminescence measurements of GaAs nanodisks fabricated by neutral beam etching
15:50-16:10	Akio Higo <i>Assistant Professor, WPI, Tohoku Univ., Japan</i>	Top-down fabricated Quantum Nanodisks Optical Device
16:10-16:30	Tomah Sogabe <i>Project Associate Professor, The Univ. of Tokyo, Japan</i>	Recent progress on high efficiency and low cost quantum dot intermediate band solar cell
16:30-16:35	Seiji Samukawa	Closing remarks

★Banquet (19:00~ at the center city of Miyazaki)