

# **Seminář odd. 26**

## **Tenkých vrstev a nanostruktur**

*Fyzikální ústav AVČR, Cukrovarnická 10, Praha 6*

*datum: 1. 3. 2013 pátek*

*čas: 13:00*

*místo: knihovna, budova A, 1.p.*

**TÉMA**

### **Toward highly efficient Si solar cells using Ge/Si heterostructures**

**Takeshi Tayagaki**

**Institute for Chemical Research, Kyoto University, Kyoto, Japan**

Recently, solar cells using quantum dots (QDs) have been proposed and extensively studied. However, so far, all reported experimental efficiencies of QD solar cells have been less than those of the best single-junction devices. One of the most critical problems is a lack of understanding of the carrier dynamics, especially, the carrier extraction mechanism from QDs. Ge/Si heterostructures are a material system compatible with the standard Si processing technology and provide a unique opportunity to investigate the carrier dynamics. In this talk, we present some results of the investigation of carrier extraction efficiencies based on photocurrent measurements in Ge/Si QD layers inserted in a Si solar cell [1,2]. In addition, we also report studies on the recombination dynamics of high-density photocarriers in Ge QDs in Si crystals performed using time-resolved near-infrared photoluminescence (PL) measurements [3].

[1] T. Tayagaki, et al., Appl. Phys. Lett. 101, 133905 (2012).

[2] N. Usami, T. Tayagaki, et al., Nanotechnology 23, 185401 (2012).

[3] T. Tayagaki et al., J. Phys. Soc. Jpn. 81, 064712 (2012).

odborný garant: *RNDr. Antonín Fejfar, Csc.*