

# TAKAHASHI LAB.

## [Nano-probing Technologies]

Centre for Interdisciplinary Research on Micro-Nano Methods

Nano-electronics

Department of Electrical Engineering and Information Systems

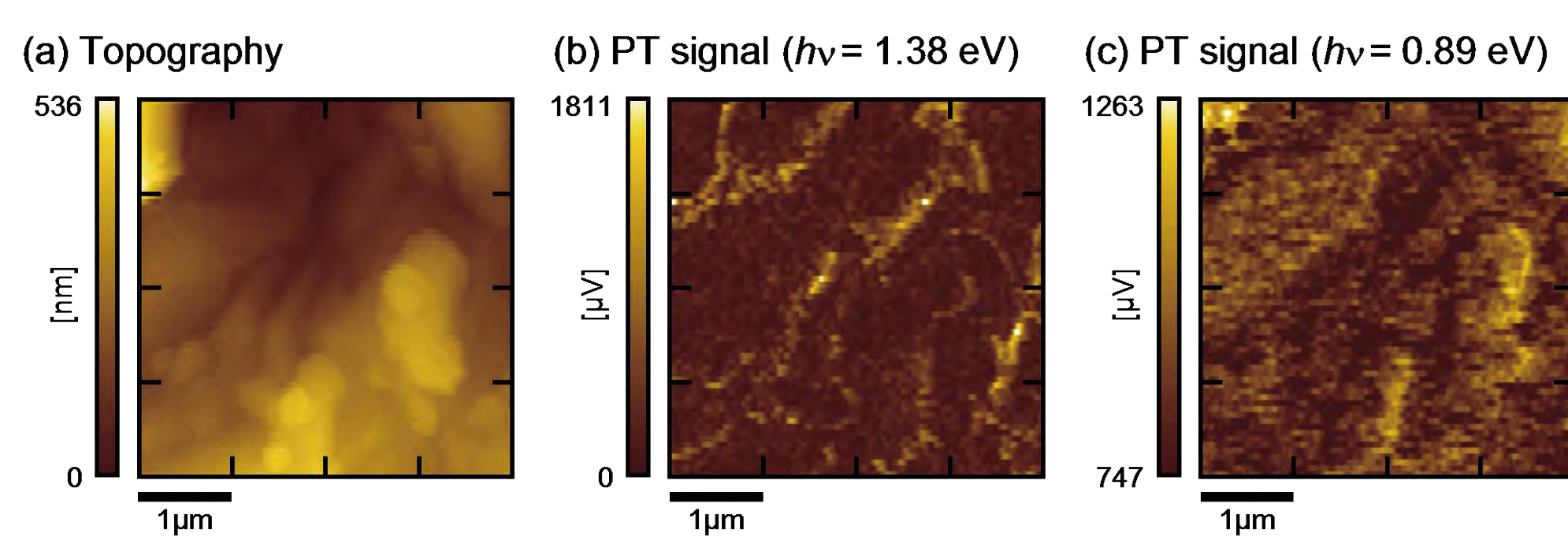
<http://www.spm.iis.u-tokyo.ac.jp>

### Development of novel nano-probing technologies and nano-scale characterization of nano-materials for future device application

We aim at investigating electronic and optical properties in various nano-materials by means of nano-probe methods such as scanning tunneling microscopy (STM), atomic force microscopy (AFM), and related ones.

#### ◆ Characterization of Solar Cell Materials

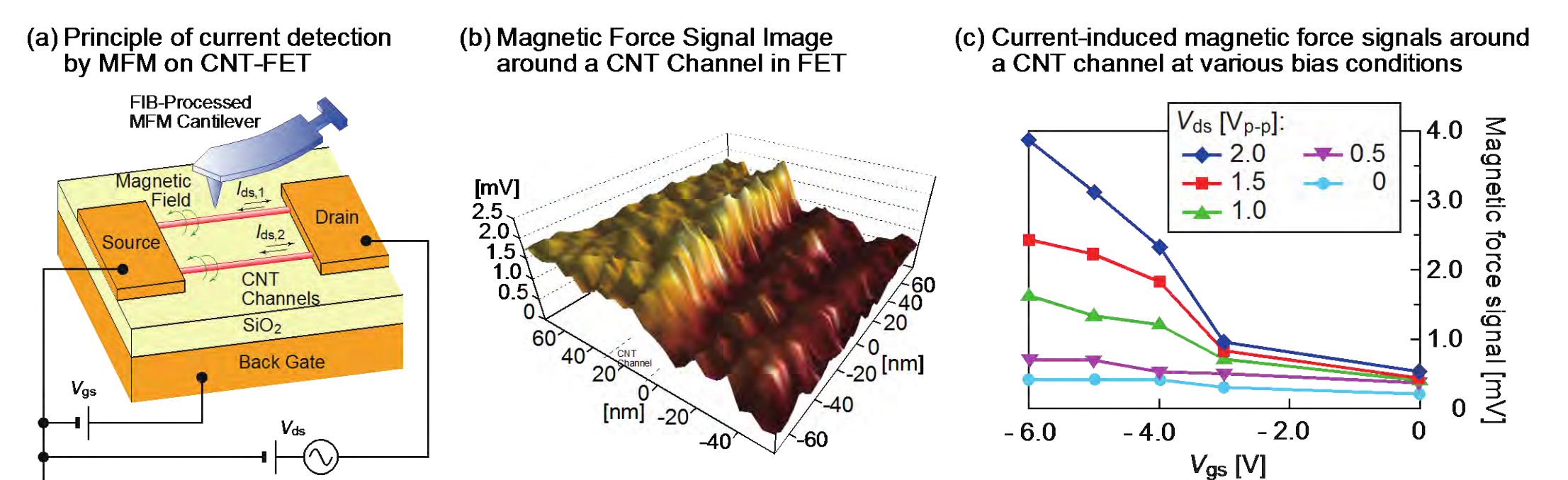
- Photovoltaic properties and minority carrier dynamics
- Photothermal spectroscopy by AFM



Images of topography and photothermal signals on CIGS solar cell

#### ◆ Characterization of Carbon Nanotube FETs

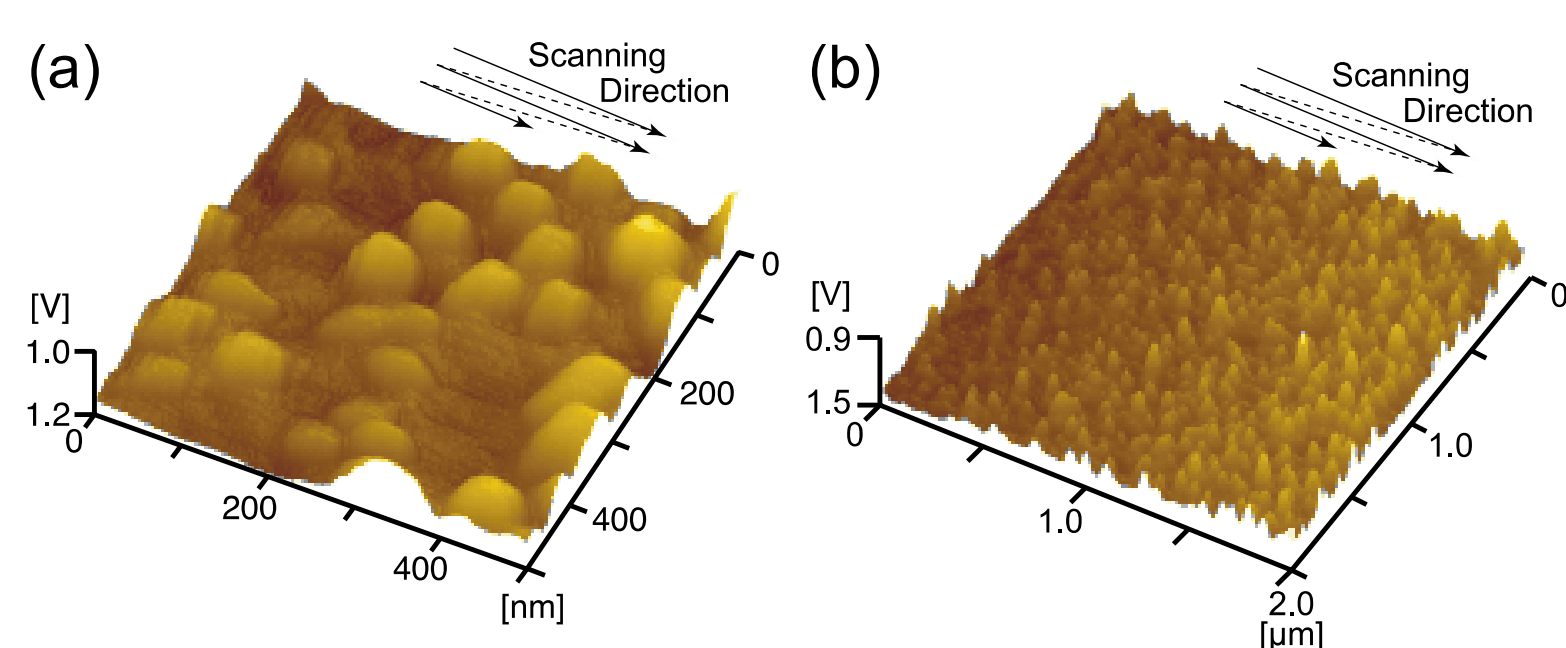
- Current detection by magnetic force microscopy (MFM)



Channel properties in CNT-FET examined by current-induced magnetic force measurements by MFM

#### ◆ Development of Novel SPM Methods

- Fast imaging in AFM
- Novel operation methods for high performance SPMs



Topographic images of InAs quantum dots observed by fast mode AFM

#### ◆ Physics in Quantum Nanostructure

- Observation of physical phenomena in low-dimensional semiconductors

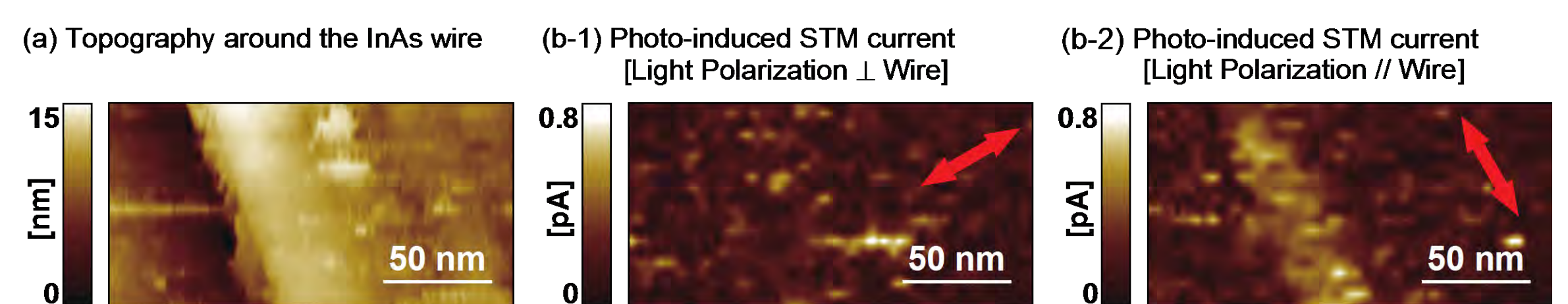
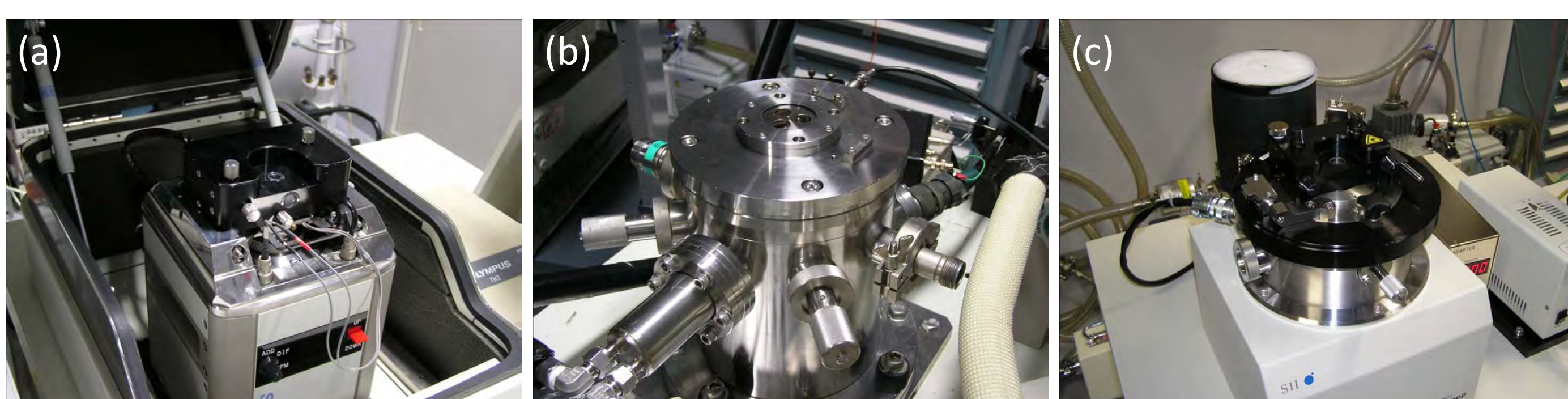


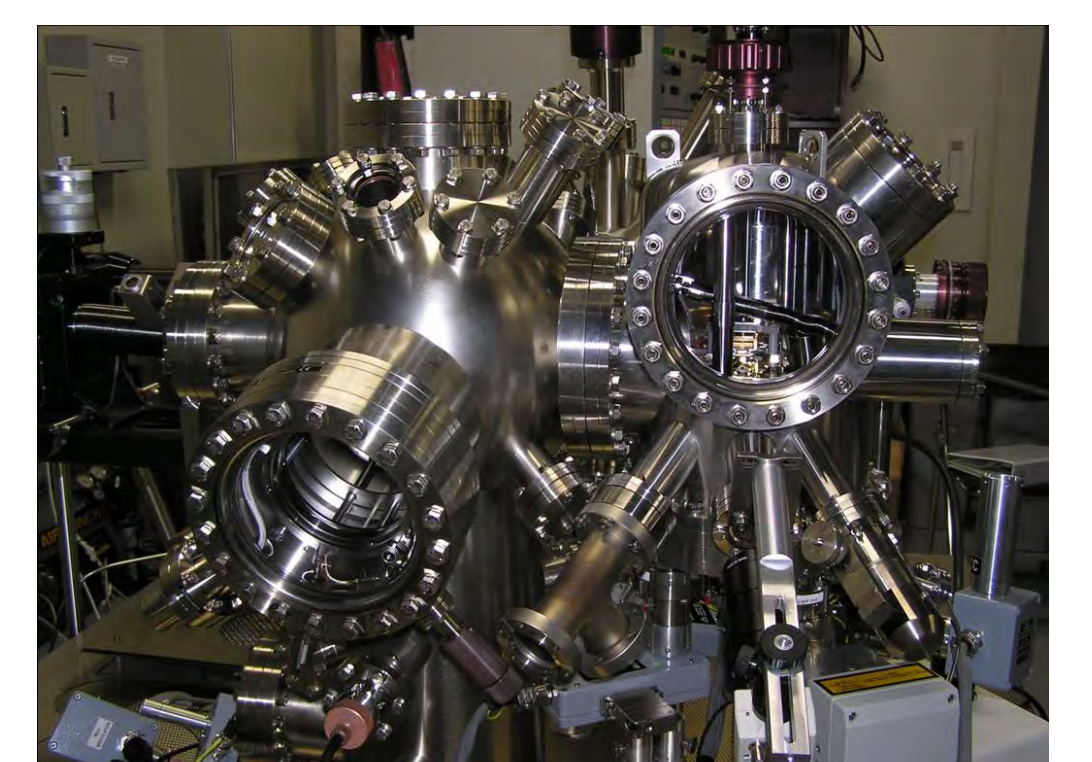
Photo-induced current signals on InAs wire structures observed by STM under light illumination



Multi-functional SPM equipments: (a) air type, (b)/(c) high vacuum and variable temperature type



Tunable Ti:Al<sub>2</sub>O<sub>3</sub> laser with solid state green laser



Variable temperature SPM in ultra-high vacuum