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最先端融合科学イノベーション教育研究コンソーシアム (CIAiS)

# “Charge Cinematography – Making movies of electrons in motion across semiconductor heterostructures”

**Prof. Keshav Dani**

**(Okinawa Institute of Science and Technology  
Graduate University (OIST))**

日時：平成29年2月22日(水) 14:00-15:30

場所：東京大学理学部1号館2階201A

## Abstract

Time Resolved photoemission microscopy combines the high temporal resolution of pump-probe techniques with the high spatial resolution of electron microscopy, there by allowing the visualization of electron transport and dynamics in solid state systems at the nano-, femto-scale. In this talk, I will discuss our recent results in imaging electron dynamics in semiconductor structures. In a type-II heterostructure, we image the highly non-equilibrium distribution of electrons in space and energy at the instant of photoexcitation, and thereafter, make a movie of their redistribution in space as they move towards equilibrium. In other words, we record the fundamental operation of photoactive semiconductor devices, like solar cells, on the femtosecond timescale [1]. In a p-doped GaAs semiconductor, we image the electron dynamics within a photoexcitation spot – a region inaccessible with optical experiments, wherein we see unexpected and complex non-equilibrium behavior.

Time permitting, I will end with a brief overview of other activities of my group at the newly established Okinawa Institute of Science and Technology (OIST) in Okinawa, Japan.

## References

[1] Man, M., et al., Nature Nanotech. 12, 36-40 (2017)

紹介教員: 田丸博晴特任准教授 (フォトンサイエンス研究機構)

本件連絡先: [office@psc.t.u-tokyo.ac.jp](mailto:office@psc.t.u-tokyo.ac.jp)

