

## **Abstract of Presentation**

### **Presentation Title:**

Imaging carrier dynamics in nanoscale potential landscapes by laser-combined scanning tunneling microscopy

### **Abstract :**

“Smaller” and “Faster” are the key factors in nanoscale science and technology. Important and interesting phenomena in various systems, such as functional materials, electronic devices, signal transfer in biosystems, and chemical reactions, are observed from the several tens of nanometers to the single-molecule range in space and from the several tens of picoseconds to subpicosecond range in time. With the size reduction in structures, the difference in the electronic properties, for example, due to the structural nonuniformity in each element, has an ever more crucial influence on macroscopic functions. And the direct observation of the characteristics, which provides us with the basis for the macroscopic analysis of the results, is of great importance. Thus, for further advances, a method of exploring the transient dynamics of the local quantum functions in organized small structures is eagerly desired.

By combining ultrashort pulse laser technology with scanning tunneling microscopy, ultimate spatial and temporal resolutions were simultaneously realized. Time-resolved tunneling current provides the information of nanoscale carrier dynamics which has been analyzed only by the optical pump-probe technique as the average spectra over the light-spot area. Carrier dynamics modulated in nanoscale potential landscapes were imaged in real space.