69th RAP Seminar

The 69th Seminar on RIKEN Center for Advanced Photonics

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Title: **Laser-combined STM and its applications: new microscopy techniques for nanoscale science**

光励起STMの開発と応用

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With size reduction, the variations in the electronic properties of materials and devices, for example, those caused by the structural nonuniformity in each element, have an ever increasing effect on macroscopic functions. For further advances in nanoscale science and technology, therefore, the development of a method for exploring the transient dynamics of local quantum functions in organized small structures is important. Since the invention of scanning tunneling microscopy (STM), addition of high time-resolution to STM has been one of the most challenging issues. One of the successful approaches is to combine STM with optical pump-probe (OPP) techniques using ultrashort-pulse lasers. Recently, based on the carrier-envelope-phase (CEP)-controlled laser technologies, a new microscopy technique, THz-STM, has been developed. The use of tip-enhanced monocycle pulses has enabled taking a snapshot of ultrafast dynamics. In my talk, I would like to introduce the laser-combined STM techniques we have been developing these years.

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