Optical Pump-probe Multiprobe Scanning Tunneling Microscopy on Transient Carrier Dynamics in Semiconductors

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We have developed Optical Pump-probe Multiprobe Scanning Tunneling Microscopy (OPP-MPSTM) technique, which enables time-resolved analysis of carrier dynamics including even anisotropic transport characteristics. Based on the previously developed femtosecond-laser-based OPP-STM system[1], a nanosecond-laser-based version has been adopted for a broad applicability. This technique, though its temporal resolution is limited by the pulse width of nanosecond laser system (5ns in current case), it is user- and budget-friendly, and most importantly, the compact design makes it convenient to combine with MPSTM system, to study carrier dynamics at nanoscale on 2D materials with acceptable temporal resolution. We carried our measurements on carrier relaxation processes in semiconductors such as GaAs and WSe_2, and details will be discussed at the conference.

References:

1). Y. Terada, et al. *Nature Photonics 4*, **12**, 869-874, 2010.