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Scope of Research

Our research interest is to understand optical and quantum properties of nanometer-structured materials and to establish opto-nanoscience for creation of innovative functional materials. Space- and time-resolved laser spectroscopy is used to study optical properties of semiconductor quantum nanostructures and strongly correlated electron systems in low-dimensional materials. The main subjects are as follows: 1) investigation of optical properties of single nanostructures through the development of a high-resolution optical microscope, 2) ultrafast optical spectroscopy of excited states of semiconductor nanostructures, 3) photophysics of solar cell materials, and 4) engineering material properties with lights.



KEYWORDS

Femtosecond Laser Spectroscopy	Single Photon Spectroscopy
Quantum Dots	Perovskites
High Harmonic Generation	

Recent Selected Publications

Zhang, Z.; Kanega, M.; Maruyama, K.; Kurihara, T.; Nakajima, M.; Tachizaki, T.; Sato, M.; Kanemitsu, Y.; Hirori, H., Spin Switching in $\text{Sm}_{0.7}\text{Er}_{0.3}\text{FeO}_3$ Triggered by Terahertz Magnetic-Field Pulses, *Nature Mater.*, doi: 10.1038/s41563-024-02034-4 (2024).

Nakagawa, K.; Mao, W.; Sato, S. A.; Ago, H.; Rubio, A.; Kanemitsu, Y.; Hirori, H., Hot Electron Effect in High-Order Harmonic Generation from Graphene Driven by Elliptically Polarized Light, *APL Photonics*, **9**, 076107 (2024).

Sekiguchi, F.; Narita, H.; Hirori, H.; Ono, T.; Kanemitsu, Y., Anomalous Behavior of Critical Current in a Superconducting Film Triggered by DC plus Terahertz Current, *Nature Commun.*, **15**, 4435 (2024).

Maruyama, K.; Zhang, Z.; Takumi, M.; Satoh, T.; Nakajima, M.; Kanemitsu, Y.; Hirori, H., Tesla-Class Single-Cycle Terahertz Magnetic Field Pulses Generated with a Spiral-Shaped Metal Microstructure., *Appl. Phys. Express*, **17**, 022004 (2024).

Hirori, H.; Sato, S. A.; Kanemitsu, Y., High-Order Harmonic Generation in Solids: The Role of Intraband Transitions in Extreme Nonlinear Optics, *J. Phys. Chem. Lett.*, **15**, 2184-2192 (2024).