90th RAP Seminar

The 90th Seminar on RIKEN Center for Advanced Photonics

Language: Japanese

Date: **June 20 (Fri), 16:20 - 17:20, 2025**

Location: **W319, 3F, Cooperation Center, Wako Campus, RIKEN**

（理研 和光キャンパス 研究交流棟 3階会議室 W319）

Title: **New Horizons in Physical Chemistry via Quantum-Optical Approaches**

量子光学アプローチによる物理化学の新展開

Speaker: **Prof. Akihito Ishizaki**

Department of Chemistry, School of Science, The University of Tokyo

石崎　章仁

東京大学 大学院理学系研究科化学専攻 教授

Quantum-entangled photon pairs have emerged as powerful tools for advanced spectroscopy. Their non-classical correlations have already enabled remarkable feats such as infrared spectroscopy using visible light and sub-shot-noise absorption measurements. As quantum-optical technologies continue to advance, the prospect of harnessing these correlations not only for steady-state absorption but also for time-resolved and nonlinear spectroscopies is becoming increasingly realistic, reigniting theoretical interest in their broader potential.

In this talk, I will present our recent theoretical investigations into time-resolved spectroscopy with entangled photons. We demonstrate that even under continuous-wave pumping, the non-classical correlations between entangled photons can directly access time-resolved spectral information—without the need for ultrafast laser pulses. Furthermore, entanglement-induced pathway selectivity enables the isolation of specific nonlinear response contributions, significantly simplifying the interpretation of complex spectroscopic data. Finally, I will discuss how these advantages can be practically realized using currently available photon-detection technologies.

Pre-registration

Contact: kobata@riken.jp (ext. 98-24239)