

42nd RAP Seminar

The 42nd Seminar on RIKEN Center for Advanced Photonics

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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: **Raman microscopy beyond the limit**

限界を超えるラマン顕微鏡

Speaker: **Prof. Katsumasa FUJITA**

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Raman spectroscopy provides information about molecular and lattice vibrations in a sample and has been utilized as a powerful analytical technique in a wide range of the research including material science and medicine. However, the application of spontaneous Raman scattering to imaging was limited due to the long exposure time required due to the small scattering cross-section. In our research, we have developed Raman microscopy techniques with improved image acquisition speed and the spatial resolution and expanding the application of Raman imaging in biological and material sciences. Our microscope detects hundreds of Raman spectra simultaneously from a sample to improve the imaging acquisition speed, and we have applied the microscope to label-free imaging molecular dynamics in cell mitosis and apoptosis and small molecules imaging using Raman tags. Due to the weak signal in Raman spectroscopy, the improvement of the spatial resolution of Raman imaging is also a challenging task. We introduced structured illumination technique into our Raman microscope and demonstrated high-resolution Raman imaging of carbon materials and biological tissues. We also explored to improve the spatial and spectral resolution in coherent anti-Stokes Raman scattering (CARS) microscopy. We confirmed that nonlinear Raman signal induced by saturation can be used to improve the spatial and spectral resolution in coherent Raman microscopy.