

4th Photonics Seminar

Date

2019.4.12 (Fri.) 15:00~16:00

Place

Rm213, Photonics Center, Osaka University

Title

「Chiral photonics and hot electron generation
(カイラルフォトンクスとホットエレクトロンの生成)」



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Abstract:

Manipulating the polarization state and intensity of light are critical to control the light-matter interaction. On the one hand, originating from the spin of photon, chiral photonics plays a vital role in fields of circular dichroism spectroscopy, optical nanocircuits, photonic spin Hall effect based precise measurement, and photochemistry. On the other hand, plasmon-mediated hot electrons (HEs) is an ultrafast optical excitation process, resulting in the improvement of the incident photon to converted electron (IPCE) ratio in photovoltaics and the promotion of injection rates at the interface between metallic nanocrystals and adsorbates. Three topics are included in this talk, firstly, nanoscale three dimensional metallic “superstructures” are synthesized by DNA-origami assembly, in contrast to static structures, the dynamic superstructures are more favorable for the application of circular dichroism spectroscopy. Secondly, some calculation results on the broadband generation of HEs are shown and evaluated, in order to analyze the impact induced by various of nanostructures and materials. Lastly, polarization-sensitive photochemistry is proposed as the new concept, which combines chiral photonics and HEs. Chiral plasmonic template can be designed towards chirality-dependent HEs mediated photochemistry, suggesting some interesting applications in polarization-sensitive photochemistry, chiral recognition or separation, and promoting chiral crystal growth at the nanoscale.



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